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SD-WM-DP-057

105-KE FILTER BACKWASH PIT TRANSFER CHANNEL DATA PACKAGE

SECTION 1 OF 2

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ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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222-S ANALYTICAL LABORATORY

Project: 105-KE FILTER BACKWASH PIT (SFBWP) TRANSFER CHANNEL

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Employee payroll numbers have been eliminated from this data package to protect the privacy of WHC employees. The elimination of these numbers in no way compromises the integrity of the raw data or information contained herein.

K. K. Giamberardini 10-13-93

K. K. Giamberardini, Manager
Laboratory Data Management

Date

NARRATIVE

105-KE BASIN SAND FILTER BACKWASH PIT (SFBWP) TRANSFER CHANNEL NARRATIVE

1.0 INTRODUCTION

Data for the Sand Filter Backwash Pit (SFBWP) transfer channel samples are being reported in accordance with **WHC-SD-NR-PLN-013**, which provides the strategy and methods to be used to sample and analyze the sludge on the floor of the 105-KE Irradiated Fuel Storage Basin Sand Filter Backwash Pit and transfer channel. The primary goal of this activity is to provide characterization data of the solid residual materials from the 105-KE Basin sand filtering process as the materials have accumulated in the SFBWP.

2.0 SAMPLES

Of the ten samples which arrived at the lab on 9/15 and 9/16/93, four were understood to have come from the KE backwash pit transfer channel itself; namely S3059-05, S3059-06, S3059-07, and S3059-08. These samples arrived in one jar each. All samples in their jars were easily identified by the sample numbers above, and all jar contents appeared to contain the materials expected; namely varying amounts of sand, brown "mud", and water, accompanied by significant radiation fields. The sand was on the bottom, followed by mud, then water. The water was clear, and its interface with mud sharp and level. The samples could be moved about carefully without disturbing this interface.

3.0 SAMPLE PROCESSING

3.1 Consolidation

Since these samples were already each in a single jar, there was no need to consolidate sample fractions, as was necessary for other samples in this campaign.

3.2 Settling

The sludge samples contained sufficient excess water to permit sample suspension. Each sludge sample was shaken to suspend the sludge, then placed on a level surface and twisted back and forth a few times to level the sand layer, then left still to settle. Tamper tape was applied to the jars to assure no disturbances. The settling time for these samples was 117 hours.

After settling, marks were made on each consolidation jar opposite the top of each discernible sludge layer. In S3059-08, there appeared to be one sand layer and two mud layers, consisting of a "coarse" mud having a darker brown color, and a "fine" mud on the very top of the sludge having a lighter brown color. None of the other samples had more than one sand layer; sample S3059-05 had no definite sand layer (though a small amount was shown to be present upon digestion). Only S3059-08 had two mud layers, the other samples had only one discernable mud layer.

The top mud layers in the settled samples were generally mounded in the center. Sample S3059-05 settled sludge was by exception level across the top layer.

After marks were made delineating the levels of each sludge layer in the samples, the marks were overlaid with clear tape for their protection. It was estimated by eye that the uncertainties in making the sludge level marks, combined with sludge surface mounding, would be equivalent to an approximately 10 mL uncertainty in determining sludge volume.

3.2 Sludge Volumes, Weights and Digestions

The radiation fields from the sludges by themselves did not warrant their being processed in a hot cell, however, the fear that dried sludge material would release large amounts of mobile alpha contamination dictated that further processing would be in the 1E-1 hot cell.

It was observed that the sludge layer settled an additional 3 to 5 millimeters between the time the excess water was drawn off the settled sludge and the time the samples were loaded into the hot cell (about one day).

Work with other samples soon showed that the hot cell was not necessary. Therefore these four samples were removed to Room 1GA and processed further in hoods there.

The drying vessels for these samples were 500 mL PTFE beakers with PTFE "watchglass" covers and PTFE standoffs (to allow venting). In turn, each sludge sample was weighed in its settling jar, then the jar was opened and the excess water was pipetted off. Next, the sludge was rinsed out of its settling jar into a tare weighed drying beaker using lab deionized water, to be dried at hot plate setting 1½ - 2 to constant weight.

Each empty consolidation jar was cleaned out by rinsing, swabbing with towels and drying in the hood draft. Its tare weight was taken, then it was weighed again with laboratory water added up to each of the sludge levels previously marked in order to provide data for sludge volume calculations.

Once dried, the solids were mixed and split for archiving and digestion. The digest portion, approximately 10 grams, was weighed in the same 500 mL PTFE beaker, approximately 10 grams. Samples S3059-05 and S3059-06 had fewer than 10 grams of net dried solids, so their entire solids were digested, leaving none for archival.

Digestion was begun by adding 125-150 mL of digestion acid, which is 1 part by volume 10 M HCl and 1 part 10M HNO_3, followed by 2 drops of concentrated aqueous HF, and placing on the heat to simmer for four hours total. The digesting mixtures were typically observed to consist of a sand on the bottom containing bits of dark foreign material, and a floc, which convected with the colored digesting acid. Sample S3059-05 however, contained very little sand and mostly the floc.

After digesting, each mixture was cooled and poured into four 50 mL plastic centrifuge cones. The digester and its undissolved residue were rinsed three times with digesting acid, and the rinses added to the cones. The cones were centrifuged 15 minutes. The clarified centrifugate was then carefully decanted into a 500 mL volumetric flask. The cones and their residue contents were then rinsed twice or thrice more into the flask by adding a portion of acid, agitating, centrifuging for 15 minutes, and decanting without loss of residue. The flask contents were then mixed and diluted to volume with deionized water, whereupon a 3.3 mL sample was withdrawn and submitted for total alpha analysis.

Next, the cone residues were rinsed back into the digester with digesting acid and the residues were digested a second time in the same manner as the first digestion. A sample of the second 500 mL volumetric flask so generated was also submitted for total alpha analysis. When total alpha results showed a satisfactory decontamination ratio between digests, the two separate digests were combined quantitatively into a 2 Liter volumetric flask and made up to volume with deionized water. Samples of this combined digest were submitted to both 222-S and PNL for chemical and radiochemical analyses.

Each sample's digest residue was rinsed back into the digester and dried to constant weight to obtain an acid-insoluble residue percentage. The dried residue was observed to consist of a reasonably clean-looking sand contaminated by gray fines, a few black bits, and a few paint chips. The sample S3059-05 consisted of more fines than sand or other material. A portion of each residue was submitted for x-ray diffraction, x-ray florescence and polarized light microscopic analyses. The remainder was archived.

4.0 SAMPLE PROCESSING RESULTS

Those results generated by sample processing have been collected in Table 4.1. Some of the calculations therein depend on the assumption that the density of water is 0.998 g/mL. Most items are self-explanatory, while a few bear additional comment:

CALCULATED HEIGHT IN SAMPLER assumes that the sample sludge volume made a column of that height in the 0.75 inch i.d. sample isolation tube. It can be compared with measured values of sludge height in the pit to gauge the efficiency of sampling, although there may be differences between settling in the laboratory and settling in the pit.

SOLIDS CONCENTRATION is the factor to use, together with PCL DILUTION FACTOR and DIGEST RATE, to convert reported chemical concentrations in units of grams/mL digestate to grams/mL sludge. The PCL DILUTION FACTOR corrects for the 3.3 mL which was removed from each individual sample digestate before their combination, while DIGEST RATE converts mL combined digestate to grams solid digested.

ALPHA DECONTAMINATION RATIO is the ratio of total alpha analysis of the first digestate to that of the second digestate of each sample. The higher the number, the greater the confidence that quantitative dissolution of fissile nuclides is being achieved.

AVERAGE PARTICLE DENSITY is the pycnometric calculation of the density required of the solids which displace water to produce the sludge density as found. Given that most of the solids are expected to be sand, (hydrous) iron oxide, aluminum oxide and uranium oxide, the density ought to be that of sand or higher. The tendency to be lower than sand in particle density may be due to the presence of lighter foreign matter such as paint chips. The result for S3059-05 is impossible, and is probably due to the fact it was almost entirely mud, which is extremely watery and therefore difficult to measure by this method.

TABLE 4.1 SAMPLE PROCESSING DATA AND CALCULATED PROPERTIES

DATUM (units)	SAMPLE S3059-05	SAMPLE S3059-06	SAMPLE S3059-07	SAMPLE S3059-08
SLUDGE NET WEIGHT (g)	63.72	22.75	93.39	120.50
DRY NET WEIGHT (g dry solids)	2.88	4.71	32.13	37.43
DIGEST NET WEIGHT (g)	2.88	4.71	9.47	8.39
RESIDUE NET WEIGHT (g residue)	0.73	2.25	7.15	7.27
SLUDGE VOLUME (mL)	59	19	66	92
VOL. % WET SAND (% by vol.)	0	43	10	3
VOL. % WET MUD (% by vol.)	100	57	90	97
WT. % SOLIDS (% by wt.)	4.52	20.70	34.40	31.06
WT % WATER (% by wt.)	95.48	79.30	65.60	68.94
WT % RESIDUE OF DIGEST (wt % of dry solids)	25.35	47.77	75.50	86.65
SLUDGE DENSITY (g per mL sludge)	1.08	1.21	1.41	1.31
CALCULATED HEIGHT IN SAMPLER (inches)	8.15	2.59	9.16	12.73
SOLIDS CONCENTRATION (g solids per mL sludge)	0.049	0.251	0.484	0.406
WATER CONCENTRATION (g water per mL sludge)	1.031	0.962	0.923	0.901
AVERAGE PARTICLE DENSITY (g particle per mL particle)	-1.69 (impossible result)	3.12	2.24	2.10
DIGEST RATE (mL digest per g solids digested)	694.44	424.63	211.19	238.38
PCL DILUTION FACTOR (no units)	1.007	1.007	1.007	1.007
ALPHA DECONTAMINATION RATIO (no units)	331	1030	701	275

5.0 INORGANIC AND RADIOCHEMICAL ANALYSIS RESULTS

Spreadsheets have been provided which summarize the inorganic and radiochemical results for the samples submitted to the 222-S laboratory. In addition, a spreadsheet is provided which relates the Sample Analysis Plan (SAP) sample ID to the various other identification codes used by Process Chemistry Laboratories and the 222-S Laboratories, and what analyses were required by the SAP on which samples.

Sample precision as defined by the Sample Analysis Plan (SAP) **WHC-SD-NR-PLN-013** is represented on the data spreadsheets under the column heading "PRECISION 2RSD (%)". This value was derived by determining the standard deviation (SD) of the three results (sample, duplicate, triplicate), multiplying the SD times two, and relating this value as a percentage of the mean of the three results. If the 2RSD exceeded the percentage stated in Table 3-3 of the SAP for that particular analysis, the analysis was rerun until acceptable precision was obtained, or until it was determined that additional analysis could not be justified due to ALARA principles and/or the low probability of achieving acceptable results. "Qualitative" analyses such as the Alpha Total supporting the digestions, and the nondestructive examination (X-Ray Diffraction) did not require duplicate and triplicate runs.

Accuracy as defined by the Sample Analysis Plan (SAP) **WHC-SD-NR-PLN-013** is represented on the data spreadsheets under the column headings "SPIKE %REC" and "SPIKE DUP %REC". If the recoveries for either of the spikes were outside the range specified in the SAP Table 3-3, then the analysis was rerun until acceptable accuracy was obtained, or until it was determined that additional analysis could not be justified due to ALARA principles and/or the low probability of achieving acceptable results. Spikes and spike duplicates were required for the plutonium, americium, and uranium analyses. Analyses which did not require spikes and spike duplicates will have the letters "NA" (not applicable) in these columns.

5.1 Alpha Total

Two spreadsheets are provided for the Alpha Total (AT) results. The first presents the AT analyses performed to support the digestion of the solid samples. The results are displayed as uCi/ml of digestate submitted for alpha analysis. The "INITIAL" result is from the first digestion. The "FINAL" result is from the second (and final) digestion. The digestion procedure was considered successful if less than one percent of the initial digestate alpha activity was present in the second digestate. Further digestions would be requested if this criteria was not met. A review of the "DECON FACTOR", which is the initial result divided by the final, shows that all samples were digested successfully on the first pass. Because these analyses were being performed to support the digestions only, no quality control samples were requested. A LMCS standard was performed successfully in each case. Alpha activity was less than detectable in the equipment blank (J1281/83 S3059-09). Raw data for the equipment blank is contained in the main pit sample data package (page 117).

The second spreadsheet provides the analytical AT results for the four transfer channel samples and the equipment blank. No hot cell work was associated with the transfer channel samples, so no information on the hot cell blank is provided in this package. The equipment blank was found to be free of significant alpha contamination, so additional radiochemical analyses were not performed on this sample. A rerun was requested for J1285 (S3059-05) due to failure of the precision criteria. The rerun was performed successfully, and appears on the spreadsheet.

The "REAGENT BLK" column of this spreadsheet lists results which provide assurance that the material used to prepare the digestate for analysis (usually water) was not contaminated with the analyte of interest. These results are always reported by volume. This convention is followed for all analysis spreadsheets.

5.2 Total Beta

The total beta analyses met all QC acceptance criteria. One abnormality was discovered with sample J1289 (S3059-08). Total beta analyses are normally performed in replicate. Two separate sample mounts are prepared and counted. The average of the two numbers is then used to provide the final result. For the triplicate analysis of J1289 the replicate count was about ten fold lower than expected. The result had been lined out by the technician, indicating a problem with this count. The triplicate result shown on the spreadsheet is the result of the remaining acceptable count, and not an average of two. The overall precision for the sample/duplicate/triplicate analyses easily meets acceptance criteria at 2.3 percent, however, indicating that the single triplicate count is representative.

5.3 Gamma Energy Analysis

Results for three of the transfer channel samples are presented on the GEA spreadsheet, although only one analysis was required by the SAP. No special problems or method variations were noted. The major gamma emitting isotope detected for each sample was Cs-137, which accounted for approximately 90% of the total gamma activity. The Am-241 values determined by gamma emission compared well with the values derived by separation and alpha energy analysis (see sec. 5.5). Two isotopes (Eu-155/J1285 and Co-60/J1289) failed the precision criteria because they were present at low concentrations.

5.4 Plutonium 238/239/240

All plutonium results met the applicable QC acceptance criteria. A rerun was requested for J1285 (S3059-05) due to low tracer recoveries. This rerun was canceled due to the very short supply of tracer material. The only significant effect of the low tracer recoveries is the unusually poor detection limits reported for Pu-238. Precision and accuracy requirements were easily met.

A rerun was requested and performed on J1286 (S3059-06) due to contamination of the blank. The results presented on the spreadsheet are from the rerun, although the two sets of data differed only slightly, with an initial analysis average of 5.3 uCi/g and the rerun of 5.0 uCi/g. It appears that the blank contamination did not significantly affect the first set of results.

No Pu-238 was present above detection limits. The large variation in detection limits is due primarily to poor tracer recovery. Increasing the sample size would result in better detection limits, but could also result in greater amounts of tracer material being consumed. This material is very expensive, and in short supply.

5.5 Americium 241

Difficulty was encountered analyzing for Am-241 by separation and Alpha Energy Analysis (AEA). Precision and accuracy criteria could not be met in all cases, as indicated on the spreadsheets by shaded cells and footnotes. Tracer recoveries were lower than desirable for J1285 (S3059-05). Sample J1285 was analyzed three times. The final analysis was acceptable with the exception of the spike recovery, which was low at 66%. Sample J1289 (S3059-08) was also analyzed three times. Two sets of data for this sample appear on the spreadsheet (one marked "RERUN"). The first set demonstrated acceptable precision, but failed the accuracy criteria. The second set passed all QC criteria, but demonstrated significant contamination of the blank. Contamination of the sample did not appear to be a problem however, because the batch with the contaminated blank provided slightly lower results (about 15 percent) than the non-contaminated batch.

Americium results are also available for three of the samples by gamma energy analysis (GEA). The average Am-241 result from the GEA, which is an independent detection technique, is compared to the average AEA result below.

SAMPLE	AEA(uCi/g)	GEA(uCi/g)
J1285	34.6	37.2
J1287	2.25	2.57
J1289	3.39/2.87	3.13

5.6 Uranium

The transfer channel samples presented a significant challenge for the uranium analysis. Although each sample was analyzed three times, acceptable accuracy results could not be obtained. The method used is subject to a number of matrix interferences. The very high iron concentration of these samples is believed to be the problem. A procedure was performed to remove the iron from the samples prior to analysis. The uranium recovery was not satisfactory, however, so the procedure was not used. The results that appear on the spreadsheet are from the batch that most closely met the accuracy requirements. No problems were encountered meeting the precision criteria. Samples J1285 (S3059-05), J1287 (S3059-07), and J1289(S3059-08) each failed one of the spike analyses. Sample J1286 (S3059-06) failed both spikes, although only slightly.

5.7 ICP

Results for the four transfer channel samples (J1285, J1286, J1287, J1289) and the equipment blank (J1288) are provided in this package. All initial and continuing instrument calibration requirements were within specified control limits. All initial and continuing calibration blanks were acceptable with the following exceptions: The high values reported for iron in CCB-2 and CCB-3 are attributed to carryover from the samples. The amount of carryover is insignificant relative to sample concentrations. The high values reported for silver are attributed to a low calibration blank. A high bias near detection limits is indicated for silver. Beryllium exceeded limits in the ICB and zinc in the ICB and CCB-4. The cause of these high readings is unclear. The precision requirements were met for all analytes except; boron, molybdenum, samarium in J1285; boron in J1286 and J1287; copper, iron, lead, manganese, zinc in J1288 (the equipment blank); and molybdenum in J1289. Failures for lead, molybdenum and samarium are attributed to the low level (<2xIDL) of these analytes in the samples. The failures for copper, iron, manganese and zinc may be attributed to carryover from the previous runs. Boron is subject to interference from iron. Although correction factors were in place, the magnitude of iron relative to boron results in poor precision for boron. Serial dilution failures were noted for calcium and magnesium in all samples, aluminum and iron in J1288, and cadmium, iron, manganese and zinc in J1289. Instrument Detection Limits, Interelement Correction Factors and Linear Ranges have been reported with sample J1226 in the Sand Filter Backwash Pit data package.

5.8 Nondestructive Examination

Samples of the residue remaining from the paired digestions were submitted for X-Ray Diffraction (XRD) analysis. The results indicated the presence of primarily silicon oxide (SiO_2) in each case. Some of the analytical cards for the XRD analysis could not be located, and are not in the package. These results are considered qualitative in nature.

X-Ray Fluorescence (XRF) analysis was requested but was not performed because the XRF instrument has not been, nor is it likely to be, functional during this project.

Polarized Light Microscopy (PLM) work is in progress and will be detailed in a separate report.

5.9 Mass Balance

Information on mass balance determinations will be presented in a separate report.

5.11 PQL Evaluation

The following analyses did not meet the PQL requirement stated in the SAP.

Analysis	PQL	Report Value	Sample
Sm (ICP)	10 ug/g	< 14-47 ug/g	all samples
Tl (ICP)	40 ug/g	< 69 ug/g	J1286
Be (ICP)	.3 ug/g	< .7 ug/g	J1288(HC Blank)
Pu-238	3 uCi/g	< 21-242 uCi/g	J1285
		< 4.9 uCi/g	J1286(Sam)
		< 3.5-5.2 uCi/g	J1287
		< 4.3-9.5 uCi/g	J1289(Sam,Trip)

Pu-238 detection limits are discussed in the plutonium section of this narrative.

6.0 REFERENCES

WHC-SD-NR-PLN-013 Rev 1, Sampling and Analysis Plan for 105-KE Basin Filter Backwash Pit, Westinghouse Hanford Company, Richland, Washington.

SAP ID	Field ID	PCL ID	RSA Lab ID	ANALYSIS
tc5	S3059-05			
initial aliquot		KE 150A	J 1238	AT
final aliquot		KE 151A	J 1239	AT
dry residue		KE 11A	J 1252	XRD,XRF,PLM
digestate		KE 13A	J 1285	AT,TB,GEA,Pu,Am,U,ICP
tc6	S3059-06			
initial aliquot		KE 152A	J 1250	AT
final aliquot		KE 12A	J 1251	AT
dry residue		KE 11B	J 1253	XRD,XRF,PLM
digestate		KE 20B	J1286	AT,TB,Pu,Am,U,ICP
tc7	S3059-07			
initial aliquot		KE 14A	J 1260	AT
final aliquot		KE 15A	J 1261	AT
dry residue		KE 18A	J 1266	XRD,XRF,PLM
digestate		KE 20D	J 1287	AT,TB,Pu,Am,U,ICP
tc8	S3059-08			
initial aliquot		KE 17A	J 1264	AT
final aliquot		KE 19A	J 1265	AT
dry residue		KE 20A	J 1267	XRD,XRF,PLM
digestate		KE 24A	J 1289	AT,TB,Pu,Am,U,ICP
eqp.blk	S3059-09			
initial aliquot		KE 22B	J 1281	AT
final aliquot		KE 23A	J1283	AT
dry residue		KE 24B	J 1290	XRD,XRF,PLM
digestate		KE 23B	J 1288	AT,ICP*
hot cell blk1	NA			
digestate		KE 144B	J 1226	AT,ICP*

*additional analyses required if contamination is present

SAMPLE DATA SUMMARY

TRANSFER CHANNEL
ALPHA TOTAL INITIAL/FINAL DIGESTION

SAMPLE ID	LAB ID	INITIAL (uCi/ml)	LAB ID	FINAL (uCi/ml)	DECON FACTOR	STD (% rec)
S3059-05	J 1238	4.57E-01	J 1239	1.38E-03	3.31E+02	1.06E+02
S3059-06	J 1250	6.38E-02	J 1251	6.21E-05	1.03E+03	1.05E+02
S3059-07	J 1260	5.64E-02	J 1261	8.04E-05	7.01E+02	1.06E+02
S3059-08	J 1264	8.53E-02	J 1265	3.10E-04	2.75E+02	1.07E+02
S3059-09	J 1281	<9.78E-03	J 1283	<1.12E-05	NA	1.00E+02

TRANSFER CHANNEL
ALPHA TOTAL

SAMPLE ID	LAB ID	SAMPLE	DUPLICATE	TRIPLICATE	MEAN	PRECISION	SPIKE	SPIKE DUP	STANDARD	BLANK
		uCi/g	uCi/g	uCi/g	uCi/g	2RSD (%)	% REC	% REC	%REC	uCi/ml
S3059-05	J1285	6.33E+01	5.83E+01	6.52E+01	6.23E+01	11.5	NA	NA	93.7	<4.18E-06
S3059-06	J1286	7.99E+00	8.59E+00	7.86E+00	8.15E+00	9.5	NA	NA	103.0	<1.07E-05
S3059-07	J1287	4.85E+00	4.93E+00	4.70E+00	4.83E+00	4.9	NA	NA	103.0	<1.07E-05
S3059-08	J1289	6.41E+00	6.19E+00	6.41E+00	6.34E+00	3.9	NA	NA	102.0	<9.78E-06
S3059-09	J1288	<1.99E-03	<3.14E-03	<1.99E-03	NA	NA	NA	NA	NA	<9.78E-06

TRANSFER CHANNEL
TOTAL BETA

SAMPLE ID	LAB ID	SAMPLE	DUPLICATE	TRIPLICATE	MEAN	PRECISION	SPIKE	SPIKE DUP	STANDARD	REAGENT BLK
		uCi/g	uCi/g	uCi/g	uCi/g	2RSD (%)	% REC	% REC	%REC	uCi/ml
S3059-05	J1285	5.23E+02	5.21E+02	5.33E+02	5.26E+02	2.4	NA	NA	99.0	<2.58E-04
S3059-06	J1286	7.52E+01	7.65E+01	7.35E+01	7.51E+01	4.0	NA	NA	99.0	<2.58E-04
S3059-07	J1287	5.27E+01	5.51E+01	5.27E+01	5.35E+01	6.0	NA	NA	93.9	<4.24E-05
S3059-08	J1289*	5.98E+01	5.98E+01	5.86E+01	5.94E+01	2.3	NA	NA	93.9	<4.24E-05

* No replicate count for the triplicate analysis.

TRANSFER CHANNEL
GEA

SAMPLE ID	LAB ID	ISOTOPE	SAMPLE	DUPLICATE	TRIPLICATE	MEAN	PRECISION	STANDARD	BLANK
			uCi/g	uCi/g	uCi/g	uCi/g	2RSD (%)	%REC	uCi/ml
S3059-05	J1285	Am-241	3.79E+01	3.71E+01	3.66E+01	3.72E+01	3.6	NA	<5.04E-04
		Co-60	5.35E+00	5.29E+00	5.08E+00	5.24E+00	5.4	103.0	<4.80E-04
		Cs-137	1.10E+02	1.09E+02	1.08E+02	1.09E+02	1.5	102.0	<6.06E-04
		Eu-154	7.13E+00	5.81E+00	6.79E+00	6.58E+00	20.8	NA	<1.66E-03
		Eu-155*	3.56E+00	4.47E+00	3.62E+00	3.88E+00	26.1	NA	<1.04E-03
S3059-07	J1287	Am-241	2.51E+00	2.47E+00	2.74E+00	2.57E+00	11.3	NA	<5.04E-04
		Cs-137	2.59E+01	2.53E+01	2.61E+01	2.58E+01	3.4	102.0	<6.06E-04
S3059-08	J1289	Am-241	3.05E+00	3.19E+00	3.14E+00	3.13E+00	4.6	NA	<5.07E-04
		Co-60*	6.67E-01	6.22E-01	8.38E-01	7.09E-01	32.1	102.0	<4.29E-04
		Cs-137	2.57E+01	2.64E+01	2.64E+01	2.62E+01	3.2	104.0	<6.34E-04

* Failed precision due to low concentration.

TRANSFER CHANNEL
Pu-239/40

SAMPLE ID	LAB ID	SAMPLE	DUPLICATE	TRIPLICATE	MEAN	PRECISION	SPIKE	SPIKE DUP	STANDARD	REAGENT BLK
		uCi/g	uCi/g	uCi/g	uCi/g	2RSD (%)	% REC	% REC	%REC	uCi/ml
S3059-05	J1285	4.57E+01	4.61E+01	4.52E+01	4.57E+01	2.0	111.0	106.0	105.7	<8.46E-06
S3059-06	J1286	4.96E+00	4.92E+00	5.17E+00	5.02E+00	5.5	106.9	97.1	108.0	<8.65E-04
S3059-07	J1287	2.91E+00	3.00E+00	3.08E+00	3.00E+00	5.7	104.1	108.0	99.6	<1.73E-03
S3059-08	J1289	7.51E+00	7.63E+00	6.72E+00	7.29E+00	13.6	101.0	87.9	105.0	<2.04E-03

TRANSFER CHANNEL
Pu-238

SAMPLE ID	LAB ID	SAMPLE	DUPLICATE	TRIPLICATE	MEAN	PRECISION	SPIKE	SPIKE DUP	STANDARD	REAGENT BLK
		uCi/g	uCi/g	uCi/g	uCi/g	2RSD (%)	% REC	% REC	%REC	uCi/ml
S3059-05	J1285	<6.17E+01	<2.42E+02	<2.08E+01	NA	NA	NA	NA	NA	<1.52E-04
S3059-06	J1286	<4.87E+00	<8.29E-01	<2.40E+00	NA	NA	NA	NA	NA	<3.45E-03
S3059-07	J1287	<3.49E+00	<4.34E+00	<5.25E+00	NA	NA	NA	NA	NA	<1.36E-02
S3059-08	J1289	<4.32E+00	<2.52E+00	<9.53E+00	NA	NA	NA	NA	NA	<5.80E-02

TRANSFER CHANNEL
Am-241

SAMPLE ID	LAB ID	SAMPLE	DUPLICATE	TRIPLICATE	MEAN	PRECISION	SPIKE	SPIKE DUP	STANDARD	REAGENT BLK
		uCi/g	uCi/g	uCi/g	uCi/g	2RSD (%)	% REC	% REC	%REC	uCi/ml
S3059-05	J1285*	3.75E+01	3.49E+01	3.15E+01	3.46E+01	17.6	66.5	97.8	108.6	<1.70E-05
S3059-06	J1286	3.71E+00	3.87E+00	4.20E+00	3.93E+00	12.6	84.1	94.7	97.4	<1.70E-05
S3059-07	J1287	2.25E+00	2.09E+00	2.40E+00	2.25E+00	14.1	87.4	115.6	96.7	<1.70E-05
S3059-08	J1289*	3.82E+00	3.12E+00	3.22E+00	3.39E+00	22.3	93.4	131.1	86.6	<1.70E-05
S3059-08	J1289RERUN**	2.81E+00	2.86E+00	2.95E+00	2.87E+00	5.1	105.4	101.9	104.5	1.30E-02

* Failed the accuracy criteria.

** Reagent blank contaminated.

TRANSFER CHANNEL
URANIUM

SAMPLE ID	LAB ID	SAMPLE	DUPLICATE	TRIPLICATE	MEAN	PRECISION	SPIKE	SPIKE DUP	STANDARD	REAGENT BLK
		ug/g	ug/g	ug/g	ug/g	2RSD (%)	% REC	% REC	%REC	ug/ml
S3059-05	J1285*	1.50E+05	1.38E+05	1.50E+05	1.45E+05	9.4	115.0	140.2	103.4	<2.27E-01
S3059-06	J1286*	2.51E+04	2.38E+04	2.38E+04	2.42E+04	6.5	71.0	79.0	93.8	<3.57E+00
S3059-07	J1287*	1.29E+04	1.29E+04	1.25E+04	1.28E+04	4.4	118.7	141.3	85.5	<7.13E+00
S3059-08	J1289*	1.56E+04	1.33E+04	1.56E+04	1.49E+04	17.9	124.0	97.0	119.0	<3.57E+00

* Sample exceeds accuracy criteria.

TRANSFER CHANNEL

ICP

	J1285 ug/g	dup ug/g	trip ug/g	2RSD (%)	DL ug/g
Ag	1.38E+01	< DL	< DL	NA	4.19E+00
Al	6.76E+04	6.65E+04	6.76E+04	1.8	2.66E+01
B	3.60E+01	2.94E+01	4.04E+01	31.7	8.39E+00
Ba	4.73E+02	4.59E+02	4.70E+02	3.3	4.19E+00
Be	7.85E+01	7.32E+01	7.76E+01	7.5	2.10E+00
Ca	8.07E+03	7.80E+03	8.05E+03	3.9	1.33E+01
Cd	5.19E+02	4.98E+02	5.22E+02	5.1	5.59E+00
Cr	9.83E+02	9.47E+02	9.84E+02	4.3	7.69E+00
Cu	1.53E+03	1.49E+03	1.53E+03	3.2	3.50E+00
Fe	1.46E+05	1.41E+05	1.48E+05	4.6	1.47E+01
Mg	1.77E+03	1.71E+03	1.78E+03	3.9	3.50E+00
Mn	2.60E+03	2.51E+03	2.61E+03	4.4	2.10E+00
Mo	2.32E+01	1.76E+01	2.11E+01	27.3	1.19E+01
Na	1.41E+03	1.39E+03	1.38E+03	2.4	1.96E+01
Pb	7.83E+02	7.45E+02	7.84E+02	5.8	4.47E+01
Si	5.15E+03	5.01E+03	5.14E+03	3.2	2.03E+01
Sm	< DL	< DL	< DL	NA	4.75E+01
Tl	5.92E+02	5.25E+02	5.48E+02	12.2	1.13E+02
Zn	2.23E+03	2.19E+03	2.25E+03	2.7	2.10E+00

	J1286 ug/g	dup ug/g	trip ug/g	2RSD (%)	DL ug/g
Ag	< DL	< DL	< DL	NA	2.56E+00
Al	1.24E+04	1.19E+04	1.17E+04	6.2	1.62E+01
B	1.28E+01	5.13E+00	4.67E+00	121.4	5.12E+00
Ba	1.36E+02	1.31E+02	1.28E+02	6.4	2.56E+00
Be	1.20E+01	1.13E+01	1.09E+01	10.1	1.28E+00
Ca	2.13E+03	2.06E+03	2.01E+03	6.0	8.11E+00
Cd	1.04E+02	9.89E+01	9.37E+01	10.3	3.42E+00
Cr	3.69E+02	3.54E+02	3.36E+02	9.3	4.70E+00
Cu	3.33E+02	3.23E+02	3.15E+02	5.7	2.14E+00
Fe	2.38E+05	2.32E+05	2.26E+05	5.1	8.97E+00
Mg	6.01E+02	5.74E+02	5.59E+02	7.4	2.14E+00
Mn	6.31E+02	6.03E+02	5.85E+02	7.6	1.28E+00
Mo	1.40E+01	1.24E+01	1.33E+01	11.8	7.26E+00
Na	6.24E+02	6.25E+02	6.29E+02	0.7	1.20E+01
Pb	2.22E+02	2.07E+02	1.91E+02	14.7	2.73E+01
Si	2.93E+03	2.84E+03	2.79E+03	4.9	1.24E+01
Sm	< DL	< DL	< DL	NA	2.90E+01
Tl	< DL	< DL	< DL	NA	6.88E+01
Zn	1.08E+03	1.05E+03	1.03E+03	5.3	1.28E+00

21

	J1287 ug/g	dup ug/g	trip ug/g	2RSD (%)	DL ug/g
Ag	< DL	< DL	< DL	NA	1.28E+00
Al	1.05E+04	1.06E+04	1.04E+04	2.6	8.09E+00
B	7.40E+00	8.72E+00	4.51E+00	62.6	2.56E+00
Ba	8.13E+01	8.26E+01	8.03E+01	2.9	1.28E+00
Be	5.78E+00	5.63E+00	5.21E+00	10.6	6.39E−01
Ca	2.05E+03	2.11E+03	2.05E+03	3.2	4.05E+00
Cd	4.12E+01	4.13E+01	3.94E+01	5.2	1.70E+00
Cr	1.72E+02	1.76E+02	1.68E+02	4.6	2.34E+00
Cu	2.21E+02	2.25E+02	2.21E+02	2.2	1.07E+00
Fe	9.70E+04	9.93E+04	9.59E+04	3.5	4.47E+00
Mg	7.61E+02	7.75E+02	7.41E+02	4.4	1.07E+00
Mn	3.42E+02	3.50E+02	3.38E+02	3.7	6.39E−01
Mo	1.05E+01	1.05E+01	8.65E+00	21.3	3.62E+00
Na	4.60E+02	4.57E+02	4.49E+02	2.5	5.96E+00
Pb	1.56E+02	1.58E+02	1.45E+02	9.3	1.36E+01
Si	1.52E+03	1.51E+03	1.46E+03	4.0	6.18E+00
Sm	< DL	< DL	< DL	NA	1.45E+01
Tl	< DL	< DL	< DL	NA	3.43E+01
Zn	3.95E+02	3.98E+02	3.84E+02	3.7	6.39E−01

	J1289 ug/g	dup ug/g	trip ug/g	2RSD (%)	DL ug/g
Ag	< DL	< DL	< DL	NA	1.44E+00
Al	1.15E+04	1.15E+04	1.17E+04	1.6	9.12E+00
B	7.14E+00	5.68E+00	5.96E+00	24.7	2.88E+00
Ba	1.11E+02	1.10E+02	1.11E+02	1.6	1.44E+00
Be	1.08E+01	1.05E+01	1.10E+01	4.6	7.20E−01
Ca	1.49E+03	1.47E+03	1.49E+03	1.4	4.56E+00
Cd	9.63E+01	9.48E+01	9.75E+01	2.8	1.92E+00
Cr	9.64E+01	9.86E+01	9.88E+01	2.7	2.64E+00
Cu	2.95E+02	2.94E+02	2.96E+02	0.9	1.20E+00
Fe	3.27E+04	3.23E+04	3.28E+04	1.6	5.04E+00
Mg	6.44E+02	6.38E+02	6.54E+02	2.4	1.20E+00
Mn	5.16E+02	5.13E+02	5.21E+02	1.5	7.20E−01
Mo	4.39E+00	4.39E+00	< DL	NA	4.08E+00
Na	5.96E+02	5.92E+02	6.00E+02	1.3	6.72E+00
Pb	1.28E+02	1.07E+02	1.20E+02	18.2	1.54E+01
Si	1.84E+03	1.81E+03	1.84E+03	2.2	6.96E+00
Sm	< DL	< DL	< DL	NA	1.63E+01
Tl	< DL	< DL	< DL	NA	3.86E+01
Zn	3.53E+02	3.52E+02	3.59E+02	2.2	7.20E−01

	J1288 ug/g	dup ug/g	trip ug/g	2RSD (%)	DL ug/g
Ag	<DL	<DL	<DL	NA	1.22E+00
Al	4.83E+02	4.45E+02	4.36E+02	11.0	7.75E+00
B	2.40E+01	2.35E+01	2.25E+01	6.7	2.45E+00
Ba	2.22E+00	1.90E+00	1.80E+00	22.3	1.22E+00
Be	<DL	<DL	<DL	NA	6.12E−01
Ca	4.46E+02	4.19E+02	4.11E+02	8.6	3.88E+00
Cd	<DL	<DL	<DL	NA	1.63E+00
Cr	4.13E+00	3.58E+00	3.76E+00	14.5	2.24E+00
Cu	3.57E+00	2.70E+00	2.35E+00	44.0	1.02E+00
Fe	3.97E+02	2.43E+02	2.26E+02	65.3	4.28E+00
Mg	1.01E+02	8.97E+01	8.76E+01	15.3	1.02E+00
Mn	2.36E+00	1.27E+00	8.96E−01	100.7	6.12E−01
Mo	<DL	<DL	<DL	NA	3.47E+00
Na	5.18E+02	5.07E+02	5.01E+02	2.6	5.71E+00
Pb	1.76E+01	2.75E+01	2.18E+01	44.5	1.30E+01
Si	1.70E+03	1.65E+03	1.63E+03	4.4	5.92E+00
Sm	<DL	<DL	<DL	NA	1.39E+01
Tl	<DL	<DL	<DL	NA	3.28E+01
Zn	7.98E+00	6.60E+00	6.29E+00	25.9	6.12E−01

UNIDIGESTED SAMPLE ANALYSES

QA 14

WHC-SD-WM-DP-057 REV O

WESTINGHOUSE HANFORD COMPANY Batch 2014

222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No. J-1238, J-1239	Customer ID: 10-22-93 10-22-93 RE-[illegible]-A, RE-[illegible]151-A
Analysis: AT	Sample Prep: Direct

Instrument: ~~AT~~ SLF 12-6-93 WA 45709	Procedure/ Rev: LA 508-101 (Rev 0-0
Technologist: Bill Smith	Date: 10-22-93
Starting Time: 1300	Temperature NA
Ending Time: 1500	Chemist: Scott

Comments:

	Description	Lab ID		Description	Lab ID
1	STD	J-1237-5225	11		
2	SAM	J-1238-5225	12		
3	SAM	J-1239-5725	13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	94351/10 ml			

A-6000-881 (03/92)

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

1-2

Serial No	Sample Point	Date	Time Issued	Priority
J 1237.-5525	BECHTOLD	10-22-93	11: 3	26

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	D3232	0

Sample Size	Customer ID
? 10 ml	STD

Remarks, Calculations, Results:

S510 EV-CRB

STD#94B51 RESULT 8.26E-3 **RUSH**

STD VAL %REC 104%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	DHMilicia Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10-22-93	1530	CA Clark

54-6800-061 (R-10-83)

13/2 10-22-93 DM J1237- 5525

1363/30

1228/30

Alpha Calculation (CEPC_CAL 2.0)
By: DH MILICIA, on 10-22-1993 at 21:24:57
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 10 mL Dilution : 1

Sample # J-1237 Mount # 1

$$\frac{1363}{30} - 0.6 = 8.6973E\text{-}03 \text{ uCi/L alpha}$$

Sample # J-1237 Mount # 2

$$\frac{1228}{30} - 0.6 = 7.8244E\text{-}03 \text{ uCi/L alpha}$$

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TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

3-4

Serial No	Sample Point,	Date	Time Issued	Priority
J 1238.-5625	BECHTOLD	10-22-93	11: 8	26

Determination	Method-Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	D3232	0

Sample Size	Customer ID
? .100-10-.100 ml	KE150A

Remarks, Calculations, Results

COUNT AS uCI/L
USE 13,14,15 OR 16

RUSH

4.57 E^{-1} uCi/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D.H. Milicia			
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10-22-93	1500	CA Clark

54-6000061/(R-10-83)

13/2 10-22-93 DM J1238-5625

7541/30

6496/30

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 10-22-1993 at 21:25:55
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 101

Sample # J-1238 Mount # 1

$$\frac{7541}{30} - 0.6 = 4.9133E+02 \text{ uCi/L alpha}$$

Sample # J-1238 Mount # 2

$$\frac{6496}{30} - 0.6 = 4.2308E+02 \text{ uCi/L alpha}$$

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TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

5-6

Serial No	Sample Point	Date	Time Issued	Priority
J 1239.-5625	BECHTOLD	10-22-93	11: 9	26

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	D3232	0

Sample Size	Customer ID
? 100 ml	KE151A

Remarks, Calculations, Results

COUNT AS uCI/L
USE 13,14,15 OR 16

RUSH

1.38 E-3 uCi/mL

Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
D H Milicia			
Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10-22-93	1500	CA Clark

10-22-93

54-[illegible] (R/10-83)

13/2 10-22-93 DM J1239-5625

2043 / 30

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 10-22-1993 at 21:26:39
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

2269 / 30

Sample # J-1239 Mount # 1

2043 / 30 - 0.6 = 1.3094E+00 uCi/L alpha

Sample # J-1239 Mount # 2

2269 / 30 - 0.6 = 1.4556E+00 uCi/L alpha

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QA 14

WHC-SD-WM-DP-057 REV 0

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch # 2041

RUSH RUSH

Lab Segment Serial No. J1250, J1251	Customer ID: KE-152-A, KE-12-A
Analysis: AT	Sample Prep: Acid digestion

Instrument: WA 57276	Procedure/ Rev: LA 508 101 / Rev D ∅
Technologist: Cynthia Johnson	Date: 10/28/93
Starting Time: 1030 hrs	Temperature N/A
Ending Time: 1350	Chemist: Stan Catlow

Comments:

	Description	Lab ID		Description	Lab ID
1	Initial LMCS Check Std	J1248-8525	11		
2	Reagent Blk	J1249-8625	12		
3	Sample	J1250-8725	13		
4	Sample	J1251-8725	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS Check Std	C9413551/10mL			

28

A-6000-881 (03/92)

OA

ANALYTICAL BATCH SUMMARY SHEET

METHOD: **LA-508-101**

DATE START: 10/28/93

PREPARED BY: **S.L. FITZGERALD**

DATE COMPLETE: 11/1/93

	UNITS:	ug/mL										
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	ACCU	%REC	DET LIM	% CT ER
STD 94B51	J1248	ALPHA	8.17E-03							105	2.54E-07	2.9
BLANK	J1249	ALPHA	<1.07E-05								2.54E-05	500
KE 152A	J1250	ALPHA	6.38E-02								2.54E-05	0.3
KE 12A	J1251	ALPHA	6.21E-05								2.54E-05	14.6

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Standard results are reported in ug/L

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

1-2

Serial No	Sample Point	Date	Time Issued	Priority
J 1248.-8525	BECHTOLD	10-26-93	10: 3	26

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	E11457	1

Sample Size	Customer ID
10ml	STD

Remarks Calculations Results

RUSH RUSH

SS10 EV-CEB

STD # 94B51 RESULT 8.17E-3

STD VALUE 8.32E-3 %REC 105%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10/28/93	Time Completed	Lab Mgr		

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AT: LA-508-101 (D-0) LIQUIDS			STANDARD	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1248-8525	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	1250	1267
2041	COUNT TIME in MINUTES	(CT)	30	30
AT or T2.2	BACKGROUND in cpm	(BKG)	0.7	0.7
AT	SAMPLE SIZE in mL	(SS)	10.000	10.000
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		40.967	41.533
Date	SAMPLE CONCENTRATION in µCi/L		8.11E-03	8.23E-03
10/28/93	AVG. µCi/L in SAMPLE or DIGEST SOLUTION as APPLICABLE) =			8.1711E-03

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	8.17E-03		DETECTION LEVEL 2.54E-07 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	8.17E-06		
RELATIVE COUNTING ERROR =	2.9%		

Data Entry by:		Date:	29-Oct-93
Approved by:		Date:	1-Nov-93

Form 1 Rev. 1

Page 1 of 1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

14/2

J1248-8575

1250/30 -.7

1267/30

Alpha Calculation (CRPC_CAL 2.0)
By: KM BARILA, on 10-29-1993 at 04:25:38
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

Sample # J1248 Mount # 1

$$\frac{1250}{30} - 0.7 = 8.1150E\text{-}03 \text{ uCi/L alpha}$$

Sample # J1248 Mount # 2

$$\frac{1267}{30} - 0.7 = 8.2272E\text{-}03 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3-4

Serial No	Sample Point	Date	Time Issued	Priority
J 1249.-8625	BECHTOLD	10-26-93	10: 4	26

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	E11457	1

Sample Size	Customer ID
? .100ml	BLK

Remarks Calculations Results

COUNT AS uCI/L
USE 13,14,15 OR 16

RUSH RUSH

$<1.07 \times 10^{-5}$ uCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Laboratory Mgr.
10/28/93		

SS-5800-001 (R/10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			BLANK	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1249-8625	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	14	22
2041	COUNT TIME in MINUTES	(CT)	30	30
AT or TS ?	BACKGROUND in cpm	(BKG)	0.7	0.7
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		0.504	0.540
Date	SAMPLE CONCENTRATION in µCi/L		9.99E-03	1.07E-02
10/28/93	AVG. µCi/L in SAMPLE or DIGEST SOLUTION as APPLICABLE) =		<	1.0345E-02

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	< 1.07E-02		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	< 1.07E-05		
LESS THAN Value was Determined from Rmax.			2.54E-05 µCi/mL
RELATIVE COUNTING ERROR =	500.0%		

Data Entry by:		Date:	29-Oct-93
Approved by:		Date:	1-Nov-93

Form 1 Rev. 1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

14/2

J1249-8625

22/30 -.7

14/30

Alpha Calculation - (CRPC_CAL 2.0)
By: KM BARKLA, on 10-29-1993 at 04:26:10
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # J1249 Mount # 1

22/30 - 0.7 < 7.8045E-03 uCi/L alpha

Sample # J1249 Mount # 2

14/30 - 0.7 < 7.0502E-03 uCi/L alpha

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

5-6

Serial No	Sample Point	Date	Time Issued	Priority
J 1250.-8725	BECHTOLD	10-26-93	10: 5	26

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	E11457	1

Sample Size	Customer ID
?.100mL	KE-152-A

Remarks Calculations Results

RUSH RUSH

SEE 13,14,15 OR 16

Cynthia Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10/28/93		

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1250-8725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	104476	88816
2041	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.7	0.7
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		3481.833	2959.833
Date	SAMPLE CONCENTRATION in µCi/L		6.90E+01	5.86E+01
10/28/93	AVG. µCi/L in SAMPLE or DIGEST SOLUTION as APPLICABLE) =			6.3801E+01

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	6.38E+01		DETECTION LEVEL 2.54E-05 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	6.38E-02		
RELATIVE COUNTING ERROR =	0.3%		

Data Entry by:		Date:	29-Oct-93
Approved by:		Date:	1-Nov-93

Form 1 Rev. 1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

14/2

J1250-8725

104476 / 30 -.7

88816 / 30

Alpha Calculation (CRPC_CAL 2.0)
By: KM BARKLA, ____ on 10-29-1993 at 04:26:40
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # J1250 Mount # 1

$$\frac{104476}{30} - 0.7 = 6.8971E+01 \text{ uCi/L alpha}$$

Sample # J1250 Mount # 2

$$\frac{88816}{30} - 0.7 = 5.8631E+01 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

7-8

Serial No	Sample Point	Date	Time Issued	Priority
J 1251.-8725	BECHTOLD	10-26-93	10: 6	26

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	E11457	1

Sample Size	Customer ID
?,100ml	KE-12-A

Remarks Calculations Results

RUSH RUSH

COUNT AS uCI/L
USE 13,14,15 OR 16

6.21×10^{-5} uCi/ml

Cynthia Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10/28/93		10/29

5A-SSC-001 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1251-8725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	95	135
2041	COUNT TIME in MINUTES	(CT)	30	30
AT or TE ?	BACKGROUND in cpm	(BKG)	0.7	0.7
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		2.467	3.800
Date	SAMPLE CONCENTRATION in µCi/L		4.89E-02	7.53E-02
10/28/93	AVG. µCi/L in SAMPLE or DIGEST SOLUTION as APPLICABLE) =			6.2067E-02

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	6.21E-02	DETECTION LEVEL 2.54E-05 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	6.21E-05	
RELATIVE COUNTING ERROR =	14.6%	

Data Entry by:		Date:	29-Oct-93
Approved by:		Date:	1-NOV-93

Form 1 Rev. 1

Page 1 of 1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

14/2

J1251-8725

95/30 -.7

135/30

Alpha Calculation (CRPC_CAL 2.0)
By: KM BARKLA, , on 10-29-1993 at 04:27:05
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # J1251 Mount # 1

$$\frac{95}{30} - 0.7 = 4.8862E\text{-}02 \text{ uCi/L alpha}$$

Sample # J1251 Mount # 2

$$\frac{135}{30} - 0.7 = 7.5273E\text{-}02 \text{ uCi/L alpha}$$

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WHC-SD-WM-DP-057 REV O

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

Batch # 2036

ANALYTICAL BATCH

Lab Segment Serial No. J-1250, J1251	Customer ID: XE-152-A, XE-12-A
Analysis: AT	Sample Prep: Direct

Instrument: ~~NA~~ 2H 11-15-93 WB27810	Procedure/ Rev: LA-505-101-0
Technologist: BILLSYTH	Date: 10-26-93
Starting Time: 1700	Temperature NA
Ending Time: 1500	Chemist: Scott

Comments:

	Description	Lab ID		Description	Lab ID
1	STD	J-1248-8525	11		
2	BLANK	J-1249-8525	12		
3	SAM	J-1250-8725	13		
4	SAM	J-1251-8725	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	941351/10ml			

A-6000-881 (03/92)

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

1-4 REQUAL 6472

Serial No	Sample Point	Date	Time Issued	Priority
J 1248.-8525	BECHTOLD	10-26-93	10: 3	26

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	E11457	0

Sample Size	Customer ID
? 10ml	STD

Remarks, Calculations, Results:

S510 EV-CRB

STD# 941351 RESULT 6.04 E-3

STD VAL ~~7.8084~~ 7.8084 E-3 %REC 77.4 %

RUSH

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	DH Milicia			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10-26-93	1500	CA Clair

(4-6800-061 (R-10-83))

13/2 10-26-93 Dm J1248-8525

$\frac{1335}{30}$ - .6

$\frac{1307}{30}$ -

$\frac{1176}{30}$ -

$\frac{1294}{30}$ -

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 10-26-1993 at 19:04:27
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 10 mL Dilution : 1

Sample # J-1248 Mount # 1

$\frac{1335}{30}$ - 0.6 = 8.5163E-03 uCi/L alpha

Sample # J-1248 Mount # 2

$\frac{1307}{30}$ - 0.6 = 8.3352E-03 uCi/L alpha

Sample # J-1248 Mount # 3

$\frac{1176}{30}$ - 0.6 = 7.4881E-03 uCi/L alpha

Sample # J-1248 Mount # 4

$\frac{1294}{30}$ - 0.6 = 8.2511E-03 uCi/L alpha

BEST AVAILABLE COPY

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

5-6

Serial No	Sample Point	Date	Time Issued	Priority
J 1249.-8625	BECHTOLD	10-26-93	10: 4	26

Determination	Method-Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	E11457	0

Sample Size	Customer ID
? 10 ml	BLK

Remarks, Calculations, Results

COUNT AS uCI/L
USE 13,14,15 OR 16

RUSH

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D.H. Milicia			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10-26-93	1520	M Clark

10/27

54-6000-061 (R-10-83)

13/2 10-26-93 DM

J1249-8625

13/30

9/30

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 10-26-1993 at 21:17:14
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 10 mL Dilution : 1

Sample # J-1249 Mount # 1

13/30 - 0.6 < 6.3923E-05 uCi/L alpha

Sample # J-1249 Mount # 2

9/30 - 0.6 < 6.3923E-05 uCi/L alpha

BEST AVAILABLE COPY

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

1-2

Serial No.	Sample Point	Date	Time Issued	Priority
J 1250.-8725	BECHTOLD	10-26-93	10: 5	26

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	E11457	0

Sample Size	Customer ID
? .100-10-.100ml	KE-152-A

Remarks, Calculations, Results:

COUNT AS uCI/L
USE 13,14,15 OR 16

RUSH

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D H Milicia			
Hrs	Hrs	Hrs	Hrs.	Hrs

Date	Time Completed	Lab Unit Mgr
10-26-93	2500	PA Pavel

54-6886-061 (R-10-83)

13/2 10-26-93 DM

J1250-8725

$\frac{1797}{30} - .6$

$\frac{944}{30}$

Alpha Calculation (CRPC_CAL 2.0)
By: DM MILICIA, on 10-26-1993 at 23:10:52
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 101

Sample # J-1250 Mount # 1

$$\frac{1797}{30} - 0.6 = 1.1619E+02 \text{ uCi/L alpha}$$

Sample # J-1250 Mount # 2

$$\frac{944}{30} - 0.6 = 6.0478E+01 \text{ uCi/L alpha}$$

BEST AVAILABLE COPY

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

3-4

Serial No	Sample Point	Date	Time Issued	Priority
J 1251.-8725	BECHTOLD	10-26-93	10: 6	26

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	E11457	0

Sample Size	Customer ID
? 100ml	KE-12-A

Remarks, Calculations, Results:

COUNT AS uCI/L
USE 13,14,15 OR 16

RUSH

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D H Miller	Em Barela		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10-26-93	1500	CA Clark

54-6800-06 (R-10-83)

13/2 10-26-93 EM

J1251-8725

173/30 - .6

99/30

Alpha Calculation (CRPC_CAL 2.0)
By: KM BARELA, on 10-27-1993 at 00:04:37
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

Sample # J1251 Mount # 1

173
---------- - 0.6 = 1.0023E-01 uCi/L alpha
30

Sample # J1251 Mount # 2

99
---------- - 0.6 = 5.2378E-02 uCi/L alpha
30

BEST AVAILABLE COPY

QA 14

WHC-SD-WM-DP-057 REV O

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch #2072

RUSH

Lab Segment Serial No. J1260, J1261	Customer ID: KE14A, KE15A
Analysis: AT	Sample Prep: Dulcie Nguyen

Instrument: WA 63999	Procedure/ Rev: LA 508-101 / Rev 0
Technologist: Cynthia Johnson CJohnson	Date: 10/28/93
Starting Time: 1110 hrs	Temperature N/A
Ending Time: 1350 hrs	Chemist: Stan Cottlow

Comments:

	Description	Lab ID		Description	Lab ID
1	Int'l Lines Check Std	J1258-5125	11		
2	Reagent Blank	J1259-5125	12		
3	Sample	J1260 5125	13		
4	Sample	J1261-5125	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
Lines Check Std	94B51/10ml			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-508-101

DATE START: 10/28/93

PREPARED BY: S.L. FITZGERALD

DATE COMPLETE: 11/1/93

	UNITS:	ug/mL										
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	ACCU	%REC	DET LIM	% CT ER
STD 94B51	J1258	ALPHA	8.24E-03							105.5	2.55E-07	2.8
BLANK	J1259	ALPHA	<1.02E-05								2.55E-05	38.3
KE 14A	J1260	ALPHA	5.64E-02								2.55E-05	0.4
KE 15A	J1261	ALPHA	8.04E-05								2.55E-05	11.2

1-Nov-93

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Standard results are reported in ug/L

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
J 1258.-5525	BECHTOLD	10-28-93	9:12	26

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	E14156	0

Sample Size	Customer ID
? 10 ml	STD

Remarks, Calculations, Results

S510 EV-CRB

STD# 94B51 RESULT

STD VAL 7.8082E-03 %REC 105.5%

RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs 10/29
Date 10/28/93	Time Completed	Lab Mgr		

54-6800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			STANDARD	REPLICATE
Serial No.	DETECTOR NUMBER		16	16
J1258-5525	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	1314	1355
2042	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	10.000	10.000
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2389	0.2389
	Ic, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		43.000	44.367
Date	SAMPLE CONCENTRATION in µCi/L		8.11E-03	8.37E-03
10/28/93	AVG. µCi/L in SAMPLE or DIGEST SOLUTION as APPLICABLE) =			8.2366E-03

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	8.24E-03		DETECTION LEVEL 2.55E-07 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	8.24E-06		
RELATIVE COUNTING ERROR =	2.8%		

Data Entry by:		Date:	29-Oct-93
Approved by:		Date:	1-Nov-93

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TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

16/2 10-28-93 1-2

J1258-5525

1314
30

1355
30

Alpha Calculation (CRPC_CAL 2.0)
By: KM BARELA, , on 10-29-1993 at 02:38:37
Det #16 2 -inch mount Alpha eff. : .2389
Sample size : 10 mL Dilution : 1

Sample # J1258 Mount # 1

$$\frac{1314}{30} \cdot 0.8 = 8.1077E\text{-}03 \text{ uCi/L alpha}$$

Sample # J1258 Mount # 2

$$\frac{1355}{30} \cdot 0.8 = 8.3654E\text{-}03 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
J 1259.-5625	BECHTOLD	10-28-93	9:13	26

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14156	0

Sample Size	Customer ID
? ,100 mL	BLK

Remarks Calculations Results

COUNT AS uCI/L
USE 13,14,15 OR 16

RUSH

$< 1.02 \times 10^{-5}$ uCi/ml

Cynthia Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10/28/93	Time Completed	Lab Dir Mgr		

54-660C-661 (R-10-93)

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AT: LA-508-101 (D-0) LIQUIDS

			BLANK	REPLICATE
Serial No.	DETECTOR NUMBER		16	16
J1259-5625	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	7	9
2042	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2389	0.2389
	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		0.539	0.539
Date	SAMPLE CONCENTRATION in µCi/L		1.02E-02	1.02E-02
10/28/93	AVG. µCi/L in SAMPLE or DIGEST SOLUTION as APPLICABLE) =		<	1.0161E-02

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	< 1.02E-02		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	< 1.02E-05		
LESS Than Value was Determined from Lc.			2.55E-05 µCi/mL
RELATIVE COUNTING ERROR =	38.3%		

Date Entry by:	R Lukeski	Date:	29-Oct-93
Approved by:		Date:	1-Nov-93

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TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

16/2 10-28-93 3-4 J1259-5625

Alpha Calculation (CRPC_CAL 2.0)
By: EM BARILA, on 10-29-1993 at 02:40:08
Det #16 2 -inch mount Alpha eff. : .2389
Sample size : .1 mL Dilution : 1

$\frac{7}{30}$

Sample # J1259 Mount # 1

$\frac{9}{30}$

$\frac{7}{30}$ - 0.8 < 7.1742E-03 uCi/L alpha

Sample # J1259 Mount # 2

$\frac{9}{30}$ - 0.8 < 7.1742E-03 uCi/L alpha

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
J 1260,-5725	BECHTOLD	10-28-93	8:14	25

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14156	0

Sample Size	Customer ID
? , 100 ml	KE 14A

Remarks, Calculations, Results

COUNT AS uCI/L
USE 13,14,15 OR 16

RUSH

5.64×10^{-2} uCi/ml

Cynthia Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10/28/93		

54-6800-06 R-10-831

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		16	16
J1260-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	78632	100806
2042	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2389	0.2389
	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		2620.267	3359.400
Date	SAMPLE CONCENTRATION in µCi/L		4.94E+01	6.33E+01
10/28/93	AVG. µCi/L in SAMPLE or DIGEST SOLUTION as APPLICABLE) =			5.6374E+01

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	5.64E+01		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	5.64E-02		2.55E-05 µCi/mL
RELATIVE COUNTING ERROR =	0.4%		

Data Entry by:		Date:	29-Oct-93
Approved by:		Date:	1-Nov-93

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TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

16/2 10-28-93 5-6 J1260-5725

$\frac{78632}{30} \cdot .8$

$\frac{100806}{30}$

Alpha Calculation (CRPC_CAL 2.0)
By: KM BARELA, on 10-29-1993 at 02:39:47
Det #16 2 -inch mount Alpha eff. : .2389
Sample size : .1 mL Dilution : 1

Sample # J1260 Mount # 1

$$\frac{78632}{30} \cdot 0.8 = 4.9406E+01 \text{ uCi/L alpha}$$

Sample # J1260 Mount # 2

$$\frac{100806}{30} \cdot 0.8 = 6.3342E+01 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
J 1261.-5725	BECHTOLD	10-28-93	9:15	26

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14156	0

Sample Size	Customer ID
?,100ml	KE 15A

Remarks, Calculations, Results

COUNT AS uCi/L:
USE 13,14,15 OR 16

RUSH

8.04×10^{-5} uCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10/28/93		

54-6[illegible]-961 (R/10/83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		16	16
J1261-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	167	137
2042	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2389	0.2389
	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		4.767	3.767
Date	SAMPLE CONCENTRATION in µCi/L		8.99E-02	7.10E-02
10/28/93	AVG. µCi/L in SAMPLE or DIGEST SOLUTION as APPLICABLE) =			8.0449E-02

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	8.04E-02	DETECTION LEVEL 2.55E-05 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	8.04E-05	
RELATIVE COUNTING ERROR =	11.2%	

Data Entry by:		Date:	29-Oct-93
Approved by:		Date:	1-Nov-93

Form 1 Rev. 1

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TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

1612 10-28-93 7-8 J1261-5725

Alpha Calculation (CRPC_CAL 2.0)
By: KM BARKLA, on 10-29-1993 at 02:39:18
Det #16 2 -inch mount Alpha eff. : .2389
Sample size : .1 mL Dilution : 1

$\frac{167}{30}$

Sample # J1261 Mount # 1

$\frac{137}{30}$

$$\frac{167}{30} \cdot 0.8 = 8.9876E\text{-}02 \text{ uCi/L alpha}$$

Sample # J1261 Mount # 2

$$\frac{137}{30} \cdot 0.8 = 7.1021E\text{-}02 \text{ uCi/L alpha}$$

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WESTINGHOUSE HANFORD COMPANY

WHC-SD-WM-DP-057 REV O 222-S LABORATORY

ANALYTICAL BATCH 2063

Lab Segment Serial No. J1264, J1265	Customer ID: KE17A, KE19A
Analysis: AT	Sample Prep: Direct Liquid

Instrument: UA45909	Procedure/ Rev: LA508-101 / Rev 0
Technologist: Cynthia Johnson C Johnson	Date: 11/2/93
Starting Time: 1045 hrs	Temperature N/A
Ending Time: 1250 hrs	Chemist: Stan Catlow

Comments: Very acidic samples. Used 100 ml sample size

	Description	Lab ID
1	INITIAL LMCS CHECK STD	J1263-5525
2	REAGENT BLANK	N/A
3	Sample	J1264-5125
4	Sample	J1265-5125
5		6gH11153
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS Check Std	109.B51/10ml			

A-6000-881 (03/92)

OA

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-508-101

DATE START: NOVEMBER 2, 1993

PREPARED BY: S.L. FITZGERALD

DATE COMPLETE: NOVEMBER 3, 1993

	UNITS:	uCi/mL							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD 109B51	J1263	ALPHA	1.11E-02				107	2.34E-07	2.5
KE-17A	J1264	ALPHA	8.53E-02					2.34E-05	0.3
KE-19A	J1265	ALPHA	3.10E-04					2.34E-05	4.8

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
J 1263.-5525	BECHTOLD	11- 1-93	14:45	10

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	E11457	0

Sample Size	Customer ID
? 10 mL	STD

Remarks, Calculations, Results

S510 EV-CRB

STD# 109 B51 RESULT 1.11 -2

STD VAL 1.04 -2 %REC 106.7%

RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst 5
C Johnson	Raymond			
Hrs	Hrs 11-2-93	Hrs C G Clark	Hrs	Hrs
Date 11/2/93	Time Completed	Lab Mgt Mgr		

54-6800-061 (R 10 83)

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AT: LA-508-101 (D-0) LIQUIDS

			STANDARD	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1263-5525	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	1778	1695
2063	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.6	0.6
AT	SAMPLE SIZE in mL	(SS)	10.000	10.000
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		58.667	55.900
Date	SAMPLE CONCENTRATION in µCi/L		1.14E-02	1.08E-02
11/02/93	AVG. µCi/L in SAMPLE and REPLICATE =			1.1113E-02

Rs (Sample Count Rate) = (TC / CT) – BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC – BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	1.11E-02	DETECTION LEVEL	
ALPHA TOTAL in µCi/mL (AVERAGE) =	1.11E-05	2.34E-07 µCi/mL	
RELATIVE COUNTING ERROR =	2.5%		

Data Entry by:		Date:	03-Nov-93
Approved by:		Date:	5-NOV-93

Form 1 Rev. 1.1

Page 1 of 1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 11-2-93 1-2

J1263-5525

$\frac{1778}{30}$

$\frac{1695}{30}$

Alpha Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, on 11-02-1993 at 18:38:13
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 10 mL Dilution : 1

Sample # J1263 Mount # 1

$$\frac{1778}{30} \cdot 0.6 = 1.1381E\text{-}02 \text{ uCi/L alpha}$$

Sample # J1263 Mount # 2

$$\frac{1695}{30} \cdot 0.6 = 1.0844E\text{-}02 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
J 1264.-5725	BECHTOLD	11- 1-93	14:46	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E11457	0

Sample Size	Customer ID
2.100mL	KE17A

Remarks Calculations Results

COUNT AS µCI/L
USE 13,14,15 OR 16

RUSH

C Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond			
Hrs	Hrs	Hrs	Hrs	Hrs
	11-2-93	padave		
Date	Time Completed	Lab Mgr's		
11/2/93				

54-6800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1264-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	131590	132214
2063	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.6	0.6
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
C JOHNSON	Ic, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		4385.733	4406.533
Date	SAMPLE CONCENTRATION in µCi/L		8.51E+01	8.55E+01
11/02/93	AVG. µCi/L in SAMPLE and REPLICATE =			8.5282E+01

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	8.53E+01	DETECTION LEVEL 2.34E-05 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	8.53E-02	
RELATIVE COUNTING ERROR =	0.3%	

Data Entry by:		Date:	03-Nov-93
Approved by:		Date:	5-NOV-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 11-2-93 5-6 J1264-5725

$\frac{131590}{30}$ - .6

$\frac{132214}{30}$

Alpha Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, on 11-02-1993 at 18:36:39
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

Sample # J1264 Mount # 1

$$\frac{131590}{30} - 0.6 = 8.5080E+01 \text{ uCi/L alpha}$$

Sample # J1264 Mount # 2

$$\frac{132214}{30} - 0.6 = 8.5483E+01 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
J 1265.-5725	BECHTOLD	11- 1-93	14:47	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E11457	0

Sample Size	Customer ID
2.100 mL	KE19A

Remarks, Calculations, Results

COUNT AS uCI/L
USE 13,14,15 OR 16

RUSH

C Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond			
Hrs	Hrs	Hrs	Hrs	Hrs
	11-2-93	CA Clark		
Date	Time Completed	Lab Unit Mgr		
11/2/93				

54-6800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1265-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	477	519
2063	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.6	0.6
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		15.300	16.700
Date	SAMPLE CONCENTRATION in µCi/L		2.97E-01	3.24E-01
11/02/93	AVG. µCi/L in SAMPLE and REPLICATE =			3.1039E-01

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	3.10E-01		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	3.10E-04		2.34E-05 µCi/mL
RELATIVE COUNTING ERROR =	4.8%		

Data Entry by:		Date:	03-Nov-93
Approved by:		Date:	5-NOV-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 11-2-93 3-4 J1265-5725

$\frac{477}{30} \cdot .6$

$\frac{519}{30} \cdot .6$

Alpha Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, on 11-02-1993 at 18:37:08
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

Sample # J1265 Mount # 1

$$\frac{477}{30} \cdot 0.6 = 2.9681E\text{-}01 \text{ uCi/L alpha}$$

Sample # J1265 Mount # 2

$$\frac{519}{30} \cdot 0.6 = 3.2397E\text{-}01 \text{ uCi/L alpha}$$

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Batch 2391

QA 27

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-057 REV O

ANALYTICAL BATCH

Lab Segment Serial No. J1285	Customer ID: KE13A
Analysis: AT	Sample Prep: Direct

Instrument: WA 45701	Procedure/ Rev: LA-508-101 / Rev D-P
Technologist: Teresa Mix	Date: 12-16-93
Starting Time: 0845	Temperature 25°C
Ending Time: 11:00	Chemist: Scot Fitzgerald

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	J1284-5525	11		
2	Blk	J1417-5625	12		
3	Sample	J1285-5725	13		
4	Sample	J1285-5725	14		
5	Sample	J1285-5725	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
ENVCRB	119B51 10ml			

A-6000-881 (03/92)

CA

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-508-101

DATE START: DECEMBER 16, 1993

PREPARED BY: S.L. FITZGERALD

DATE COMPLETE: DECEMBER 17, 1993

		UNITS:	ug/mL									
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	ACCU	%REC	DET LIM	% CT ER
STD 119B51	J1284	ALPHA	7.92E-03							93.7	2.62E-07	3.0
BLANK	J1417	ALPHA	<4.18E-06								1.05E-05	131
KE13A	J1285	ALPHA	9.06E-02	8.34E-02	9.33E-02	8.91E-02	1.02E-02	11.49			9.93E-06	0.2
											9.93E-06	0.2
											9.93E-06	0.2

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Standard results are reported as uCi/L

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

9-10

WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1284.-5525	BECHTOLD	11- 4-93	8:47	13

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	E11157	4

Sample Size	Customer ID
10 ml	STD

Remarks Calculations Results

P510 EV-CRB

STD# 119351 RESULT 7.92 E-3

STD VAL 8.449 E-3 %REC 93.7%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Teresa M	Raymond M Brown			
Hrs	Hrs 12.16.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
12-16-93			

54-6800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			STANDARD	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1284-5525	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	1281	1216
2391	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	10.000	10.000
Rerun No.	DILUTION FACTOR	(DF)	1	1
4	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
T MIX	Rc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		41.900	39.733
Date	SAMPLE CONCENTRATION in µCi/L		8.13E-03	7.71E-03
12/16/93	AVG. µCi/L in SAMPLE and REPLICATE =			7.9181E-03

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	7.92E-03	DETECTION LEVEL 2.62E-07 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	7.92E-06	
RELATIVE COUNTING ERROR =	3.0%	

Data Entry by:		Date:	17-Dec-93
Approved by:		Date:	17-Dec-93

Form 1 Rev. 1.1

13 2" 12.16.93 R #9-10 J1284-5525

1281 / 30 — .8

1216 / 30 —

Alpha Calculation (CRPC_CAL 2.0)
By: MC BIERMAN, on 12-16-1993 at 21:44:15
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 10 mL Dilution : 1

Sample # J 1284 Mount # 1

$$\frac{1281}{30} \cdot 0.8 = 8.1283E\text{-}03 \text{ uCi/L alpha}$$

Sample # J 1284 Mount # 2

$$\frac{1216}{30} \cdot 0.8 = 7.7080E\text{-}03 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

7-8 WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1417.-5625	BECHTOLD	12-15-93	15:49	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? 0.250 ml	BLANK

Remarks, Calculations Results
COUNT AS uCI/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
	12.16.93			

Date	Time Completed	Lab Unit Mgr.	
12-16-93			

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

AT: LA-508-101 (D-0) LIQUIDS

			BLANK	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1417-5625	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	12	19
2391	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	0.250	0.250
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
T MIX	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		0.539	0.539
Date	SAMPLE CONCENTRATION in µCi/L		4.18E-03	4.18E-03
12/16/93	AVG. µCi/L in SAMPLE and REPLICATE =		<	4.1816E-03

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	< 4.18E-03		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	< 4.18E-06		
LESS Than Value was Determined from Lc.			1.05E-05 µCi/mL
RELATIVE COUNTING ERROR =	131.1%		

Data Entry by:		Date:	17-Dec-93
Approved by:		Date:	17-Dec-93

Form 1 Rev. 1.1

13 2" 12.16.93 VC #78

J1417-5625

12/30 - .8

19/30

Alpha Calculation (CRPC_CAL 2.0)
By: MC BIRKMAN, on 12-16-1993 at 21:42:35
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .25 mL Dilution : 1

Sample # J 1417 Mount # 1

12/30 - 0.8 < 2.9525E-03 uCi/L alpha

Sample # J 1417 Mount # 2

19/30 - 0.8 < 2.9525E-03 uCi/L alpha

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

1-2

WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5725	BECHTOLD	11- 4-93	8:52	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	4

Sample Size	Customer ID
? 0.250 ml	XE13A

Remarks, Calculations, Results

COUNT AS uCi/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Teresa M. [illegible]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
12-16-93			

54 6800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1285-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	346406	354328
2391	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.7	0.7
AT	SAMPLE SIZE in mL	(SS)	0.250	0.250
Rerun No.	DILUTION FACTOR	(DF)	1	1
4	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
T MIX	Ic, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		11546.167	11810.233
Date	SAMPLE CONCENTRATION in µCi/L		8.96E+01	9.16E+01
12/16/93	AVG. µCi/L in SAMPLE and REPLICATE =			9.0619E+01

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	9.06E+01	DETECTION LEVEL 9.93E-06 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	9.06E-02	
RELATIVE COUNTING ERROR =	0.2%	

Data Entry by:		Date:	17-Dec-93
Approved by:		Date:	17-Dec-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 12/14/93 MCB

J1285-5725

$\frac{346406}{30}$ - 7

$\frac{354328}{30}$

Alpha Calculation (CRPC_CAL 2.0)
By: MC BIERMAN, on 12-16-1993 at 21:46:31
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .25 mL Dilution : 1

Sample # J 1285 Mount # 1

$$\frac{346406}{30} \cdot 0.7 = 8.9595E+01 \text{ uCi/L alpha}$$

Sample # J 1285 Mount # 2

$$\frac{354328}{30} \cdot 0.7 = 9.1644E+01 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3-1

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5725	BECHTOLD	11- 4-93	8:58	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	5

Sample Size	Customer ID
? 0.250 ml	KE13A

Remarks, Calculations, Results

COUNT AS uCI/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr.	
12-16-93			

54-6800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1285-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	328889	315982
2391	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.7	0.7
AT	SAMPLE SIZE in mL	(SS)	0.250	0.250
Rerun No.	DILUTION FACTOR	(DF)	1	1
5	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
T MIX	Rc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		10962.267	10532.033
Date	SAMPLE CONCENTRATION in µCi/L		8.51E+01	8.17E+01
12/16/93	AVG. µCi/L in SAMPLE and REPLICATE =			8.3395E+01

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	8.34E+01	DETECTION LEVEL	
ALPHA TOTAL in µCi/mL (AVERAGE) =	8.34E-02	9.93E-06 µCi/mL	
RELATIVE COUNTING ERROR =	0.2%		

Data Entry by:		Date:	17-Dec-93
Approved by:		Date:	17-Dec-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 12/16/93 MWS

J1285-5725

328889
30

315982
30

Alpha Calculation (CRPC_CAL 2.0)
By: MC BIERMAN, , on 12-16-1993 at 21:47:36
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .25 mL Dilution : 1

Sample # J 1285 Mount # 1

$$\frac{328889}{30} - 0.7 = 8.5964E+01 \text{ uCi/L alpha}$$

Sample # J 1285 Mount # 2

$$\frac{315982}{30} - 0.7 = 8.1725E+01 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

5-6

WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5725	BECHTOLD	11-14-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	6

Sample Size	Customer ID
? 0.250 ml	KE13A

Remarks, Calculations, Results

COUNT AS uCI/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Teresa Mi	[illegible]			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
12-16-93		[illegible]	[illegible]

54-6800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1285-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	355308	365951
2391	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.7	0.7
AT	SAMPLE SIZE in mL	(SS)	0.250	0.250
Rerun No.	DILUTION FACTOR	(DF)	1	1
6	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
T MIX	Ic, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		11842.900	12197.667
Date	SAMPLE CONCENTRATION in µCi/L		9.19E+01	9.47E+01
12/16/93	AVG. µCi/L in SAMPLE and REPLICATE =			9.3274E+01

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	9.33E+01	DETECTION LEVEL 9.93E-06 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	9.33E-02	
RELATIVE COUNTING ERROR =	0.2%	

Data Entry by:	[illegible]	Date:	17-Dec-93
Approved by:	[illegible]	Date:	17-Dec-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 12/16/93 MCB

J1285-5725

355308 ~~Alpha Calculation~~ (CRPC_CAL 2.0)
30 By: MO FIERMAN, on 12-16-1993 at 21:45:35
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .25 mL Dilution : 1

365951 Sample # J 1285 Mount # 1
30

355308
---------- - 0.7 = 9.1697E+01 uCi/L alpha
30

Sample # J 1285 Mount # 2

365951
---------- - 0.7 = 9.4550E+01 uCi/L alpha
30

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WESTINGHOUSE HANFORD COMPANY

WHC-SD-WM-DP-057 REV O

222-S LABORATORY

ANALYTICAL BATCH 2312

Lab Segment Serial No. J1285	Customer ID: KE13A
Analysis:	Sample Prep: Direct Liquid

Instrument: WA 45709	Procedure/ Rev: LA 508-101/Rev D-0
Technologist: Cynthia Johnson CJohnson	Date: 12/9/93
Starting Time: 0950	Temperature N/A
Ending Time: 1040	Chemist: Stan Catlow

Comments:

	Description	Lab ID
1	INITIAL LMCS CHECK STD	J1284-5525
2	REAGENT BLANK	
3	cf 12-7-93	J1284-5725
4	sample	J1285-5725
5	sample duplicate	J1285 5725
6	sample triplicate	J1285-5725
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
cf 12-7-93				
LMCS Check Std	109B51/10ml			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-508-101

DATE START: DECEMBER 9, 1993

PREPARED BY: S.L. FITZGERALD

DATE COMPLETE: DECEMBER 13, 1993

	UNITS:	ug/mL										
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	ACCU	%REC	DET LIM	% CT ER
STD 109B51	J1284	ALPHA	1.08E-02							103.9	2.01E-07	2.5
KE146A	J1235	ALPHA	8.65E-02	7.36E-02	8.79E-02	8.27E-02	1.58E-02	19.07			8.02E-06	0.2
											8.02E-06	0.2
											8.02E-06	0.2

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Standard results are reported as uCi/L

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV O

1-2

Serial No	Sample Point		Time Issued	Priority
J 1284.-5525	BECHTOLD	11- 4-93	8:47	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	114107	0

Sample Size	Customer ID
10 ml	

Remarks, Calculations, Results

STD# 109 651 RESULT 1.08 E-2 uCi/L

STD VAL 1.0398 E-2 %REC 103.9 %

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5

Date	Time Completed	Lab Unit Mgr	
12/9/93	1040		

54-6800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			STANDARD	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1284-5525	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	1706	1654
2312	COUNT TIME in MINUTES	(CT)	30	30
AT or T3 ?	BACKGROUND in cpm	(BKG)	0.4	0.4
AT	SAMPLE SIZE in mL	(SS)	10.000	10.000
Rerun No.	DILUTION FACTOR	(DF)	1	1
3	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
	Rs, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		56.467	54.733
Date	SAMPLE CONCENTRATION in µCi/L		1.10E-02	1.06E-02
12/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			1.0786E-02

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	1.08E-02		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	1.08E-05		2.01E-07 µCi/mL
RELATIVE COUNTING ERROR =	2.5%		

Data Entry by:		Date:	10-Dec-93
Approved by:		Date:	14-Dec-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 12-9-93 DM

J1284-5525

$\frac{1706}{30} - .4$

$\frac{1654}{30}$

Alpha Calculation (CRTC_C&L 2.0)
By: EM BARELA, on 12-09-1993 at 17:52:50
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 10 mL Dilution : 1

Sample # J1284 Mount # 1

$$\frac{1706}{30} - 0.4 = 1.0954E\text{-}02 \text{ uCi/L alpha}$$

Sample # J1284 Mount # 2

$$\frac{1654}{30} - 0.4 = 1.0618E\text{-}02 \text{ uCi/L alpha}$$

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3-4

WHC-SD-WM-DP-057 REV 0

Serial No.	Sample Point	Date	Time Issued	Priority
J 1285.-5725	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	1

Sample Size	Customer ID
? .250 ml	KE13A

Remarks Calculations Results

COUNT AS uCI/L
USE 13,14,15 OR 16

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
12/9/93	1040	

54 E800-061 (R 10 83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1285-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	367204	301914
2312	COUNT TIME in MINUTES	(CT)	30	30
AT or T3 ?	[illegible]	(BKG)	0.4	0.4
AT	SAMPLE SIZE in mL	(SS)	0.250	0.250
Rerun No.	DILUTION FACTOR	(DF)	1	1
1	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
	Rc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		12239.733	10063.400
Date	SAMPLE CONCENTRATION in µCi/L		9.50E+01	7.81E+01
12/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			8.6533E+01

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	8.65E+01	DETECTION LEVEL 8.02E-06 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	8.65E-02	
RELATIVE COUNTING ERROR =	0.2%	

Data Entry by:		Date:	10-Dec-93
Approved by:		Date:	14-Dec-93

Form 1 Rev. 1.1

Page 1 of 1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 12-9-93 DM

J1285-5725

367204/30 - .4

301914/30

Alpha Calculation (CRPC_CAL 2.0)
By: EM BARKLA, , on 12-09-1993 at 17:48:29
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 1 mL Dilution : 4

Sample # J1285 Mount # 1

367204
---------- - 0.4 = 9.4977E+01 uCi/L alpha
30

Sample # J1285 Mount # 2

301914
---------- - 0.4 = 7.8089E+01 uCi/L alpha
30

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

5-6

WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5725	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/mL	[illegible]	1

Sample Size	Customer ID
.250 ml	

Remarks Calculations Results

[illegible] Duplicate RERUN

USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	[illegible]	[illegible]		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Laboratory Manager	
12-9-93	1040	[illegible]	[illegible]

54-6800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1285-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	293240	276215
2312	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.4	0.4
AT	SAMPLE SIZE in mL	(SS)	0.250	0.250
Rerun No.	DILUTION FACTOR	(DF)	1	1
1	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
	Ps, Pmax, or Ps, (SAMPLE RATE) as APPROPRIATE		9774.267	9206.767
Date	SAMPLE CONCENTRATION in µCi/L		7.58E+01	7.14E+01
12/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			7.3644E+01

Ps (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Ps * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	7.36E+01		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	7.36E-02		8.02E-06 µCi/mL
RELATIVE COUNTING ERROR =	0.2%		

Data Entry by:	[illegible]	Date:	10-Dec-93
Approved by:	[illegible]	Date:	14-Dec-93

Form 1 Rev. 1.1

Page 1 of 1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 12-9-93 Dm

J1285-5225

293240 / 30 --4

276215 / 30

Alpha Calculation (CRPC_CAL 2.0)
By: KM BARELA, on 12-09-1993 at 17:51:40
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 1 mL Dilution : 4

Sample # J1285 Mount # 1

$$\frac{293240}{30} \cdot 0.4 = 7.5845E+01 \text{ uCi/L alpha}$$

Sample # J1285 Mount # 2

$$\frac{276215}{30} \cdot 0.4 = 7.1442E+01 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

7-8

WHC-SD-WM-DP-057 REV O

Serial No.	Sample Point	Date	Time Issued	Priority
J 1285.-5725	BECHTOLD	11- 4-93	8:58	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	3

Sample Size	Customer ID
? .250 ml	KE13A

Remarks Calculations Results Triplicate **RERUN**

COUNT AS uCI/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	DHMedina	Eric Barela		
Hrs	Hrs	Hrs	Hrs	Hrs
Date 12-9-93	Time Completed 1040	Lab Approval		

54 6800-061 (R 10 83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1285-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	358429	321014
2312	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.4	0.4
AT	SAMPLE SIZE in mL	(SS)	0.250	0.250
Rerun No.	DILUTION FACTOR	(DF)	1	1
3	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		11947.233	10700.067
Date	SAMPLE CONCENTRATION in µCi/L		9.27E+01	8.30E+01
12/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			8.7868E+01

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	8.79E+01	DETECTION LEVEL 8.02E-06 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	8.79E-02	
RELATIVE COUNTING ERROR =	0.2%	

Data Entry by:		Date:	10-Dec-93
Approved by:		Date:	14-Dec-93

Form 1 Rev. 1.1

13/2 12-9-93 DM

J1285-5725

$\frac{358429}{30} - .4$

$\frac{321014}{30}$

Alpha Calculation (CKPC_CAL 2.0)
By: LM BARELA, on 12-09-1993 at 18:52:57
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .25 mL Dilution : 1

Sample # J1285 Mount # 1

$$\frac{358429}{30} - 0.4 = 9.2707E+01 \text{ uCi/L alpha}$$

Sample # J1285 Mount # 2

$$\frac{321014}{30} - 0.4 = 8.3029E+01 \text{ uCi/L alpha}$$

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WESTINGHOUSE HANFORD COMPANY Batch 2093

222-S LABORATORY

ANALYTICAL BATCH WHC-SD-WM-DP-057 REV 0

Lab Segment Serial No. J1285, J1284, J1287	Customer ID: K813A, K813B, K813B
Analysis: AT	Sample Prep: [illegible]

Instrument: WA 57276	Procedure/ Rev: LA 528-101 / Rev D
Technologist: Cynthia Johnson	Date: 11/09/93
Starting Time: 1030 hrs	Temperature N/A
Ending Time: 1410 hrs	Chemist: Stan Cutler

Comments: Used 100 ml sample size. Samples are golden yellow in color and very acidic.

	Description	Lab ID
1	Instrument check std	J1284-5525
2	Reagent blank	J1284-5525
3	Sample	J1285-5125
4	Sample duplicate	J1285-5125
5	Sample triplicate	J1285-5125
6	Sample	J1286-5125
7	Sample duplicate	J1286-5125
8	Sample triplicate	J1286-5125
9	Sample	J1287-5125
10	Sample duplicate	J1287-5125

	Description	Lab ID
11	Sample triplicate	J1287-5125
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
Instrument check std	1C91B51/1 ml			
		* Rerun	OUT FOR RERUN	

83

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-508-101

DATE START: NOVEMBER 9, 1993

PREPARED BY: S.L. FITZGERALD

DATE COMPLETE: NOVEMBER 11, 1993

	UNITS:	ug/mL										
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	ACCU	%REC	DET LIM	% CT ER
STD 94B51	J1284	ALPHA	1.07E-02							103	2.67E-07	2.6
BLANK	J1300	ALPHA	<1.07E-05								2.67E-05	55.3
KE-13A	J1285	ALPHA	1.06E-01	8.68E-02	1.18E-01	1.04E-01	3.15E-02	30.38			2.67E-05	0.3
											2.67E-05	0.3
											2.67E-05	0.2
KE-20B	J1286	ALPHA	1.87E-02	2.01E-02	1.84E-02	1.91E-02	1.81E-03	9.518			2.67E-05	0.6
											2.67E-05	0.6
											2.67E-05	0.6
KE-20D	J1287	ALPHA	2.28E-02	2.32E-02	2.21E-02	2.27E-02	1.11E-03	4.906			2.67E-05	0.5
											2.67E-05	0.6
											2.54E-05	0.6

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Standard results are reported as uCi/L

The precision for sample J1285 is greater than 25% so this sample needs to be rerun.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV 0

Serial No.	Sample Point	Date	Time Issued	Priority
J 1284.-5525	BECHTOLD	11- 4-93	8:47	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	E14157	0

Sample Size: ? 10mL

Customer ID: STD

Remarks, Calculations, Results

S510 EV-CRB

STD# 109B51 RESULT 1.07 E-2

STD VAL 1.0399 E-2 %REC 102.9%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
	11.16.93			

Date	Time Completed	Lab Unit Mgr
11/9/93	1410hrs	

54-6800-063 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			STANDARD	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1284-5525	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	1688	1607
2110	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	10.000	10.000
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		55.467	52.767
Date	SAMPLE CONCENTRATION in µCi/L		1.10E-02	1.05E-02
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			1.0720E-02

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	1.07E-02		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	1.07E-05		2.67E-07 µCi/mL
RELATIVE COUNTING ERROR =	2.6%		

Data Entry by:		Date:	11-Nov-93
Approved by:		Date:	17-Nov-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

14 2" 11.10.93 R 1-2

J1284-5525

1688 / 30

1607 / 30

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 11-10-1993 at 15:11:56
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

Sample # J-1284 Mount # 1

$$\frac{1688}{30} \cdot 0.8 = 1.0987E\text{-}02 \text{ uCi/L alpha}$$

Sample # J-1284 Mount # 2

$$\frac{1607}{30} \cdot 0.8 = 1.0452E\text{-}02 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3-4

WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1300.-5625	BECHTOLD	11- 4-93	15:22	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .100mL	BLK

Remarks, Calculations, Results

COUNT AS uCI/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
	11.16.93			

Date	Time Completed	Lab Unit Mgr
11/9/93	1410 hrs	

54-6800-06 (R-10-83)

BEST AVAILABLE COPY

AT: LA-508-101 (D-0) LIQUIDS

			BLANK	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1300-5625	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	13	13
2110	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		0.539	0.539
Date	SAMPLE CONCENTRATION in µCi/L		1.07E-02	1.07E-02
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =		<	1.0675E-02

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	< 1.07E-02		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	< 1.07E-05		
LESS Than Value was Determined from Lc.			2.67E-05 µCi/mL
RELATIVE COUNTING ERROR =	55.3%		

Data Entry by:		Date:	11-Nov-93
Approved by:		Date:	17-Nov-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

14 2" 11.10.93 R 3-4 J1300-5625

13/30 - Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 11-10-1993 at 15:12:35
13/30 - Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # J-1300 Mount # 1

13
---------- - 0.8 < 7.5370E-03 uCi/L alpha
30

Sample # J-1300 Mount # 2

13
---------- - 0.8 < 7.5370E-03 uCi/L alpha
30

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

5-6 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5725	BECHTOLD	11- 4-93	8:48	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .100 ml	KE13A

Remarks Calculations Results

COUNT AS uCI/L sample
USE 13,14,15 OR 16

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	D. Hamilton		
Hrs	Hrs	Hrs	Hrs	Hrs
	11.10.93			
Date	Time Completed	Lab Unit Mgr		
11/9/93	1410 hrs			

54-6800-061 (R 10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1285-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	180196	141745
2110	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		6005.733	4724.033
Date	SAMPLE CONCENTRATION in µCi/L		1.19E+02	9.36E+01
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			1.0627E+02

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	1.06E+02		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	1.06E-01		2.67E-05 µCi/mL
RELATIVE COUNTING ERROR =	0.3%		

Data Entry by:		Date:	11-Nov-93
Approved by:		Date:	17-NOV-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

14 2" 11.10-93 VC 5-C

J1285-5725

180196 / 30

141745 / 30

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 11-10-1993 at 15:13:11
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # J-1285 Mount # 1

$$\frac{180196}{30} \cdot 0.8 = 1.1897E+02 \text{ uCi/L alpha}$$

Sample # J-1285 Mount # 2

$$\frac{141745}{30} \cdot 0.8 = 9.3577E+01 \text{ uCi/L alpha}$$

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

7-8

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5725	BECHTOLD	11- 4-93	8:58	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
?, 100 mL	KE13A

Remarks, Calculations, Results

Duplicate

COUNT AS uCI/L
USE 13,14,15 OR 16

OUT FOR RERUN

C Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	D. Hamlin		
Hrs	Hrs 11-10-93	Hrs	Hrs	Hrs
Date 11/9/93	Time Completed 1410 hrs	Lab Unit Mgr		

54-0800-061 (R-10-83)

BEST AVAILABLE COPY

AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1285-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	131021	131920
2110	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
C JOHNSON	Ic, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		4366.567	4396.533
Date	SAMPLE CONCENTRATION in µCi/L		8.65E+01	8.71E+01
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			8.6793E+01

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	8.68E+01	DETECTION LEVEL 2.67E-05 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	8.68E-02	
RELATIVE COUNTING ERROR =	0.3%	

Data Entry by:		Date:	11-Nov-93
Approved by:		Date:	17-NOV-93

Form 1 Rev. 1.1

Page 1 of 1

14 2" 11.10.93 VR 7-8

J1285-5725

131021 / 30 - .8

131920 / 30 -

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 11-10-1993 at 15:13:42
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # J-1285 Mount # 1

131021
---------- - 0.8 = 8.6496E+01 uCi/L alpha
30

Sample # J-1285 Mount # 2

131920
---------- - 0.8 = 8.7090E+01 uCi/L alpha
30

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV O

9-10

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5725	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .100 ml	KE13A

Remarks Calculations Results

triplicate

COUNT AS uCi/L
USE 13,14,15 OR 16

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	D H Milbin		
Hrs	Hrs	Hrs	Hrs	Hrs
	11-10-93			

Date	Time Completed	Lab Unit Mgr
11/9/93	1410 hrs	

54 6800-061 (R 10-83)

BEST AVAILABLE COPY

AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1285-5725	DISH SIZE 1 , 2 , or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	180344	175910
2110	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		6010.667	5862.867
Date	SAMPLE CONCENTRATION in µCi/L		1.19E+02	1.16E+02
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			1.1760E+02

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	1.18E+02		DETECTION LEVEL 2.67E-05 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	1.18E-01		
RELATIVE COUNTING ERROR =	0.2%		

Data Entry by:		Date:	11-Nov-93
Approved by:		Date:	17-NOV-93

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

14 2" 11.10.93 VR 9-10

J 1285-5725

180344 / 30 - 8

175910 / 30 -

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 11-10-1993 at 15:14:11
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # J-1285 Mount # 1

180344
---------- - 0.8 = 1.1906E+02 uCi/L alpha
30

Sample # J-1285 Mount # 2

175910
---------- - 0.8 = 1.1614E+02 uCi/L alpha
30

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Workunit
J 1286.-5725	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
2.100 ml	KE20B

Remarks Calculations Results

COUNT AS uCI/L sample
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 11/9/93	Time Completed 1410 hrs	Lab Unit Mgr		

54-6800-06 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1286-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	27852	28986
2110	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		927.600	965.400
Date	SAMPLE CONCENTRATION in µCi/L		1.84E+01	1.91E+01
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			1.8749E+01

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	1.87E+01		DETECTION LEVEL 2.67E-05 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	1.87E-02		
RELATIVE COUNTING ERROR =	0.6%		

Data Entry by:		Date:	11-Nov-93
Approved by:		Date:	17-NOV-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

14/2 11-10-93 1-2

J1286-51725

$\frac{27852}{30} - .8$

$\frac{28986}{30}$

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, , on 11-10-1993 at 15:14:47
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # J-1286 Mount # 1

$$\frac{27852}{30} - 0.8 = 1.8375E+01 \text{ uCi/L alpha}$$

Sample # J-1286 Mount # 2

$$\frac{28986}{30} - 0.8 = 1.9123E+01 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5725	BECHTOLD	11- 4-93	8:51	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
?.100ml	KE20B

Remarks, Calculations, Results

duplicate

COUNT AS uCI/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 11/9/93	Time Completed 1410 hrs	Lab Unit Mgr		

54-6800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1286-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	27303	33543
2093	COUNT TIME in MINUTES	(CT)	30	30
AT or TB 7	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		909.300	1117.300
Date	SAMPLE CONCENTRATION in µCi/L		1.80E+01	2.21E+01
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.0072E+01

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	2.01E+01	DETECTION LEVEL 2.67E-05 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	2.01E-02	
RELATIVE COUNTING ERROR =	0.6%	

Data Entry by:		Date:	11-Nov-93
Approved by:		Date:	17-NOV-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-057 REV 0

14/2 11-10-93 3-4

J1286-5725

27303/30 - .8

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 11-10-1993 at 15:15:21
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

33543/30

Sample # J-1286 Mount # 1

$$\frac{27303}{30} - 0.8 = 1.8012E+01 \text{ uCi/L alpha}$$

Sample # J-1286 Mount # 2

$$\frac{33543}{30} - 0.8 = 2.2132E+01 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5725	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .100 ml	KE20B

Remarks Calculations Results *Duplicate*

COUNT AS uCI/L
USE 13,14,15 OR 16

C. Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 11/9/93	Time Completed 1410 hrs	Lab Unit Mgr		

54-6800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1286-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	27998	27871
2093	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		932.467	928.233
Date	SAMPLE CONCENTRATION in µCi/L		1.85E+01	1.84E+01
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			1.8429E+01

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	1.84E+01	DETECTION LEVEL	
ALPHA TOTAL in µCi/mL (AVERAGE) =	1.84E-02	2.67E-05 µCi/mL	
RELATIVE COUNTING ERROR =	0.6%		

Data Entry by:		Date:	11-Nov-93
Approved by:		Date:	17-NOV-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-057 REV 0

14/2 11-10-93 s-6

J1286-5725

27998
30

27871
30

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 11-10-1993 at 15:15:50
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Sample # J-1286 Mount # 1

$$\frac{27998}{30} - 0.8 = 1.8471E+01 \text{ uCi/L alpha}$$

Sample # J-1286 Mount # 2

$$\frac{27871}{30} - 0.8 = 1.8387E+01 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
J 1287.-5725	BECHTOLD ..	11- 4-93	8:52	18

Determination	Method-Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
?.100 ml	KE20D

Remarks, Calculations, Results

COUNT AS uCI/L sample
USE 13,14,15 OR 16

C Joh

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 11/9/93	Time Completed 1410 hrs	Lab Unit Mgr		

54-6800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1287-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	34015	34981
2093	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		1133.033	1165.233
Date	SAMPLE CONCENTRATION in µCi/L		2.24E+01	2.31E+01
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.2763E+01

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	2.28E+01	DETECTION LEVEL	
ALPHA TOTAL in µCi/mL (AVERAGE) =	2.28E-02	2.67E-05 µCi/mL	
RELATIVE COUNTING ERROR =	0.5%		

Data Entry by:		Date:	11-Nov-93
Approved by:		Date:	17-NOV-93

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-057 REV 0

14/2 11-10-93 7-8

J1287-5725

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 11-10-1993 at 15:16:24
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

$\frac{34015}{30} - .8$

Sample # J-1287 Mount # 1

$\frac{34981}{30}$

$$\frac{34015}{30} - 0.8 = 2.2444E+01 \text{ uCi/L alpha}$$

Sample # J-1287 Mount # 2

$$\frac{34981}{30} - 0.8 = 2.3082E+01 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
J 1287.-5725	BECHTOLD	11- 4-93	8:59	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .100 mp	KE20D

Remarks, Calculations, Results

COUNT AS uCi/L duplicate
USE 13,14,15 OR 16

C Joh

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 11/9/93	Time Completed 1410 hrs	Lab Unit Mgr		

54 6800-061 (R-90) 831

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1287-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	30934	39518
2093	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.8	0.8
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		1030.333	1316.467
Date	SAMPLE CONCENTRATION in µCi/L		2.04E+01	2.61E+01
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.3244E+01

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	2.32E+01		DETECTION LEVEL 2.67E-05 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	2.32E-02		
RELATIVE COUNTING ERROR =	0.6%		

Data Entry by:		Date:	11-Nov-93
Approved by:		Date:	17-NOV-93

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

14/2 11-10-93 9-18

J1287-5725

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, , on 11-10-1993 at 15:16:58
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

$\frac{30934}{30} \cdot .8$

$\frac{39518}{30}$

Sample # J-1287 Mount # 1

$$\frac{30934}{30} \cdot 0.8 = 2.0410E+01 \text{ uCi/L alpha}$$

Sample # J-1287 Mount # 2

$$\frac{39518}{30} \cdot 0.8 = 2.6078E+01 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
J 1287.-5725	BECHTOLD	11- 4-93	8:59	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
?.100 ml	KE20D

Remarks, Calculations, Results

COUNT AS uCI/L triplicate
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 11/9/93	Time Completed 1410 hrs	Lab Unit Mgr		

54-6800-061 (R/10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1287-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	31506	35579
2093	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.7	0.7
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2274	0.2274
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		1049.500	1185.267
Date	SAMPLE CONCENTRATION in µCi/L		2.08E+01	2.35E+01
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.2134E+01

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	2.21E+01	DETECTION LEVEL 2.54E-05 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	2.21E-02	
RELATIVE COUNTING ERROR =	0.6%	

Data Entry by:		Date:	11-Nov-93
Approved by:		Date:	17-Nov-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

14/2 11-11-93

J1287-5725

$\frac{31506}{30} - \cancel{.2} \cdot 7$

Alpha Calculation (CRPC_CAL 2.0)
By: RA WILLIAMS, on 11-11-1993 at 08:52:56
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

$\frac{35579}{30}$

Sample # J1287-5725 Mount # 1

$$\frac{31506}{30} - 0.7 = 2.0789E+01 \text{ uCi/L alpha}$$

Sample # J1287-5725 Mount # 2

$$\frac{35579}{30} - 0.7 = 2.3479E+01 \text{ uCi/L alpha}$$

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WHC-SD-WM-DP-057 REV 0

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 2092

Lab Segment Serial No. J1288 J1289	Customer ID: [illegible] K1 94 A
Analysis: AT	Sample Prep: [illegible]

Instrument: WA 45709	Procedure/ Rev: [illegible]
Technologist: Cynthia Johnson	Date: 11 / 09 / 93
Starting Time: 1030 hrs	Temperature N/A
Ending Time: 1400 hrs	Chemist: [illegible]

Comments: Used 100 ml sample size. Sample # J1288 was clear. All other samples were a golden yellow color. Very acidic

	Description	Lab ID		Description	Lab ID
1	Initial IMC Check Std	[illegible]	11		
2	[illegible]	[illegible]	12		
3	Sample	[illegible]	13		
4	Sample duplicate	[illegible]	14		
5	Sample triplicate	[illegible]	15		
6	Sample	J1289-5125	16		
7	Sample duplicate	J1289-5125	17		
8	Sample triplicate	J1289-5125	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
IMC Check Std	IC91351 / 5 ml			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-508-101

DATE START: NOVEMBER 9, 1993

PREPARED BY: S.L. FITZGERALD

DATE COMPLETE: NOVEMBER 11, 1993

		UNITS:	ug/mL									
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	ACCU	%REC	DET LIM	% CT ER
STD 94B51	J1301	ALPHA	1.06E-02							102	2.48E-07	2.5
BLANK	J1302	ALPHA	<9.78E-06								2.48E-05	316
KE-23B	J1288	ALPHA	<9.78E-06	<1.54E-05	<9.78E-06	NA	NA	NA			2.48E-05	122
											2.48E-05	208
											2.48E-05	500
KE-24A	J1289	ALPHA	2.67E-02	2.58E-02	2.67E-02	2.64E-02	1.04E-03	3.936			2.87E-05	0.5
											2.87E-05	0.5
											2.87E-05	0.5

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Standard results are reported as uCi/L

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

1-2 WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1301.-5525	BECHTOLD	11- 8-93	8:47	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	E14157	0

Sample Size	Customer ID
? 10mL	STD

Remarks Calculations Results

SEC 10 EVACUE

FILE# 109651 INTEG 1.06 E-2

STD VAL 1.0399 -2 %REC 101.97

C Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond D. Hutchison			
Hrs	Hrs 11.11.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11/9/93	1400hrs		

BEST AVAILABLE COPY

AT: LA-508-101 (D-0) LIQUIDS

			STANDARD	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1301-5525	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	1699	1608
2092	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.7	0.7
AT	SAMPLE SIZE in mL	(SS)	10.000	10.000
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		55.933	52.900
Date	SAMPLE CONCENTRATION in µCi/L		1.09E-02	1.03E-02
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			1.0556E-02

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	1.06E-02		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	1.06E-05		2.48E-07 µCi/mL
RELATIVE COUNTING ERROR =	2.5%		

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	17-Nov-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

132 11.11.93 R 1-2

J 1301-5525

1699/30 - 7

1608/30 -

Alpha Calculation (CEPC_CAL 2.0)
By: DH MILICIA, , on 11-11-1993 at 11:10:01
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 10 mL Dilution : 1

Sample # J-1301 Mount # 1

$$\frac{1699}{30} - 0.7 = 1.0851E\text{-}02 \text{ uCi/L alpha}$$

Sample # J-1301 Mount # 2

$$\frac{1608}{30} - 0.7 = 1.0262E\text{-}02 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3-4 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1302.-5625	BECHTOLD	11- 8-93	8:50	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .100ml	BLK

Remarks, Calculations, Results

COUNT AS uCI/L
USE 13,14,15 OR 16

C John

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	D H Malicia		
Hrs	Hrs 11-11-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr.	
11/9/93	1400hrs		

54 6800-061 (R 10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			BLANK	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1302-5625	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	19	16
2092	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.7	0.7
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		0.504	0.504
Date	SAMPLE CONCENTRATION in µCi/L		9.78E-03	9.78E-03
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =		<	9.7788E-03

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	< 9.78E-03	DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	< 9.78E-06	
LESS Than Value was Determined from Lc.		2.48E-05 µCi/mL
RELATIVE COUNTING ERROR =	316.2%	

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

B2" 11.11.93 KE ~~78~~ Dm

J1302-5625

19/30

16/30

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, , on 11-11-1993 at 11:10:43
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

Sample # J-1302 Mount # 1

$$\frac{19}{30} - 0.7 < 6.9045E\text{-}03 \text{ uCi/L alpha}$$

Sample # J-1302 Mount # 2

$$\frac{16}{30} - 0.7 < 6.9045E\text{-}03 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

5-6 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1288.-5725	BECHTOLD	11- 4-93	8:53	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .100mL	KE23B

Remarks Calculations Results

COUNT AS uCi/L
DEF 13, 14, 15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	D.H. Mulicin		
Hrs	Hrs	Hrs	Hrs	Hrs
	11.11.93			
Date 11/9/93	Time Completed 1400hrs	Lab Unit Mgr		

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1288-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	16	16
2092	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.7	0.7
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		0.504	0.504
Date	SAMPLE CONCENTRATION in µCi/L		9.78E-03	9.78E-03
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =		<	9.7788E-03

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	< 9.78E-03		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	< 9.78E-06		
LESS Than Value was Determined from Lc.			2.48E-05 µCi/mL
RELATIVE COUNTING ERROR =	121.7%		

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	17-Nov-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13 2" 11.11.93 VR 5-6

J 1288-5225

16/30

Alpha Calculation (CLPC_CAL 2.0)
By: DH MILICIA, on 11-11-1993 at 11:11:08
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

16/30

Sample # J-1288 Mount # 1

16
---------- - 0.7 < 6.9045E-03 uCi/L alpha
30

Sample # J-1288 Mount # 2

16
---------- - 0.7 < 6.9045E-03 uCi/L alpha
30

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

7-8 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1288.-5725	BECHTOLD	11- 4-93	9: 1	18

Determination	Method-Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
?.100ml	KE23B

Remarks Calculations Results

COUNT AS uCI/L Duplicate
USE 13,14,15 OR 16

C Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	D.H. Milliken		
Hrs	Hrs 11.11.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Dept Mgr
11/9/93	1400hrs	

54-6800-061 (R10 83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1288-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	29	18
2092	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.7	0.7
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		0.794	0.504
Date	SAMPLE CONCENTRATION in µCi/L		1.54E-02	9.78E-03
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =		<	1.2593E-02

Rs (Sample Count Rate) = (TC / CT) - BKG
ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	< 1.54E-02		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	< 1.54E-05		
LESS THAN Value was Determined from Rmax.			2.48E-05 µCi/mL
RELATIVE COUNTING ERROR =	208.2%		

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	17-NOV-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13.2" 11.11.93 R 7-8

J1288-5725

29/30 — 7

18/30 —

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 11-11-1993 at 11:11:40
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

Sample # J-1288 Mount # 1

29/30 - 0.7 < 1.2718E-02 uCi/L alpha

Sample # J-1288 Mount # 2

18/30 - 0.7 < 6.9045E-03 uCi/L alpha

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

9-10 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1288.-5725	BECHTOLD	11- 4-93	9: 1	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
.100ml	KE33b

Remarks Calculations Results

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	D.H. Gilliam		
Hrs	Hrs 11.11.93	Hrs	Hrs	Hrs
Date 11/9/93	Time 1400hrs			

54-6800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1288-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	21	18
2092	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	0.7	0.7
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
C JOHNSON	Ic, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		0.504	0.504
Date	SAMPLE CONCENTRATION in µCi/L		9.78E-03	9.78E-03
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =		<	9.7788E-03

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	< 9.78E-03		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	< 9.78E-06		
LESS THAN Value was Determined from Rmax.			2.48E-05 µCi/mL
RELATIVE COUNTING ERROR =	500.0%		

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	17-NOV-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13 2" 11.11.93 VR 9-10

J1288-5725

21/30 - 18/30 -

Alpha Calculation (CKPC_CAL 2.0)
By: DH MILICIA, on 11-11-1993 at 11:12:07
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

Sample # J-1288 Mount # 1

21
---------- - 0.7 < 6.9147E-03 uCi/L alpha
30

Sample # J-1288 Mount # 2

18
---------- - 0.7 < 6.9045E-03 uCi/L alpha
30

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV O

1-2

Serial No	Sample Point	Date	Time Issued	Priority
J 1289.-5725	BECHTOLD	11- 4-93	8:53	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .100ml	KE24A

Remarks Calculations Results

COUNT AS uCI/L sample
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11/9/93	1400HRS	

54 0800-061 R 10-831

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1289-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	38715	43781
2092	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	1	1
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
C JOHNSON	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		1289.500	1458.367
Date	SAMPLE CONCENTRATION in µCi/L		2.50E+01	2.83E+01
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.6653E+01

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	2.67E+01		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	2.67E-02		2.87E-05 µCi/mL
RELATIVE COUNTING ERROR =	0.5%		

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	17-NOV-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 11-11-93 Dm

J1289-5725

38715 / 30 - 1.

43781 / 30

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, , on 11-11-1993 at 13:21:30
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

Sample # J-1289 Mount # 1

38715 / 30 - 1.0 = 2.5015E+01 uCi/L alpha

Sample # J-1289 Mount # 2

43781 / 30 - 1.0 = 2.8291E+01 uCi/L alpha

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3-4

WHC-SD-WM-DP-057 REV 0

Serial No.	Sample Point	Date	Time Issued	Priority
J 1289.-5725	BECHTOLD	11- 4-93	9: 2	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
.100ml	[illegible]

Remarks Calculations Results: duplicate

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D.H. [illegible]			
Hrs	Hrs	Hrs	Hrs	Hrs
Date 11/9/93	Time Completed 1400 hrs	Last Analyst Name		

54-5800-061 (R-10-83)

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1289-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	38601	41311
2092	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	1	1
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		1285.700	1376.033
Date	SAMPLE CONCENTRATION in µCi/L		2.49E+01	2.67E+01
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.5818E+01

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	2.58E+01		DETECTION LEVEL 2.87E-05 µCi/mL
ALPHA TOTAL in µCi/mL (AVERAGE) =	2.58E-02		
RELATIVE COUNTING ERROR =	0.5%		

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	17-Nov-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 11-11-93 DM

J1289-5225

38601 / 30

41311 / 30

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, _____ on 11-11-1993 at 13:22:05
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

Sample # J-1289 Mount # 1

$$\frac{38601}{30} \cdot 1.0 = 2.4942E+01 \text{ uCi/L alpha}$$

Sample # J-1289 Mount # 2

$$\frac{41311}{30} \cdot 1.0 = 2.6694E+01 \text{ uCi/L alpha}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV O

5-6

Serial No	Sample Point	Date	Time Issued	Priority
J 1289.-5725	BECHTOLD	11- 4-93	9: 2	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
2.100ml	KE24A

Remarks Calculations Results triplicate

COUNT AS uCi/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	P.H. Nelson			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11/9/93	1400 hrs	

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AT: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		13	13
J1289-5725	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	39098	43446
2092	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	1	1
AT	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.2322	0.2322
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		1302.267	1447.200
Date	SAMPLE CONCENTRATION in µCi/L		2.53E+01	2.81E+01
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.6669E+01

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

ALPHA TOTAL in µCi/L (AVERAGE) =	2.67E+01		DETECTION LEVEL
ALPHA TOTAL in µCi/mL (AVERAGE) =	2.67E-02		2.87E-05 µCi/mL
RELATIVE COUNTING ERROR =	0.5%		

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	17-Nov-93

Form 1 Rev. 1.1

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

13/2 11-11-93 DM

J1289-5725

39098 / 30 - 1.0

43446 / 30

Alpha Calculation (CRPC_CAL 2.0)
By: DH MILICIA, on 11-11-1993 at 14:18:26
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .1 mL Dilution : 1

Sample # J-1289 Mount # 1

$$\frac{39098}{30} - 1.0 = 2.5263E+01 \text{ uCi/L alpha}$$

Sample # J-1289 Mount # 2

$$\frac{43446}{30} - 1.0 = 2.8075E+01 \text{ uCi/L alpha}$$

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OA
6

WESTINGHOUSE HANFORD COMPANY

Batch 2106

WHC-SD-WM-DP-057 REV O

222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No. T-1284 [illegible]	Customer ID: [illegible]
Analysis: TB	Sample Prep: Direct

Instrument: ~~AA~~ UV-VIS 4-5709	Procedure/ Rev: LA-508-101-D0
Technologist: BILL SYTH [illegible]	Date: 11-8-93
Starting Time: 1300	Temperature NA
Ending Time: 1500	Chemist: Smith

Comments:

	Description	Lab ID		Description	Lab ID
1	STD	T-1284-[illegible]	11		
2	BLK	[illegible]	12		
3	SAM	T-1284-[illegible]	13		
4	DUP	T-1284-[illegible]	14		
5	TRIP	T-1284-[illegible]	15		
6	SAM	T-1284-5720	16		
7	DUP	T-1284-[illegible]	17		
8	TRIP	T-1284-[illegible]	18		
9		5720	19		
10		QH 1193	20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	109861/10 ml			

A-6000-881 (03/92)

OP

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-057 REV O

METHOD: LA-508-101

DATE START: OCTOBER 25, 1993

PREPARED BY: S.L. FITZGERALD

DATE COMPLETE: NOVEMBER 1, 1993

	UNITS:	ug/mL										
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	ACCU	%REC	DET LIM	% CT ER
STD 109B51	J1284	BETA	2.83E-01							99	7.67E-07	0.4
BLANK	J1300	BETA	<2.58E-04								3.07E-04	500
KE-13A	J1285	BETA	7.48E-01	7.45E-01	7.62E-01	7.52E-01	1.81E-02	2.41			3.07E-04	0.2
											3.07E-04	0.2
											3.07E-04	0.2
KE-20B	J1286	BETA	1.76E-01	1.79E-01	1.72E-01	1.76E-01	7.02E-03	4.00			7.67E-05	0.2
											7.67E-05	0.2
											7.67E-05	0.2

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Standard results are reported in ug/L

152

Serial No	Sample Point	Date	Time Issued	Priority
J 1284.-5520	BECHTOLD	11- 4-93	8:47	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	% RECOVERY	E14157	0

Sample Size	Customer ID
? 10 ml	STD

Remarks Calculations Results

8515 EV-CRB

STD#109B51 RESULT 2.83 E-1

STD VAL 2.86 E-1 %REC 99.0

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 11-8-93	Hrs 11.9.93	Hrs	Hrs
Date 11-8-93	Time Completed 1500	Lab Unit Mgr		11/9

5-6806-201 (9-10/83)

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TB: LA-508-101 (D-0) LIQUIDS

			STANDARD	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1284-5520	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	58725	58350
2106	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	17	17
TB	SAMPLE SIZE in mL	(SS)	10.000	10.000
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
W SYTH	Lc, Rmax, or Rs (SAMPLE RATE) as APPROPRIATE		1940.500	1928.000
Date	SAMPLE CONCENTRATION in µCi/L		2.84E-01	2.82E-01
11/08/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.8325E-01

Rs (Sample Count Rate) = (TC / CT) - BKG

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA in µCi/L (AVERAGE) =	2.83E-01	DETECTION LEVEL	
TOTAL BETA in µCi/mL (AVERAGE) =	2.83E-04	7.67E-07 µCi/mL	
RELATIVE COUNTING ERROR =	0.4%		

Data Entry by:		Date:	09-Nov-93
Approved by:		Date:	10-NOV-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

#14/2 11-8-93 [illegible]

10 ml

58725/30 - 17

J1284-5520

58350/30 - 17

Beta Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, on 11-09-1993 at 03:55:26
Det #14 2 -inch mount Beta eff. : .3076
Sample size : 10 mL Dilution : 1

Sample # J1284 Mount # 1

$$\frac{58725}{30} - 17.0 = 2.8417E\text{-}01 \text{ uCi/L beta}$$

Sample # J1284 Mount # 2

$$\frac{58350}{30} - 17.0 = 2.8234E\text{-}01 \text{ uCi/L beta}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3.84

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1300.-5620	BECHTOLD	11- 4-93	15:22	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? Ra 11/9/93 .025 mL	BLK

Remarks Calculations Results

COUNT AS uCI/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 11-8-93	Hrs 11.9.93	Hrs	Hrs
Date 11-8-93	Time Completed 1500	Lab		

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TB: LA-508-101 (D-0) LIQUIDS

			BLANK	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1300-5620	DISH SIZE 1 , 2 , or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	642	511
2106	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	17	17
TB	SAMPLE SIZE in mL	(SS)	0.025	0.025
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
W. SYTH	Lc, Pmax, or Rs (SAMPLE RATE) as APPROPRIATE		4.400	2.518
Date	SAMPLE CONCENTRATION in µCi/L		2.58E-01	1.48E-01
11/08/93	AVG. µCi/L in SAMPLE and REPLICATE =		<	2.0262E-01

Rs (Sample Count Rate) = (TC / CT) - BKG

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA in µCi/L (AVERAGE) =	< 2.58E-01	DETECTION LEVEL
TOTAL BETA in µCi/mL (AVERAGE) =	< 2.58E-04	
LESS THAN Value was Determined from Rs.		3.07E-04 µCi/mL
RELATIVE COUNTING ERROR =	500.0%	

Data Entry by:		Date:	09-Nov-93
Approved by:		Date:	10-Nov-93

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14/2 11-8-93 AB

10 ml

J1300-5620

642/30 - 17

511/30 - 17

Beta Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, _____, on 11-09-1993 at 03:52:16
Det #14 2 -inch mount Beta eff. : .3076
Sample size : 10 mL Dilution : 1

Sample # J1300 Mount # 1

$$\frac{642}{30} - 17.0 = 6.4434E\text{-}04 \text{ uCi/L beta}$$

Sample # J1300 Mount # 2

$$\frac{511}{30} - 17.0 < 2.6224E\text{-}04 \text{ uCi/L beta}$$

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WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5720	BECHTOLD	11- 4-93	8:48	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .025 ml	KE13A

Remarks Calculations Results
COUNT AS uCi/L sample
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 11-8-93	Hrs 11.9.93	Hrs	Hrs
Date 11-8-93	Time Completed 1500	Lab Mgr		

54-5500-067 (R-10/93)

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TB: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1285-5720	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	372467	394839
2106	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	17	17
TB	SAMPLE SIZE in mL	(SS)	0.025	0.025
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
W SYTH	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		12398.567	13144.300
Date	SAMPLE CONCENTRATION in µCi/L		7.26E+02	7.70E+02
11/08/93	AVG. µCi/L in SAMPLE and REPLICATE =			7.4810E+02

Rs (Sample Count Rate) = (TC / CT) - BKG
TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA in µCi/L (AVERAGE) =	7.48E+02		DETECTION LEVEL
TOTAL BETA in µCi/mL (AVERAGE) =	7.48E-01		3.07E-04 µCi/mL
RELATIVE COUNTING ERROR =	0.2%		

Data Entry by:		Date:	09-Nov-93
Approved by:		Date:	10-NOV-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14/2 11-8-93

372467/30 -17

394839/30 -17

.025 mL

J1285-5220

Beta Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, _ , on 11-09-1993 at 03:54:52
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .025 mL Dilution : 1

Sample # J1285 Mount # 1

$$\frac{372467}{30} - 17.0 = 7.2626E+02 \text{ uCi/L beta}$$

Sample # J1285 Mount # 2

$$\frac{394839}{30} - 17.0 = 7.6994E+02 \text{ uCi/L beta}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

788

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5720	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .025 ml	KE13A

Remarks Calculations Results

COUNT AS uCI/L duplicate
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 11-8-93	Hrs 11.9.93	Hrs	Hrs
Date 11-8-93	Time Completed 2500	Lab Unit Manager		

54-5300-061 (R-10-83)

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TB: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1285-5720	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	372604	391736
2106	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	17	17
TB	SAMPLE SIZE in mL	(SS)	0.025	0.025
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
W SYTH	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		12403.133	13040.867
Date	SAMPLE CONCENTRATION in µCi/L		7.27E+02	7.64E+02
11/08/93	AVG. µCi/L in SAMPLE and REPLICATE =			7.4521E+02

Rs (Sample Count Rate) = (TC / CT) - BKG

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA in µCi/L (AVERAGE) =	7.45E+02	DETECTION LEVEL
TOTAL BETA in µCi/mL (AVERAGE) =	7.45E-01	3.07E-04 µCi/mL
RELATIVE COUNTING ERROR =	0.2%	

Data Entry by:		Date:	09-Nov-93
Approved by:		Date:	10-Nov-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14/2 11-8-93 .0

.025 ml

372604 / 30 - 17

J1285-5720

391736 / 30 - 17

Beta Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, , on 11-09-1993 at 03:54:18
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .025 mL Dilution : 1

Sample # J1285 Mount # 1

$$\frac{372604}{30} - 17.0 = 7.2653E+02 \text{ uCi/L beta}$$

Sample # J1285 Mount # 2

$$\frac{391736}{30} - 17.0 = 7.6388E+02 \text{ uCi/L beta}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

9510

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5720	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .025 ml	KE13A

Remarks Calculations Results triplicate

COUNT AS uCI/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
		Raymond		
Hrs	Hrs 11-8-93	Hrs 11.9.93	Hrs	Hrs
Date 11-8-93	Time Completed 1500	Lab Unit Supv		11/9

SY-6E0C-051 (R-10-83)

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TB: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1285-5720	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	389717	391630
2106	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	17	17
TB	SAMPLE SIZE in mL	(SS)	0.025	0.025
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
W SYTH	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		12973.567	13037.333
Date	SAMPLE CONCENTRATION in µCi/L		7.60E+02	7.64E+02
11/08/93	AVG. µCi/L in SAMPLE and REPLICATE =			7.6181E+02

Rs (Sample Count Rate) = (TC / CT) - BKG

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA in µCi/L (AVERAGE) =	7.62E+02		DETECTION LEVEL
TOTAL BETA in µCi/mL (AVERAGE) =	7.62E-01		3.07E-04 µCi/mL
RELATIVE COUNTING ERROR =	0.2%		

Data Entry by:		Date:	09-Nov-93
Approved by:		Date:	10-Nov-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14/3 11-8-93

389717 -17
30

391630 -17
30

J1285-5720

Beta Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, on 11-09-1993 at 03:53:49
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .025 mL Dilution : 1

Sample # J1285 Mount # 1

$$\frac{389717}{30} - 17.0 = 7.5994E+02 \text{ uCi/L beta}$$

Sample # J1285 Mount # 2

$$\frac{391630}{30} - 17.0 = 7.6368E+02 \text{ uCi/L beta}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

1-2

WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5720	BECHTOLD	11- 4-93	8:51	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .100 ml	KE20B

Remarks Calculations Results

COUNT AS uCI/L sample
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 11.9.93	Hrs	Hrs	Hrs
Date 11-8-93	Time Completed 1500	Lab Manager		

54-6500-061 (R-10-83)

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TB: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1286-5720	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	364508	358238
2106	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	17	17
TB	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
W SYTH	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		12133.267	11924.267
Date	SAMPLE CONCENTRATION in µCi/L		1.78E+02	1.75E+02
11/08/93	AVG. µCi/L in SAMPLE and REPLICATE =			1.7615E+02

Rs (Sample Count Rate) = (TC / CT) - BKG
TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA in µCi/L (AVERAGE) =	1.76E+02	DETECTION LEVEL	
TOTAL BETA in µCi/mL (AVERAGE) =	1.76E-01	7.67E-05 µCi/mL	
RELATIVE COUNTING ERROR =	0.2%		

Data Entry by:		Date:	09-Nov-93
Approved by:		Date:	10-NOV-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

#14 2" 11.9.93 #1-2

J1286-5720

364508 / 30 _ 17

358238 / 30 _

Beta Calculation (CRPC_CAL 2.0)
By: RA WILLIAMS, on 11-09-1993 at 08:12:55
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

Sample # J1286-5720 Mount # 1

$$\frac{364508}{30} - 17.0 = 1.7768E+02 \text{ uCi/L beta}$$

Sample # J1286-5720 Mount # 2

$$\frac{358238}{30} - 17.0 = 1.7462E+02 \text{ uCi/L beta}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV O

3-4

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5720	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? 100 ml	KE20B

Remarks Calculations Results

COUNT AS uCi/L duplicate
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond			
Hrs	Hrs 11.9.93	Hrs	Hrs	Hrs
Date	Time Completed	Lab Mgr		
11-8-93	1500			11/9

54-6800 (R 12-83)

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TB: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1286-5720	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	363863	369949
2106	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	17	17
TB	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
W SYTH	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		12111.767	12314.633
Date	SAMPLE CONCENTRATION in µCi/L		1.77E+02	1.80E+02
11/08/93	AVG. µCi/L in SAMPLE and REPLICATE =			1.7885E+02

Rs (Sample Count Rate) = (TC / CT) - BKG
TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA in µCi/L (AVERAGE) =	1.79E+02	DETECTION LEVEL	
TOTAL BETA in µCi/mL (AVERAGE) =	1.79E-01	7.67E-05 µCi/mL	
RELATIVE COUNTING ERROR =	0.2%		

Data Entry by:		Date:	09-Nov-93
Approved by:		Date:	11-Nov-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14 2" 11.9.93 R #3-4

J1286-5720

363863 / 30 — 17

369949 / 30 —

Beta Calculation (CRPC_CAL 2.0)
By: RA WILLIAMS, , on 11-09-1993 at 08:13:38
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

Sample # J1286-5720 Mount # 1

$$\frac{363863}{30} - 17.0 = 1.7737E+02 \text{ uCi/L beta}$$

Sample # J1286-5720 Mount # 2

$$\frac{369949}{30} - 17.0 = 1.8034E+02 \text{ uCi/L beta}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

5-6 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5720	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? ,100ml	KE20B

Remarks, Calculations, Results triplicate

COUNT AS uCI/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond			
Hrs	Hrs	Hrs	Hrs	Hrs
	11.9.93			
Date	Time Completed	Lab Unit Mgr		
11-8-93	1500			11/9

54-6800-[illegible] (R 10/83)

BEST AVAILABLE COPY

TB: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1286-5720	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	363117	344503
2106	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	17	17
TB	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
W SYTH	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		12086.900	11466.433
Date	SAMPLE CONCENTRATION in µCi/L		1.77E+02	1.68E+02
11/08/93	AVG. µCi/L in SAMPLE and REPLICATE =			1.7246E+02

Rs (Sample Count Rate) = (TC / CT) - BKG
TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA	in µCi/L (AVERAGE) =	1.72E+02	DETECTION LEVEL
TOTAL BETA	in µCi/mL (AVERAGE) =	1.72E-01	7.67E-05 µCi/mL
RELATIVE COUNTING ERROR	=	0.2%	

Data Entry by:		Date:	09-Nov-93
Approved by:		Date:	10-Nov-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14 2" 11.9.93 VR #5-6

J1286-5720

363117 / 30 — 17

344503 / 30

Beta Calculation (CRPC_CAL 2.0)
By: RA WILLIAMS, , on 11-09-1993 at 08:14:12
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

Sample # J1286-5720 Mount # 1

$$\frac{363117}{30} - 17.0 = 1.7700E+02 \text{ uCi/L beta}$$

Sample # J1286-5720 Mount # 2

$$\frac{344503}{30} - 17.0 = 1.6791E+02 \text{ uCi/L beta}$$

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WESTINGHOUSE HANFORD COMPANY Batch 2105

WHC-SD-WM-DP-057 REV 0 222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No. [illegible]	Customer ID: [illegible]
Analysis: TB	Sample Prep: [illegible]

Instrument: Det #14 WB27807	Procedure/ Rev: LA-508-101 / Rev 0.0
Technologist: Cynthia Johnson	Date: 11-/09/93
Starting Time: 1030 hrs	Temperature N/A
Ending Time: 1400 hrs	Chemist: Steve Cohen

Comments: Used 100ml sample size. Samples are golden yellow. Also very acidic

	Description	Lab ID		Description	Lab ID
1	Initial Time Check Std	[illegible]	11		
2	[illegible]	[illegible]	12		
3	sample	[illegible]	13		
4	sample duplicate	[illegible]	14		
5	sample triplicate	[illegible]	15		
6	sample	[illegible]	16		
7	sample duplicate	[illegible]	17		
8	sample triplicate	[illegible]	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
Lines Check Std	1CGB51 / 10ml			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-508-101

DATE START: NOVEMBER 9, 1993

PREPARED BY: S.L. FITZGERALD

DATE COMPLETE: NOVEMBER 18, 1993

		UNITS:	ug/mL										
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	ACCU	%REC	DET LIM	% CT ER
STD 94B51	J1301	BETA	2.68E-01							93 9	7.88E-07	0 4
BLANK	J1302	BETA	<4.24E-05								7.88E-05	330
KE-20D	J1287	BETA	2.48E-01	2.61E-01	2.48E-01	2.52E-01	1.50E-02	5.95			7.88E-05	0.1
											7.88E-05	0.1
											7.88E-05	0.1
KE-24A	J1289	BETA	2.49E-01	2.49E-01	2.44E-01	2.47E-01	5.77E-03	2.33			7.88E-05	0.1
											7.88E-05	0.1
											7.88E-05	0.1

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Standard results are reported in ug/L

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

1-2

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1301.-5520	BECHTOLD	11- 8-93	8:47	13

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	% RECOVERY	E14157	0

Sample Size	Customer ID
? 10 mL	STD

Remarks Calculations Results

8515 EV-DRE

STD# 109B551 RESULT 2.68-1

STD VAL 2.8546-1 %REC 93.9%

C Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Eva Barcelo	Raymond		
Hrs	Hrs	Hrs	Hrs	Hrs
		11.12.93		
Date 11/9/93	Time Completed 1400h	Lab Unit Mgr		

54-680C-061 (R-10-83)

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TB: LA-508-101 (D-0) LIQUIDS			STANDARD	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1301-5520	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	56018	54894
2105	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	18	18
TB	SAMPLE SIZE in mL	(SS)	10.000	10.000
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		1849.267	1811.800
Date	SAMPLE CONCENTRATION in µCi/L		2.71E-01	2.65E-01
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.6806E-01

Rs (Sample Count Rate) = (TC / CT) - BKG

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA in µCi/L (AVERAGE) =	2.68E-01		DETECTION LEVEL
TOTAL BETA in µCi/mL (AVERAGE) =	2.68E-04		7.88E-07 µCi/mL
RELATIVE COUNTING ERROR =	0.4%		

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	13-Nov-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14/2

J1301-5520

56018 / 30

54894 / 30

~~Beta~~ Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, , on 11-12-1993 at 03:08:21
Det #14 2 -inch mount Beta eff. : .3076
Sample size : 10 mL Dilution : 1

Sample # J1301 Mount # 1

$$\frac{56018}{30} - 18.0 = 2.7081E\text{-}01 \text{ uCi/L beta}$$

Sample # J1301 Mount # 2

$$\frac{54894}{30} - 18.0 = 2.6532E\text{-}01 \text{ uCi/L beta}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3-4 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1302.-5620	BECHTOLD	11- 8-93	8:50	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .100ml	BLK

Remarks Calculations Results

COUNT AS uCI/L
USE 13,14,15 OR 16

C John

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Gina Lacek	Raymond		
Hrs	Hrs	Hrs 11.12.93	Hrs	Hrs

Date	Time Completed	Laboratory Mgr.	
11/9/93	1400hrs		

54-6800-061 (R 10-83)

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TB: LA-508-101 (D-0) LIQUIDS

			BLANK	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1302-5620	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	550	626
2105	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	18	18
TB	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		2.895	2.867
Date	SAMPLE CONCENTRATION in µCi/L		4.24E-02	4.20E-02
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =		<	4.2190E-02

Rs (Sample Count Rate) = (TC / CT) - BKG
TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA in µCi/L (AVERAGE) =	< 4.24E-02		DETECTION LEVEL
TOTAL BETA in µCi/mL (AVERAGE) =	< 4.24E-05		
LESS THAN Value was Determined from Rs.			7.88E-05 µCi/mL
RELATIVE COUNTING ERROR =	330.2%		

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	18-NOV-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14/2

J1302-5620

550
30

626
30

Beta Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, , on 11-12-1993 at 03:08:54
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

Sample # J1302 Mount # 1

$$\frac{550}{30} - 18.0 < 3.1472E\text{-}02 \text{ uCi/L beta}$$

Sample # J1302 Mount # 2

$$\frac{626}{30} - 18.0 = 4.1980E\text{-}02 \text{ uCi/L beta}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

5-6

WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1287.-5720	BECHTOLD	11- 4-93	8:52	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
?.100 mL	KE20D

Remarks Calculations Results sample

COUNT AS uCI/L
USE 13,14,15 OR 16

C John

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Eric Beck	Raymond		
Hrs	Hrs	Hrs 11·12·93	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr.	
11/9/93	1400hrs		

54-6800-061 (R-10-83)

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TB: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1287-5720	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	512016	504517
2105	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	18	18
TB	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		17049.200	16799.233
Date	SAMPLE CONCENTRATION in µCi/L		2.50E+02	2.46E+02
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.4784E+02

Rs (Sample Count Rate) = (TC / CT) - BKG
TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA in µCi/L (AVERAGE) =	2.48E+02		DETECTION LEVEL
TOTAL BETA in µCi/mL (AVERAGE) =	2.48E-01		7.88E-05 µCi/mL
RELATIVE COUNTING ERROR =	0.1%		

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	18-Nov-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14/2

J1287-5720

512016 / 30

Beta Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, on 11-12-1993 at 03:09:24
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

504517 / 30

Sample # J1287 Mount # 1

$$\frac{512016}{30} - 18.0 = 2.4967E+02 \text{ uCi/L beta}$$

Sample # J1287 Mount # 2

$$\frac{504517}{30} - 18.0 = 2.4601E+02 \text{ uCi/L beta}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

7-8

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1287.-5720	BECHTOLD	11- 4-93	8:59	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? , 100 ml	KE20D

Remarks Calculations Results

duplicate

COUNT AS uCI/L
USE 13,14,15 OR 16

C John

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Em Barch	Raymond		
Hrs	Hrs	Hrs	Hrs	Hrs
		11.12.93		
Date 11/9/93	Time Completed 1400 hrs	Lab Int Mgr		

54-6800-061 (R-10-831)

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TB: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1287-5720	DISH SIZE 1 , 2 , or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	539145	529973
2105	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	18	18
TB	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		17953.500	17647.767
Date	SAMPLE CONCENTRATION in µCi/L		2.63E+02	2.58E+02
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.6067E+02

Rs (Sample Count Rate) = (TC / CT) - BKG
TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA in µCi/L (AVERAGE) =	2.61E+02		DETECTION LEVEL
TOTAL BETA in µCi/mL (AVERAGE) =	2.61E-01		7.88E-05 µCi/mL
RELATIVE COUNTING ERROR =	0.1%		

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	19-Nov-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14/2

J1287-5720

$\frac{539145}{30}$ - 18

$\frac{529973}{30}$

Beta Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, on 11-12-1993 at 03:10:06
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

Sample # J1287 Mount # 1

$$\frac{539145}{30} - 18.0 = 2.6291E+02 \text{ uCi/L beta}$$

Sample # J1287 Mount # 2

$$\frac{529973}{30} - 18.0 = 2.5843E+02 \text{ uCi/L beta}$$

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV O

9-10

Serial No	Sample Point	Date	Time Issued	Priority
J 1287.-5720	BECHTOLD	11- 4-93	8:59	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .100 ml	KE20D

Remarks Calculations Results Triplicate

COUNT AS uCi/L
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
		Raymond		
Hrs	Hrs	Hrs	Hrs	Hrs
		11.12.93		
Date 11/9/93	Time Completed 1400 hrs	Lab Unit Mgr		

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

TB: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1287-5720	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	503427	513122
2105	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	18	18
TB	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		16762.900	17086.067
Date	SAMPLE CONCENTRATION in µCi/L		2.45E+02	2.50E+02
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.4784E+02

Rs (Sample Count Rate) = (TC / CT) - BKG
TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA in µCi/L (AVERAGE) =	2.48E+02	DETECTION LEVEL
TOTAL BETA in µCi/mL (AVERAGE) =	2.48E-01	7.88E-05 µCi/mL
RELATIVE COUNTING ERROR =	0.1%	

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	18-NOV-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14/2

J1287-5720

503427 - 18
30

513122
30

Beta Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, on 11-12-1993 at 03:10:35
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

Sample # J1287 Mount # 1

$$\frac{503427}{30} - 18.0 = 2.4548E+02 \text{ uCi/L beta}$$

Sample # J1287 Mount # 2

$$\frac{513122}{30} - 18.0 = 2.5021E+02 \text{ uCi/L beta}$$

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

1-2

WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1289.-5720	BECHTOLD	11- 4-93	8:53	16

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
?, 100 ml	KE24A

Remarks Calculations Results

COUNT AS uCI/L sample
USE 13,14,15 OR 16

C Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond			
Hrs	Hrs	Hrs	Hrs	Hrs
	11.12.93			

Date	Time Completed	Lab Unit Mgr	
11/9/93	1400 hrs		

54-0000-061 (R-10-83)

BEST AVAILABLE COPY

TB: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1289-5720	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	508537	513792
2105	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	18	18
TB	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		16933.233	17108.400
Date	SAMPLE CONCENTRATION in µCi/L		2.48E+02	2.51E+02
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.4925E+02

Rs (Sample Count Rate) = (TC / CT) - BKG
TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA	in µCi/L (AVERAGE) =	2.49E+02	DETECTION LEVEL
TOTAL BETA	in µCi/mL (AVERAGE) =	2.49E-01	7.88E-05 µCi/mL
RELATIVE COUNTING ERROR	=	0.1%	

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	18-NOV-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14 2" 11.12.93 #1-2

508537 / 30 = 18

513792 / 30

J1289-5720

Beta Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, , on 11-12-1993 at 06:14:59
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

Sample # J1289 Mount # 1

508537
---------- - 18.0 = 2.4797E+02 uCi/L beta
30

Sample # J1289 Mount # 2

513792
---------- - 18.0 = 2.5054E+02 uCi/L beta
30

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3-4 WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1289.-5720	BECHTOLD	11- 4-93	9: 2	16

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? .100 ml	KE24A

Remarks Calculations Results

COUNT AS uCI/L duplicate
USE 13,14,15 OR 16

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond			
Hrs	Hrs 11.12.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11/9/93	1400 hrs	

54-6800-061 (R-10-83)

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TB: LA-508-101 (D-0) LIQUIDS

			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	14
J1289-5720	DISH SIZE 1, 2, or 5	(MS)	2	2
Batch ID	TOTAL COUNTS	(TC)	510694	511310
2105	COUNT TIME in MINUTES	(CT)	30	30
AT or TB ?	BACKGROUND in cpm	(BKG)	18	18
TB	SAMPLE SIZE in mL	(SS)	0.100	0.100
Rerun No.	DILUTION FACTOR	(DF)	1	1
0	DIGEST DILUTION FACTOR	(DDF)	1	1
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	0.3076
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		17005.133	17025.667
Date	SAMPLE CONCENTRATION in µCi/L		2.49E+02	2.49E+02
11/09/93	AVG. µCi/L in SAMPLE and REPLICATE =			2.4917E+02

Rs (Sample Count Rate) = (TC / CT) - BKG
TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L
Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)
Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA in µCi/L (AVERAGE) =	2.49E+02		DETECTION LEVEL
TOTAL BETA in µCi/mL (AVERAGE) =	2.49E-01		7.88E-05 µCi/mL
RELATIVE COUNTING ERROR =	0.1%		

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	18-NOV-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14 2" 11.12.93 VR

#3-4

J1289-5720

$\frac{510694}{30} - 18$

$\frac{511310}{30}$

```
Beta Calculation          (CRPC_CAL 2.0)
By: VA RAYMOND,           on 11-12-1993 at 06:14:29
Det #14   2 -inch mount   Beta eff. : .3076
Sample size :  .1  mL     Dilution :  1

 Sample # J1289     Mount # 1

   510694
 ------------- - 18.0  =  2.4902E+02 uCi/L  beta
      30

 Sample # J1289     Mount # 2

   511310
 ------------- - 18.0  =  2.4932E+02 uCi/L  beta
      30
```

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV 0

5-6

Serial No	Sample Point	Date	Time Issued	Priority
J 1289.-5720	BECHTOLD ,	11- 4-93	9: 2	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/ML	E14157	0

Sample Size	Customer ID
? 100 ml	KE24A

Remarks Calculations Results Triplicate

COUNT AS uCI/L
USE 13,14,15 OR 16

C John

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond			
Hrs	Hrs	Hrs	Hrs	Hrs
	11.12.93			
Date 11/9/93	Time Completed 1400 hrs	Lab Unit Mgr		

54-6800-061 (R-10-83)

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TB: LA-508-101 (D-0) LIQUIDS			SAMPLE	REPLICATE
Serial No.	DETECTOR NUMBER		14	N/A
J1289-5720	DISH SIZE 1 , 2 , or 5	(MS)	2	N/A
Batch ID	TOTAL COUNTS	(TC)	500685	N/A
2105	COUNT TIME in MINUTES	(CT)	30	N/A
AT or TB ?	BACKGROUND in cpm	(BKG)	18	N/A
TB	SAMPLE SIZE in mL	(SS)	0.100	N/A
Rerun No.	DILUTION FACTOR	(DF)	1	N/A
0	DIGEST DILUTION FACTOR	(DDF)	1	N/A
Analyst	EFFICIENCY FACTOR	(EFF)	0.3076	N/A
C JOHNSON	Lc, Rmax, or Rs, (SAMPLE RATE) as APPROPRIATE		16671.500	N/A
Date	SAMPLE CONCENTRATION in µCi/L		2.44E+02	N/A
11/09/93	µCi/L in SAMPLE =			2.4414E+02

Rs (Sample Count Rate) = (TC / CT) - BKG

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

Relative Counting Error = (The Square Root of TC + BKG * CT) / (TC - BKG * CT)

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

TOTAL BETA	in µCi/L	=	2.44E+02	DETECTION LEVEL
TOTAL BETA	in µCi/mL	=	2.44E-01	7.88E-05 µCi/mL
RELATIVE COUNTING ERROR		=	0.1%	

Data Entry by:	CA Clark	Date:	16-Nov-93
Approved by:		Date:	18-Nov-93

Form 1 Rev. 1.1

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

14 2" 11.12.93 R #5-6

J1289-5720

500685 / 30 _ 18

~~42214~~ / 30 _

REV 11/14/93

Beta Calculation (CRPC_CAL 2.0)
By: VA RAYMOND, on 11-12-1993 at 06:14:02
Det #14 2 -inch mount Beta eff. : .3076
Sample size : .1 mL Dilution : 1

Sample # J1289 Mount # 1

$$\frac{500685}{30} - 18.0 = 2.4414E+02 \text{ uCi/L beta}$$

Sample # J1289 Mount # 2

$$\frac{42214}{30} - 18.0 = 2.0343E+01 \text{ uCi/L beta}$$

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QA 17

WESTINGHOUSE HANFORD COMPANY

Batch 2090

WHC-SD-WM-DP-057 REV O

222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No. [illegible]	Customer ID: [illegible]
Analysis: Cs 137	Sample Prep: [illegible]

Instrument: GB 1037 1055/2605	Procedure/ Rev: WA 548 121/ [illegible]
Technologist: Cynthia Johnson CR Johnson	Date: 11/09/93
Starting Time: 1000 hrs	Temperature N/A
Ending Time: 1030 hrs	Chemist: [illegible] PP Bachelor

Comments: Used 100 ml sample size. Samples were golden yellow in appearance.

	Description	Lab ID
1	Initial Lines Check Std	[illegible]
2	Reagent Blank	[illegible]
3	[illegible]	[illegible]
4	[illegible] Duplicate	[illegible]
5	Sample [illegible] Triplicate	[illegible]
6	Sample	[illegible]
7	Sample [illegible]	[illegible]
8	Sample [illegible]	[illegible]
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
Lines Check Std	32B51 / [illegible]			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-057 REV O

METHOD: LA-548-121

DATE START: 6 DECEMBER 1993

PREPARED BY: P. P. Bachelor PP Bachelor

DATE COMPLETE: 6 DECEMBER 1993

	UNITS:	uCi/mL									
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	%REC	DET LIM	% CT ER
STD 32B51	J1284-553	CO-60	1.05E+02						103		2.9
		CS-134	6.95E+01						89.3		2.8
		CS-137	1.34E+02						102		2.1
BLANK	J1300-563	AM-241	<5.04E-04							5.04E-04	
		CO-60	<4.80E-04							4.80E-04	
		CS-137	<6.06E-04							6.06E-04	
		EU-154	<1.66E-03							1.66E-03	
		EU-155	<1.04E-03							1.04E-03	
12	12-20-93	Am-241	5.42-2	5.31-2	5.23-2	5.32-2	1.91-3	3.6			
SAMPLE	J1285-573	CO-60	7.66E-03	7.57E-03	7.27E-03	7.50E-03	3.3E-04	~~0.045~~	5.4		
		CS-137	1.57E-01	1.56E-01	1.55E-01	1.56E-01	1.6E-03	~~0.011~~	1.5		
		EU-154	1.02E-02	8.31E-03	9.71E-03	9.41E-03	1.6E-03	~~0.17~~	20.8		
		EU-155	5.09E-03	6.39E-03	5.18E-03	5.55E-03	1.2E-03	0.229	~~34.3~~ 26.1		
	J1287-573	AM-241	1.18E-02	1.16E-02	1.29E-02	1.21E-02	1.1E-03	~~0.005~~	11.3		
		CS-137	1.22E-01	1.19E-01	1.23E-01	1.21E-01	3.4E-03	~~0.028~~	3.4		

NARRATIVE: PPB NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

The results for the spike are in percent recovery.

GAMMA ENERGY ANALYSIS - UNDIGESTED SAMPLE

3701

Serial No	Sample Point	Date	Time Issued	Priority
J 1384.-5630	BECHTOLD	11- 4-93	8:47	18

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	% RECOVERY	E14157	0

Sample Size	Customer ID
? .100ml	STD

Remarks, Calculations, Results

COLX STD#
R901 STD VAL
RESULT % REC
R905 STD VAL
RESULT % REC

^{60}Co $\frac{1.0216\ E+02}{1.05\ E+02} * 100 = 103\%$ Li .001 10

^{134}Cs $\frac{7.7810\ E+01}{6.95\ E+01} * 100 = 89.3\%$

^{137}Cs $\frac{1.3138\ E+02}{1.34\ E+02} * 100 = 102\%$

C John

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond			
Hrs	Hrs 11.10.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11/9/93	1030	Bachelor	

54-6800-061 (R-10-83)

3702

Serial No	Sample Point	Date	Time Issued	Priority
J 1300.-5630	BECHTOLD	11- 4-93	15:22	18

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	E14157	0

Sample Size	Customer ID
? .100 ml + 22 ml QH2O	BLK

Remarks, Calculations, Results

COUNT AS uCI/L NO PEAKS FOUND
LASER PRINTOUT

C John

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond			
Hrs	Hrs 11.10.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11/9/93	1030	Bachelor	

54-6800-061 (R-10-83)

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GAMMA ENERGY ANALYSIS - UNDIGESTED SAMPLE

3707

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5730	BECHTOLD	11- 4-93	8:48	18

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	E14157	0

Sample Size	Customer ID
?.100 ml + 22 ml QH2O	KE13A

Remarks, Calculations, Results Sample

COUNT AS uCI/L
LASER PRINTOUT
^{60}Co: 7.66 E-03 uCi/mL
^{137}Cs: 1.57 E-01 uCi/mL
^{154}Eu: 1.02 E-02 uCi/mL
^{155}Eu: 5.09 E-03 uCi/mL
^{241}Am: 5.42 E-2 "

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D H Milburn			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11/9/93	1030	R Bachelor	

54-6800-061 (R-10-83)

3708

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5730	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	E14157	0

Sample Size	Customer ID
?.100 ml + 22 ml QH2O	KE13A

Remarks, Calculations, Results Dup

COUNT AS uCI/L
LASER PRINTOUT
^{60}Co: 7.57 E-03 uCi/mL
^{137}Cs: 1.56 E-01 uCi/mL
^{154}Eu: 8.31 E-03 uCi/mL
^{155}Eu: 6.39 E-03 uCi/mL
^{241}Am: 5.21 E-3 "

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D H Milburn			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11/9/93	1030		

54-6800-061 (R-10-83)

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GAMMA ENERGY ANALYSIS - UNDIGESTED SAMPLE

3709

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5730	BECHTOLD	11- 4-93	8:53	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	E14157	0

Sample Size	Customer ID
? .100 ml + 22 ml Q H_2O	KE13A

Remarks, Calculations, Results

COUNT AS uCI/L
LASER PRINTOUT
TRiplicate

^{60}Co: 7.27 E-03 µCi/mL
^{137}Cs: 1.55 E-01 µCi/mL
^{154}Eu: 9.71 E-03 µCi/mL
^{155}Eu: 5.18 E-03 µCi/mL
^{241}Am: 5.23E-02 "

C Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D H Milicia			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11/9/93	1030	B Bachelor	

54-6800-061 (R-10-83)

3710

Serial No	Sample Point	Date	Time Issued	Priority
J 1287.-5730	BECHTOLD	11- 4-93	8:52	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	E14157	0

Sample Size	Customer ID
? .100 ml + 22 ml Q H_2O	KE20D

Remarks, Calculations, Results

COUNT AS uCI/L
LASER PRINTOUT

Sample
^{241}Am: 1.18 E-02 µCi/mL
^{137}Cs: 1.22 E-01 µCi/mL
^{60}Co: <4.55E-04 "
^{154}Eu: <1.56E-03 "
^{155}Eu: <1.30E-03 "

C Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D H Milicia			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11/9/93	1030	B Bachelor	

54-6800-061 (R-10-83)

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GAMMA ENERGY ANALYSIS - UNDIGESTED SAMPLE

3712

Serial No	Sample Point	Date	Time Issued	Priority
J 1287.-5730	BECHTOLD	11- 4-93	8:59	18

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	E14157	0

Sample Size	Customer ID
? .100 ml + 22 ml Q H_2O	KE20D

Remarks, Calculations, Results Dup

COUNT AS uCI/L
LASER PRINTOUT

^{241}Am : 1.16 E-02 µCi/mL
^{137}Cs : 1.19 E-01 µCi/mL
^{60}Co : <5.03E-04 "
^{154}Eu : <1.42E-03 "
^{155}Eu : <1.36E-03 "

C Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D H Matlock			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11/9/93	1030	Bachelor	

54-6800-061 (R-10-83)

3715

Serial No	Sample Point	Date	Time Issued	Priority
J 1287.-5730	BECHTOLD	11- 4-93	8:59	18

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	E14157	0

Sample Size	Customer ID
? .100 ml + 22 ml Q H_2O	KE20D

Remarks, Calculations, Results Triplicate

COUNT AS uCI/L
LASER PRINTOUT

^{241}Am : 1.29 E-02 µCi/mL
^{137}Cs : 1.23 E-01 µCi/mL
^{60}Co : <4.92E-04 "
^{154}Eu : <1.42E-03 "
^{155}Eu : <1.35E-03 "

C Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 11-10-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11/9/93	1030	Bachelor	

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

Raymond 11.10.93

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                     *
*          G A M M A   S P E C T R U M   A N A L Y S I S              *
*                                                                     *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

CANBERRA SPECTRAN-F V2.06 SOFTWARE

WHC-SD-WM-DP-057 REV O

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 03:19:16

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 41
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: VR

SAMPLE DESCRIPTION: J1234-5530
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 10-NOV-93 AT 02:28:59

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3007. SECONDS
DEAD TIME: 0.23 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 20-OCT-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 03:19:16

P E A K A N A L Y S I S

WHC-SD-WM-DP-057 REV O

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	1126.69	563.23	1.52	674.	560.	12.0	CS-134, EU-152
2C	1138.80	569.28	1.52	610.	1070.	10.8	CS-134, BI-207
3	1209.60	604.67	1.57	679.	6265.	2.8	CS-134
4	1323.47	661.58	1.63	576.	9938.	2.1	CS-137
4B		661.41			81.	28.8	
5C	1591.83	795.73	1.67	446.	4425.	3.9	CS-134
6C	1603.96	801.80	1.67	407.	384.	13.7	CS-134
7	2346.70	1173.08	1.80	415.	5367.	2.9	CO-60
8	2665.34	1332.37	2.02	134.	4940.	2.9	CO-60
9	2731.46	1365.43	1.83	28.	133.	21.7	CS-134
10	2922.02	1460.69	2.05	34.	572.	8.9	K-40
10B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 03:19:16

SAMPLE: J1284-5530

WHC-SD-WM-DP-057 REV O

DATA COLLECTED ON 10-NOV-93 AT 02:28:59
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<8.55E-01		LLD<8.55E-01		59.54	
AM-243	LLD<5.41E-01		LLD<5.41E-01		74.67	
BA-133	LLD<1.17E+00		LLD<1.17E+00		356.02	
BA-140	LLD<3.45E+00		LLD<3.45E+00		537.27	
BI-212	LLD<6.77E+00		LLD<6.77E+00		727.20	
CEPR144	LLD<6.59E+00		LLD<6.59E+00		133.51	
CO-60	1.05E+02	+-3.21E+00	1.05E+02	+-3.21E+00	1332.50	-0.13
					1173.24	-0.15
CR-51	LLD<6.56E+00		LLD<6.56E+00		320.09	
CS-134	6.95E+01	+-2.84E+00	6.95E+01	+-2.84E+00	795.84	-0.11
					604.70	-0.03
CS-137	1.34E+02	+-3.16E+00	1.34E+02	+-3.16E+00	661.65	-0.07
EU-152	LLD<2.79E+00		LLD<2.79E+00		1408.01	
EU-154	LLD<2.18E+00		LLD<2.18E+00		1274.45	
EU-154H	LLD<2.07E+00		LLD<2.07E+00		1274.80	
EU-155	LLD<1.74E+00		LLD<1.74E+00		105.31	
FE-59	LLD<2.34E+00		LLD<2.34E+00		1099.25	
I-131	LLD<8.87E-01		LLD<8.87E-01		364.48	
K-40	LLD<1.47E+01		LLD<1.47E+01		1460.75	
LA-140	LLD<5.23E-01		LLD<5.23E-01		1596.20	
MN-54	LLD<9.83E-01		LLD<9.83E-01		834.83	
NA-22	LLD<7.75E-01		LLD<7.75E-01		1274.55	
NB-94	LLD<8.30E-01		LLD<8.30E-01		702.63	
NB-95	LLD<8.97E-01		LLD<8.97E-01		765.78	
NP-237	LLD<2.62E+00		LLD<2.62E+00		86.50	
PB-212	LLD<1.13E+00		LLD<1.13E+00		239.00	
PU-239	LLD<6.12E+03		LLD<6.12E+03		129.30	
PU-241	LLD<1.99E+05		LLD<1.99E+05		148.57	
RA-224	LLD<1.29E+01		LLD<1.29E+01		240.99	
RA-226	LLD<1.21E+01		LLD<1.21E+01		186.10	
RU-103	LLD<8.65E-01		LLD<8.65E-01		497.08	
RU103	LLD<9.11E-01		LLD<9.11E-01		497.08	
RURH106	LLD<1.57E+01		LLD<1.57E+01		621.80	
SB-125	LLD<2.78E+00		LLD<2.78E+00		427.89	
SB-125A	LLD<2.78E+00		LLD<2.78E+00		427.89	
SE-75	LLD<8.42E-01		LLD<8.42E-01		264.66	
SN-113	LLD<1.25E+00		LLD<1.25E+00		391.67	
SR-85	LLD<8.64E-01		LLD<8.64E-01		513.99	
TH-228	LLD<2.75E+01		LLD<2.75E+01		84.37	
TL-208	LLD<1.08E+00		LLD<1.08E+00		583.20	
U-235	LLD<8.13E-01		LLD<8.13E-01		185.71	
Y-88	LLD<5.28E-01		LLD<5.28E-01		1836.06	
ZN-65	LLD<2.62E+00		LLD<2.62E+00		1115.55	
ZR-95	LLD<1.50E+00		LLD<1.50E+00		756.73	
TOTAL	3.09E+02	+-5.32E+00	3.09E+02	+-5.32E+00		

STANDARD DEVIATION = 0.05

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.40E-09 UC/LI
TOTAL MEASURED ACTIVITY = 3.09E+02 (+-5.32E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

WHC-SD-WM-DP-057 REV O

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1126.69	563.23	560.	12.0	2.12E+01
1138.80	569.28	1070.	10.8	4.08E+01
1603.96	801.80	384.	13.7	1.92E+01
2731.46	1365.43	133.	21.7	1.07E+01

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2[illegible].02	1460.69	572.	8.9	4.87E+01

Raymond
11.10.93

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                     *
*            G A M M A   S P E C T R U M   A N A L Y S I S            *
*                                                                     *
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WHC-SD-WM-DP-057 REV O

CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 04:21:06

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 41
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: VR

SAMPLE DESCRIPTION: J1300-5630
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 10-NOV-93 AT 03:30:56

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3002. SECONDS
DEAD TIME: 0.07 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 20-OCT-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 04:21:06

P E A K A N A L Y S I S

WHC-SD-WM-DP-057 REV O

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	477.39	238.67	1.11	394.	57.	100.0	PB-212A
2	703.62	351.75	1.74	164.	133.	31.6	PB-214A
2B		351.90			109.	28.2	
3	1218.91	609.32	1.34	90.	107.	32.2	BI-214A,
3B		609.19			122.	21.0	RU-103
4	2921.83	1460.59	2.02	24.	548.	8.9	K-40
4B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 04:21:06

SAMPLE: J1300-5630
DATA COLLECTED ON 10-NOV-93 AT 03:30:56
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

WHC-SD-WM-DP-057 REV O

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<5.04E-01		LLD<5.04E-01		59.54	
AM-243	LLD<3.89E-01		LLD<3.89E-01		74.67	
BA-133	LLD<5.61E-01		LLD<5.61E-01		356.02	
BA-140	LLD<1.33E+00		LLD<1.33E+00		537.27	
BI-212	LLD<3.10E+00		LLD<3.10E+00		727.20	
CEPR144	LLD<4.08E+00		LLD<4.08E+00		133.51	
CO-60	LLD<4.80E-01		LLD<4.80E-01		1332.50	
CR-51	LLD<2.86E+00		LLD<2.86E+00		320.09	
CS-134	LLD<4.26E-01		LLD<4.26E-01		795.84	
CS-137	LLD<6.06E-01		LLD<6.06E-01		661.65	
EU-152	LLD<2.27E+00		LLD<2.27E+00		1408.01	
EU-154	LLD<1.66E+00		LLD<1.66E+00		1274.45	
EU-154H	LLD<1.55E+00		LLD<1.55E+00		1274.80	
EU-155	LLD<1.04E+00		LLD<1.04E+00		105.31	
FE-59	LLD<1.02E+00		LLD<1.02E+00		1099.25	
I-131	LLD<3.40E-01		LLD<3.40E-01		364.48	
K-40	LLD<1.44E+01		LLD<1.44E+01		1460.75	
LA-140	LLD<4.33E-01		LLD<4.33E-01		1596.20	
MN-54	LLD<4.02E-01		LLD<4.02E-01		834.83	
NA-22	LLD<5.91E-01		LLD<5.91E-01		1274.55	
NB-94	LLD<3.70E-01		LLD<3.70E-01		702.63	
NB-95	LLD<3.49E-01		LLD<3.49E-01		765.78	
NP-237	LLD<1.67E+00		LLD<1.67E+00		86.50	
~~PB-212~~	~~5.81E-01~~	~~+-5.81E-01~~	~~5.81E-01~~	~~+-5.81E-01~~	~~239.00~~	~~-0.33~~ BKG RJB 11/16/93
PU-239	LLD<3.98E+03		LLD<3.98E+03		129.30	
PU-241	LLD<1.26E+05		LLD<1.26E+05		148.57	
RA-224	LLD<6.92E+00		LLD<6.92E+00		240.99	
RA-226	LLD<6.69E+00		LLD<6.69E+00		186.10	
RU-103	LLD<3.36E-01		LLD<3.36E-01		497.08	
RU103	LLD<3.54E-01		LLD<3.54E-01		497.08	
RURH106	LLD<7.15E+00		LLD<7.15E+00		621.80	
SB-125	LLD<1.03E+00		LLD<1.03E+00		427.89	
SB-125A	LLD<1.03E+00		LLD<1.03E+00		427.89	
SE-75	LLD<4.53E-01		LLD<4.53E-01		264.66	
SN-113	LLD<5.04E-01		LLD<5.04E-01		391.67	
SR-85	LLD<4.32E-01		LLD<4.32E-01		513.99	
TH-228	LLD<1.72E+01		LLD<1.72E+01		84.37	
TL-208	LLD<5.75E-01		LLD<5.75E-01		583.20	
U-235	LLD<4.43E-01		LLD<4.43E-01		185.71	
Y-88	LLD<2.80E-01		LLD<2.80E-01		1836.06	
ZN-65	LLD<1.29E+00		LLD<1.29E+00		1115.55	
ZR-95	LLD<6.00E-01		LLD<6.00E-01		756.73	
TOTAL	5.81E-01	+-5.81E-01	5.81E-01	+-5.81E-01		

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

AL[illegible]TECTED PEAKS WERE USED IN THE ANALYSIS

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
703.62	351.75	133.	31.6	3.30E+00
1218.91	609.32	107.	32.2	4.30E+00
2921.83	1460.59	548.	8.9	4.67E+01

D. H. Milicia
11-10-93

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*                                                                     *
*            G A M M A   S P E C T R U M   A N A L Y S I S            *
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WHC-SD-WM-DP-057 REV O

CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 09:50:23

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 41
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: DM

SAMPLE DESCRIPTION: J-1285-5730
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 10-NOV-93 AT 09:00:11

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3005. SECONDS
DEAD TIME: 0.17 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 20-OCT-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 09:50:23

P E A K A N A L Y S I S

WHC-SD-WM-DP-057 REV O

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	97.53	48.81	2.00	1673.	424.	28.4	U-234
2	118.87	59.47	0.98	1362.	6195.	3.0	AM-241,U-237, EU-155
3	172.95	86.50	1.02	1028.	607.	16.3	CS-136, EU-155, EU-155A, PB-214X, TL-208X
4	210.46	105.25	0.95	1121.	349.	28.6	EU-155, EU-155B, NP-239
5	246.01	123.02	0.94	935.	1126.	9.3	EU-152,CO-57, EU-154A
6	1183.62	591.68	1.55	195.	31.	137.0	EU-154C
7	1218.54	609.13	1.09	190.	136.	34.2	BI-214A,
7B		609.19			122.	21.0	RU-103
8	1323.37	661.54	1.59	223.	11598.	1.9	CS-137
8B		661.41			81.	28.8	
9	1446.70	723.18	1.47	133.	126.	32.8	SB-124,I-131, AG-108, EU-154D, ZR-95
10	2009.44	1004.49	2.10	112.	95.	40.8	EU-154G, EU-152
11	2346.68	1173.07	1.92	74.	350.	13.2	CO-60
12	2549.01	1274.22	2.53	45.	177.	19.4	EU-154, EU-154H, NA-22
13	2665.28	1332.34	1.78	22.	361.	11.2	CO-60
14	2921.73	1460.54	2.02	34.	568.	8.9	K-40
14B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 09:50:23

WHC-SD-WM-DP-057 REV O

SAMPLE: J-1285-5730
DATA COLLECTED ON 10-NOV-93 AT 09:00:11
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	5.42E+01	+-1.67E+00	5.42E+01	+-1.67E+00	59.54	-0.07
AM-243	LLD<4.87E-01		LLD<4.87E-01		74.67	
BA-133	LLD<8.89E-01		LLD<8.89E-01		356.02	
BA-140	LLD<2.13E+00		LLD<2.13E+00		537.27	
BI-212	LLD<6.34E+00		LLD<6.34E+00		727.20	
CEPR144	LLD<5.29E+00		LLD<5.29E+00		133.51	
CO-60	7.66E+00	+-8.62E-01	7.66E+00	+-8.62E-01	1332.50	-0.16
					1173.24	-0.17
CR-51	LLD<4.59E+00		LLD<4.59E+00		320.09	
CS-134	LLD<6.10E-01		LLD<6.10E-01		795.84	
CS-137	1.57E+02	+-3.35E+00	1.57E+02	+-3.35E+00	661.65	-0.11
EU-152	LLD<2.27E+00		LLD<2.27E+00		1408.01	
EU-154	1.02E+01	+-1.97E+00	1.02E+01	+-1.97E+00	1274.45	-0.23
					123.07	-0.05
					1004.76	-0.27
EU-154H	1.02E+01	+-1.97E+00	1.02E+01	+-1.97E+00	1274.80	-0.58
EU-155	5.09E+00	+-1.46E+00	5.09E+00	+-1.46E+00	105.31	-0.05
					86.54	-0.04
FE-59	LLD<9.40E-01		LLD<9.40E-01		1099.25	
I-131	LLD<6.54E-01		LLD<6.54E-01		364.48	
K-40	LLD<1.49E+01		LLD<1.49E+01		1460.75	
LA-140	LLD<3.48E-01		LLD<3.48E-01		1596.20	
MN-54	LLD<4.98E-01		LLD<4.98E-01		834.83	
~~NA-22~~	~~3.61E+00~~	~~+-7.00E-01~~	~~3.61E+00~~	~~+-7.00E-01~~	~~1274.55~~	~~-0.33~~
NB-94	LLD<4.50E-01		LLD<4.50E-01		702.63	
NB-95	LLD<4.12E-01		LLD<4.12E-01		765.78	
~~NP-237~~	~~1.49E+01~~	~~+-2.44E+00~~	~~1.49E+01~~	~~+-2.44E+00~~	~~86.50~~	~~-0.00~~
PB-212	LLD<8.49E-01		LLD<8.49E-01		239.00	
PU-239	LLD<5.14E+03		LLD<5.14E+03		129.30	
PU-241	LLD<1.65E+05		LLD<1.65E+05		148.57	
RA-224	LLD<9.84E+00		LLD<9.84E+00		240.99	
RA-226	LLD<9.75E+00		LLD<9.75E+00		186.10	
RU-103	LLD<6.28E-01		LLD<6.28E-01		497.08	
RU103	LLD<6.60E-01		LLD<6.60E-01		497.08	
RURH106	LLD<9.54E+00		LLD<9.54E+00		621.80	
SB-125	LLD<2.06E+00		LLD<2.06E+00		427.89	
SB-125A	LLD<2.06E+00		LLD<2.06E+00		427.89	
SE-75	LLD<6.20E-01		LLD<6.20E-01		264.66	
SN-113	LLD<8.72E-01		LLD<8.72E-01		391.67	
SR-85	LLD<6.23E-01		LLD<6.23E-01		513.99	
TH-228	LLD<2.86E+01		LLD<2.86E+01		84.37	
TL-208	LLD<6.74E-01		LLD<6.74E-01		583.20	
U-235	LLD<6.52E-01		LLD<6.52E-01		185.71	
Y-88	LLD<4.96E-01		LLD<4.96E-01		1836.06	
ZN-65	LLD<1.34E+00		LLD<1.34E+00		1115.55	
ZR-95	LLD<7.91E-01		LLD<7.91E-01		756.73	

^{154}Eu 11/16/93

^{155}Eu 11/16/93

TOTAL 2.63E+02 +-5.58E+00 2.63E+02 +-5.58E+00

STANDARD DEVIATION = 0.17

EB[illegible] = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 5.04E-09 UC/LI
TOTAL MEASURED ACTIVITY = 2.53E+02 (+-5.22E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
97.53	48.81	424.	28.4	5.13E+00
1183.62	591.68	31.	137.0	1.22E+00
1446.70	723.18	126.	32.8	5.77E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1218.54	609.13	136.	34.2	5.46E+00
2921.73	1460.54	568.	8.9	4.84E+01

D. H. Zeilicia
11-10-93

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*                                                                     *
*            G A M M A   S P E C T R U M   A N A L Y S I S            *
*                                                                     *
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WHC-SD-WM-DP-057 REV O

CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 10:50:16

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 41
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: DM

SAMPLE DESCRIPTION: J-1285-5730 DUP
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 10-NOV-93 AT 10:00:03

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3004. SECONDS
DEAD TIME: 0.13 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 20-OCT-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 10:50:16

P E A K A N A L Y S I S

WHC-SD-WM-DP-057 REV O

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	97.47	48.78	1.50	1510.	276.	39.6	U-234
2C	118.92	59.49	0.97	1429.	6065.	3.0	AM-241,U-237, EU-155
3	172.98	86.52	1.07	1026.	567.	17.3	CS-136, EU-155, EU-155A, PB-214X, TL-208X
4	210.57	105.30	1.16	1062.	438.	22.7	EU-155, EU-155B, NP-239
5	246.02	123.02	1.08	964.	1179.	9.1	EU-152,CO-57, EU-154A
6	1218.61	609.17	1.61	193.	163.	29.4	BI-214A,
6B		609.19			122.	21.0	RU-103
7	1323.55	661.63	1.60	268.	11519.	1.9	CS-137
7B		661.41			81.	28.8	
8	1447.08	723.37	1.67	131.	136.	30.4	SB-124,I-131, AG-108, EU-154D, ZR-95
[illegible]	2346.99	1173.23	1.88	87.	355.	13.5	CO-60
1[illegible]	2549.69	1274.56	1.70	43.	145.	22.2	EU-154, EU-154H, NA-22
11	2665.36	1332.38	2.24	36.	357.	11.8	CO-60
12	2922.26	1460.81	1.99	32.	617.	8.5	K-40
12B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 10:50:16

WHC-SD-WM-DP-057 REV O

SAMPLE: J-1285-5730 DUP
DATA COLLECTED ON 10-NOV-93 AT 10:00:03
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	5.31E+01	+-1.67E+00	5.31E+01	+-1.67E+00	59.54	-0.04
AM-243	LLD<4.87E-01		LLD<4.87E-01		74.67	
BA-133	LLD<8.70E-01		LLD<8.70E-01		356.02	
BA-140	LLD<2.40E+00		LLD<2.40E+00		537.27	
BI-212	LLD<5.94E+00		LLD<5.94E+00		727.20	
CEPR144	LLD<5.26E+00		LLD<5.26E+00		133.51	
CO-60	7.57E+00	+-9.00E-01	7.57E+00	+-9.00E-01	1332.50	-0.12
					1173.24	-0.01
CR-51	LLD<4.80E+00		LLD<4.80E+00		320.09	
CS-134	LLD<5.85E-01		LLD<5.85E-01		795.84	
CS-137	1.56E+02	+-3.35E+00	1.56E+02	+-3.35E+00	661.65	-0.02
EU-152	LLD<2.05E+00		LLD<2.05E+00		1408.01	
EU-154	LLD<1.42E+00		LLD<1.42E+00		1274.45	
EU-154H	8.31E+00	+-1.85E+00	8.31E+00	+-1.85E+00	1274.80	-0.24
EU-155	6.39E+00	+-1.45E+00	6.39E+00	+-1.45E+00	105.31	-0.00
					86.54	-0.03
FE-59	LLD<1.14E+00		LLD<1.14E+00		1099.25	
I-131	LLD<6.75E-01		LLD<6.75E-01		364.48	
K-40	LLD<1.47E+01		LLD<1.47E+01		1460.75	
LA-140	LLD<5.02E-01		LLD<5.02E-01		1596.20	
MN-54	LLD<4.39E-01		LLD<4.39E-01		834.83	
~~NA-22~~	~~2.95E+00~~	~~+-6.55E-01~~	~~2.95E+00~~	~~+-6.55E-01~~	~~1274.55~~	~~0.01~~ 154 Eu [illegible] 11/16/93
NB-94	LLD<4.50E-01		LLD<4.50E-01		702.63	
NB-95	LLD<4.50E-01		LLD<4.50E-01		765.78	
~~NP-237~~	~~1.40E+01~~	~~+-2.41E+00~~	~~1.40E+01~~	~~+-2.41E+00~~	~~86.50~~	~~0.01~~ 155 Eu [illegible] 11/16/93
PB-212	LLD<8.72E-01		LLD<8.72E-01		239.00	
PU-239	LLD<5.09E+03		LLD<5.09E+03		129.30	
PU-241	LLD<1.65E+05		LLD<1.65E+05		148.57	
RA-224	LLD<9.63E+00		LLD<9.63E+00		240.99	
RA-226	LLD<9.67E+00		LLD<9.67E+00		186.10	
RU-103	LLD<6.46E-01		LLD<6.46E-01		497.08	
RU103	LLD<6.79E-01		LLD<6.79E-01		497.08	
RURH106	LLD<9.88E+00		LLD<9.88E+00		621.80	
SB-125	LLD<2.08E+00		LLD<2.08E+00		427.89	
SB-125A	LLD<2.08E+00		LLD<2.08E+00		427.89	
SE-75	LLD<6.39E-01		LLD<6.39E-01		264.66	
SN-113	LLD<9.01E-01		LLD<9.01E-01		391.67	
SR-85	LLD<6.32E-01		LLD<6.32E-01		513.99	
TH-228	LLD<2.85E+01		LLD<2.85E+01		84.37	
TL-208	LLD<7.17E-01		LLD<7.17E-01		583.20	
U-235	LLD<6.47E-01		LLD<6.47E-01		185.71	
Y-88	LLD<3.82E-01		LLD<3.82E-01		1836.06	
ZN-65	LLD<1.39E+00		LLD<1.39E+00		1115.55	
ZR-95	LLD<8.07E-01		LLD<8.07E-01		756.73	
TOTAL	2.48E+02	+-5.16E+00	2.48E+02	+-5.16E+00		

STANDARD DEVIATION = 0.08

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 5.47E-09 UC/LI
TOTAL MEASURED ACTIVITY = 2.40E+02 (+-4.81E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

WHC-SD-WM-DP-057 REV O

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
97.47	48.78	276.	39.6	3.34E+00
246.02	123.02	1179.	9.1	1.44E+01
1447.08	723.37	136.	30.4	6.27E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1[illegible].61	609.17	163.	29.4	6.53E+00
2[illegible].26	1460.81	617.	8.5	5.26E+01

D. H. Zaldivar
11-10-93

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*                                                                     *
*            G A M M A   S P E C T R U M   A N A L Y S I S            *
*                                                                     *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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CANBERRA SPECTRAN-F V2.06 SOFTWARE WHC-SD-WM-DP-057 REV 0

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 12:01:21

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 41
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: DM

SAMPLE DESCRIPTION: J-1285-5730 TRIP.
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 10-NOV-93 AT 10:57:00

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3003. SECONDS
DEAD TIME: 0.10 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 20-OCT-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 12:01:21

P E A K A N A L Y S I S

WHC-SD-WM-DP-057 REV O

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	97.49	48.78	1.82	1514.	331.	33.3	U-234
2?	118.93	59.50	0.98	1417.	5968.	3.0	AM-241,U-237, EU-155
3	172.98	86.51	0.93	976.	639.	15.2	CS-136, EU-155, EU-155A, PB-214X, TL-208X
4	210.41	105.22	1.17	1155.	355.	28.5	EU-155, EU-155B, NP-239
5	245.97	123.00	1.00	956.	1181.	9.1	EU-152,CO-57, EU-154A
6	1218.61	609.17	1.23	241.	101.	49.4	BI-214A,
6B		609.19			122.	21.0	RU-103
7	1323.40	661.55	1.63	250.	11496.	1.9	CS-137
7B		661.41			81.	28.8	
8	1446.96	723.31	1.06	132.	103.	38.8	SB-124,I-131, AG-108, EU-154D, ZR-95
9	1746.62	873.11	1.09	108.	75.	48.5	EU-154E, RH-106
10	1822.09	910.83	1.34	110.	59.	61.1	AC-228A
10B		910.98			84.	23.3	
11	2009.47	1004.50	1.40	89.	137.	27.6	EU-154G, EU-152
12	2346.38	1172.92	2.01	77.	368.	12.8	CO-60
13	2549.22	1274.32	2.73	51.	169.	20.4	EU-154, EU-154H, NA-22
14	2665.10	1332.25	2.31	39.	343.	12.2	CO-60
15	2921.45	1460.41	2.15	28.	562.	8.9	K-40
15B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

? - MULTIPLET ANALYSIS CONVERGED BUT GFIT > 4
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 12:01:21

WHC-SD-WM-DP-057 REV O

SAMPLE: J-1285-5730 TRIP.
DATA COLLECTED ON 10-NOV-93 AT 10:57:00
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	5.23E+01	+-1.66E+00	5.23E+01	+-1.66E+00	59.54	-0.04
AM-243	LLD<4.86E-01		LLD<4.86E-01		74.67	
BA-133	LLD<8.47E-01		LLD<8.47E-01		356.02	
BA-140	LLD<2.28E+00		LLD<2.28E+00		537.27	
BI-212	LLD<5.90E+00		LLD<5.90E+00		727.20	
CEPR144	LLD<5.34E+00		LLD<5.34E+00		133.51	
CO-60	7.27E+00	+-8.91E-01	7.27E+00	+-8.91E-01	1332.50	-0.25
					1173.24	-0.31
CR-51	LLD<4.70E+00		LLD<4.70E+00		320.09	
CS-134	LLD<5.39E-01		LLD<5.39E-01		795.84	
CS-137	1.55E+02	+-3.34E+00	1.55E+02	+-3.34E+00	661.65	-0.10
EU-152	LLD<2.27E+00		LLD<2.27E+00		1408.01	
EU-154	9.71E+00	+-1.98E+00	9.71E+00	+-1.98E+00	1274.45	-0.13
					123.07	-0.07
					1004.76	-0.26
EU-154H	9.71E+00	+-1.98E+00	9.71E+00	+-1.98E+00	1274.80	-0.48
EU-155	5.18E+00	+-1.48E+00	5.18E+00	+-1.48E+00	105.31	-0.08
					86.54	-0.03
FE-59	LLD<8.91E-01		LLD<8.91E-01		1099.25	
I-131	LLD<6.47E-01		LLD<6.47E-01		364.48	
K-40	LLD<1.46E+01		LLD<1.46E+01		1460.75	
LA-140	LLD<4.33E-01		LLD<4.33E-01		1596.20	
MN-54	LLD<5.04E-01		LLD<5.04E-01		834.83	
~~NA-22~~	~~3.45E+00~~	~~+-7.03E-01~~	~~3.45E+00~~	~~+-7.03E-01~~	~~1274.55~~	~~-0.23~~ ^{154}Eu 11/16/93
NB-94	LLD<4.52E-01		LLD<4.52E-01		702.63	
NB-95	LLD<4.50E-01		LLD<4.50E-01		765.78	
~~NP-237~~	~~1.57E+01~~	~~+-2.41E+00~~	~~1.57E+01~~	~~+-2.41E+00~~	~~86.50~~	~~0.01~~ ^{155}Eu 11/16/93
PB-212	LLD<8.71E-01		LLD<8.71E-01		239.00	
PU-239	LLD<5.14E+03		LLD<5.14E+03		129.30	
PU-241	LLD<1.60E+05		LLD<1.60E+05		148.57	
RA-224	LLD<9.52E+00		LLD<9.52E+00		240.99	
RA-226	LLD<9.39E+00		LLD<9.39E+00		186.10	
RU-103	LLD<6.29E-01		LLD<6.29E-01		497.08	
RU103	LLD<6.61E-01		LLD<6.61E-01		497.08	
RURH106	LLD<1.00E+01		LLD<1.00E+01		621.80	
SB-125	LLD<2.15E+00		LLD<2.15E+00		427.89	
SB-125A	LLD<2.15E+00		LLD<2.15E+00		427.89	
SE-75	LLD<6.40E-01		LLD<6.40E-01		264.66	
SN-113	LLD<8.81E-01		LLD<8.81E-01		391.67	
SR-85	LLD<6.24E-01		LLD<6.24E-01		513.99	
TH-228	LLD<2.89E+01		LLD<2.89E+01		84.37	
TL-208	LLD<6.73E-01		LLD<6.73E-01		583.20	
U-235	LLD<6.29E-01		LLD<6.29E-01		185.71	
Y-88	LLD<5.28E-01		LLD<5.28E-01		1836.06	
ZN-65	LLD<1.35E+00		LLD<1.35E+00		1115.55	
ZR-95	LLD<8.48E-01		LLD<8.48E-01		756.73	

TOTAL 2.59E+02 +-5.57E+00 2.59E+02 +-5.57E+00

STANDARD DEVIATION = 0.14

E[illegible] = ***** MEV/DISINTEGRATION

WHC-SD-WM-DP-057 REV O

MAXIMUM PERMISSABLE ACTIVITY = 5.13E-09 UC/LI
TOTAL MEASURED ACTIVITY = 2.49E+02 (+-5.20E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
97.49	48.78	331.	33.3	4.01E+00
1440.96	723.31	103.	38.8	4.73E+00
1746.62	873.11	75.	48.5	4.03E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1218.61	609.17	101.	49.4	4.05E+00
1822.09	910.83	59.	61.1	3.26E+00
2921.45	1460.41	562.	8.9	4.79E+01

D. H. Maillia
11-10-93

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*                                                                     *
*              G A M M A   S P E C T R U M   A N A L Y S I S          *
*                                                                     *
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CANBERRA SPECTRAN-F V2.06 SOFTWARE

WHC-SD-WM-DP-057 REV 0

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 13:00:13

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 41
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: DM

SAMPLE DESCRIPTION: J-1287-5730
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 10-NOV-93 AT 12:10:02

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3005. SECONDS
DEAD TIME: 0.17 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 20-OCT-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 13:00:13

P E A K A N A L Y S I S

WHC-SD-WM-DP-057 REV O

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	118.93	59.50	0.99	750.	1345.	7.6	AM-241,U-237, EU-155
2	245.73	122.88	1.05	893.	348.	26.0	EU-152,CO-57, EU-154A
3	1166.79	583.27	1.20	186.	67.	64.7	EU-154,
3B		583.13			94.	24.1	TL-208
4	1218.42	609.07	1.22	182.	119.	38.8	BI-214A,
4B		609.19			122.	21.0	RU-103
5	1323.29	661.49	1.56	184.	9005.	2.1	CS-137
5B		661.41			81.	28.8	
6	2346.08	1172.77	1.20	63.	82.	38.2	CO-60
7	2921.68	1460.52	2.25	52.	504.	10.0	K-40
7B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 13:00:13

WHC-SD-WM-DP-057 REV O

SAMPLE: J-1287-5730
DATA COLLECTED ON 10-NOV-93 AT 12:10:02
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	1.18E+01	+-9.06E-01	1.18E+01	+-9.06E-01	59.54	-0.04
AM-243	LLD<4.47E-01		LLD<4.47E-01		74.67	
BA-133	LLD<8.12E-01		LLD<8.12E-01		356.02	
BA-140	LLD<2.03E+00		LLD<2.03E+00		537.27	
BI-212	LLD<4.22E+00		LLD<4.22E+00		727.20	
CEPR144	LLD<5.00E+00		LLD<5.00E+00		133.51	
CO-60	LLD<4.55E-01		LLD<4.55E-01		1332.50	
CR-51	LLD<4.15E+00		LLD<4.15E+00		320.09	
CS-134	LLD<4.97E-01		LLD<4.97E-01		795.84	
CS-137	1.22E+02	+-2.88E+00	1.22E+02	+-2.88E+00	661.65	-0.16
EU-152	LLD<1.69E+00		LLD<1.69E+00		1408.01	
EU-154	LLD<1.56E+00		LLD<1.56E+00		1274.45	
EU-154H	LLD<1.55E+00		LLD<1.55E+00		1274.80	
EU-155	LLD<1.30E+00		LLD<1.30E+00		105.31	
FE-59	LLD<1.02E+00		LLD<1.02E+00		1099.25	
I-131	LLD<5.81E-01		LLD<5.81E-01		364.48	
K-40	LLD<1.51E+01		LLD<1.51E+01		1460.75	
LA-140	LLD<5.23E-01		LLD<5.23E-01		1596.20	
MN-54	LLD<4.54E-01		LLD<4.54E-01		834.83	
NA-22	LLD<5.55E-01		LLD<5.55E-01		1274.55	
NB-94	LLD<3.79E-01		LLD<3.79E-01		702.63	
NB-95	LLD<4.47E-01		LLD<4.47E-01		765.78	
NP-237	LLD<1.99E+00		LLD<1.99E+00		86.50	
PB-212	LLD<8.07E-01		LLD<8.07E-01		239.00	
PU-239	LLD<4.72E+03		LLD<4.72E+03		129.30	
PU-241	LLD<1.52E+05		LLD<1.52E+05		148.57	
RA-224	LLD<8.74E+00		LLD<8.74E+00		240.99	
RA-226	LLD<8.92E+00		LLD<8.92E+00		186.10	
RU-103	LLD<5.71E-01		LLD<5.71E-01		497.08	
RU103	LLD<6.01E-01		LLD<6.01E-01		497.08	
RURH106	LLD<8.89E+00		LLD<8.89E+00		621.80	
SB-125	LLD<1.96E+00		LLD<1.96E+00		427.89	
SB-125A	LLD<1.96E+00		LLD<1.96E+00		427.89	
SE-75	LLD<5.77E-01		LLD<5.77E-01		264.66	
SN-113	LLD<8.45E-01		LLD<8.45E-01		391.67	
SR-85	LLD<5.98E-01		LLD<5.98E-01		513.99	
TH-228	LLD<2.26E+01		LLD<2.26E+01		84.37	
TL-208	LLD<6.74E-01		LLD<6.74E-01		583.20	
U-235	LLD<6.01E-01		LLD<6.01E-01		185.71	
Y-88	LLD<2.80E-01		LLD<2.80E-01		1836.06	
ZN-65	LLD<1.36E+00		LLD<1.36E+00		1115.55	
ZR-95	LLD<7.41E-01		LLD<7.41E-01		756.73	
TOTAL	1.33E+02	+-3.02E+00	1.33E+02	+-3.02E+00		

STANDARD DEVIATION = 0.08

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.26E-08 UC/LI
TOTAL MEASURED ACTIVITY = 1.33E+02 (+-3.02E+00) UC/LI
% [illegible]. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
245.73	122.88	348.	26.0	4.24E+00
2346.08	1172.77	82.	38.2	5.72E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1166.79	583.27	67.	64.7	2.59E+00
1218.42	609.07	119.	38.8	4.76E+00
2921.68	1460.52	504.	10.0	4.29E+01

D. H. Milbrin
11-10-93

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                   *
*          G A M M A   S P E C T R U M   A N A L Y S I S            *
*                                                                   *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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CANBERRA SPECTRAN-F V2.06 SOFTWARE

WHC-SD-WM-DP-057 REV 0

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 14:11:52

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 41
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: DM

SAMPLE DESCRIPTION: J-1287-5730
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 10-NOV-93 AT 13:21:38

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3006. SECONDS
DEAD TIME: 0.20 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 20-OCT-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 14:11:52

P E A K A N A L Y S I S

WHC-SD-WM-DP-057 REV O

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	118.90	59.48	0.98	706.	1322.	7.6	AM-241,U-237, EU-155
2	246.01	123.02	0.82	793.	326.	25.6	EU-152,CO-57, EU-154A
3	1218.58	609.16	1.33	153.	134.	32.1	BI-214A,
3B		609.19			122.	21.0	RU-103
4	1323.39	661.54	1.55	230.	8783.	2.2	CS-137
4B		661.41			81.	28.8	
5	1822.61	911.09	2.36	60.	97.	31.8	AC-228A
5B		910.98			84.	23.3	
6	2346.09	1172.78	1.21	42.	96.	29.7	CO-60
7	2921.96	1460.66	2.07	32.	521.	9.4	K-40
7B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 14:11:52

SAMPLE: J-1287-5730

WHC-SD-WM-DP-057 REV O

DATA COLLECTED ON 10-NOV-93 AT 13:21:38
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	1.16E+01	+-8.89E-01	1.16E+01	+-8.89E-01	59.54	-0.05
AM-243	LLD<4.41E-01		LLD<4.41E-01		74.67	
BA-133	LLD<7.92E-01		LLD<7.92E-01		356.02	
BA-140	LLD<1.90E+00		LLD<1.90E+00		537.27	
BI-212	LLD<3.90E+00		LLD<3.90E+00		727.20	
CEPR144	LLD<5.10E+00		LLD<5.10E+00		133.51	
CO-60	LLD<5.03E-01		LLD<5.03E-01		1332.50	
CR-51	LLD<4.30E+00		LLD<4.30E+00		320.09	
CS-134	LLD<4.84E-01		LLD<4.84E-01		795.84	
CS-137	1.19E+02	+-2.86E+00	1.19E+02	+-2.86E+00	661.65	-0.11
EU-152	LLD<2.05E+00		LLD<2.05E+00		1408.01	
EU-154	LLD<1.42E+00		LLD<1.42E+00		1274.45	
EU-154H	LLD<1.29E+00		LLD<1.29E+00		1274.80	
EU-155	LLD<1.30E+00		LLD<1.30E+00		105.31	
FE-59	LLD<9.63E-01		LLD<9.63E-01		1099.25	
I-131	LLD<5.93E-01		LLD<5.93E-01		364.48	
K-40	LLD<1.47E+01		LLD<1.47E+01		1460.75	
LA-140	LLD<5.44E-01		LLD<5.44E-01		1596.20	
MN-54	LLD<4.11E-01		LLD<4.11E-01		834.83	
NA-22	LLD<5.05E-01		LLD<5.05E-01		1274.55	
NB-94	LLD<3.88E-01		LLD<3.88E-01		702.63	
NB-95	LLD<4.47E-01		LLD<4.47E-01		765.78	
NP-237	LLD<2.00E+00		LLD<2.00E+00		86.50	
PB-212	LLD<7.63E-01		LLD<7.63E-01		239.00	
PU-239	LLD<4.79E+03		LLD<4.79E+03		129.30	
PU-241	LLD<1.51E+05		LLD<1.51E+05		148.57	
RA-224	LLD<8.66E+00		LLD<8.66E+00		240.99	
RA-226	LLD<8.92E+00		LLD<8.92E+00		186.10	
RU-103	LLD<5.42E-01		LLD<5.42E-01		497.08	
RU103	LLD<5.70E-01		LLD<5.70E-01		497.08	
RURH106	LLD<9.18E+00		LLD<9.18E+00		621.80	
SB-125	LLD<1.86E+00		LLD<1.86E+00		427.89	
SB-125A	LLD<1.86E+00		LLD<1.86E+00		427.89	
SE-75	LLD<5.85E-01		LLD<5.85E-01		264.66	
SN-113	LLD<7.78E-01		LLD<7.78E-01		391.67	
SR-85	LLD<5.86E-01		LLD<5.86E-01		513.99	
TH-228	LLD<2.21E+01		LLD<2.21E+01		84.37	
TL-208	LLD<6.46E-01		LLD<6.46E-01		583.20	
U-235	LLD<5.99E-01		LLD<5.99E-01		185.71	
Y-88	LLD<3.82E-01		LLD<3.82E-01		1836.06	
ZN-65	LLD<1.27E+00		LLD<1.27E+00		1115.55	
ZR-95	LLD<7.18E-01		LLD<7.18E-01		756.73	
TOTAL	1.30E+02	+-2.99E+00	1.30E+02	+-2.99E+00		

STANDARD DEVIATION = 0.04

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.26E-08 UC/LI
TOTAL MEASURED ACTIVITY = 1.30E+02 (+-2.99E+00) UC/LI
% [illegible]H. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
246.01	123.02	326.	25.6	3.98E+00
2346.09	1172.78	96.	29.7	6.70E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1218.58	609.16	134.	32.1	5.36E+00
1822.61	911.09	97.	31.8	5.40E+00
2921.96	1460.66	521.	9.4	4.44E+01

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*                                                                     *
*          G A M M A   S P E C T R U M   A N A L Y S I S              *
*                                                                     *
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WHC-SD-WM-DP-057 REV O

CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 19:11:54

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 41
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY:

SAMPLE DESCRIPTION: J1287-5730
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 10-NOV-93 AT 18:21:43

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3004. SECONDS
DEAD TIME: 0.13 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 20-OCT-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 19:11:54

P E A K A N A L Y S I S

WHC-SD-WM-DP-057 REV O

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	118.96	59.51	1.01	732.	1472.	7.1	AM-241,U-237, EU-155
2	246.03	123.03	0.89	805.	265.	31.2	EU-152,CO-57, EU-154A
3	1218.66	609.19	1.19	156.	131.	32.9	BI-214A,
3B		609.19			122.	21.0	RU-103
4	1323.24	661.47	1.57	206.	9085.	2.1	CS-137
4B		661.41			81.	28.8	
5	1822.17	910.87	1.79	68.	74.	41.5	AC-228A
5B		910.98			84.	23.3	
6	2346.19	1172.83	1.49	63.	101.	32.1	CO-60
7	2921.17	1460.26	2.00	38.	554.	9.1	K-40
7B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 10-NOV-93 19:11:54

WHC-SD-WM-DP-057 REV O

SAMPLE: J1287-5730
DATA COLLECTED ON 10-NOV-93 AT 18:21:43
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	1.29E+01	+-9.22E-01	1.29E+01	+-9.22E-01	59.54	-0.02
AM-243	LLD<4.44E-01		LLD<4.44E-01		74.67	
BA-133	LLD<8.48E-01		LLD<8.48E-01		356.02	
BA-140	LLD<1.97E+00		LLD<1.97E+00		537.27	
BI-212	LLD<3.61E+00		LLD<3.61E+00		727.20	
CEPR144	LLD<5.22E+00		LLD<5.22E+00		133.51	
CO-60	LLD<4.92E-01		LLD<4.92E-01		1332.50	
CR-51	LLD<4.21E+00		LLD<4.21E+00		320.09	
CS-134	LLD<4.51E-01		LLD<4.51E-01		795.84	
CS-137	1.23E+02	+-2.91E+00	1.23E+02	+-2.91E+00	661.65	-0.18
EU-152	LLD<1.59E+00		LLD<1.59E+00		1408.01	
EU-154	LLD<1.42E+00		LLD<1.42E+00		1274.45	
EU-154H	LLD<1.43E+00		LLD<1.43E+00		1274.80	
EU-155	LLD<1.35E+00		LLD<1.35E+00		105.31	
FE-59	LLD<9.40E-01		LLD<9.40E-01		1099.25	
I-131	LLD<5.79E-01		LLD<5.79E-01		364.48	
K-40	LLD<1.49E+01		LLD<1.49E+01		1460.75	
LA-140	LLD<3.15E-01		LLD<3.15E-01		1596.20	
MN-54	LLD<4.27E-01		LLD<4.27E-01		834.83	
NA-22	LLD<5.05E-01		LLD<5.05E-01		1274.55	
NB-94	LLD<4.03E-01		LLD<4.03E-01		702.63	
NB-95	LLD<4.09E-01		LLD<4.09E-01		765.78	
NP-237	LLD<1.98E+00		LLD<1.98E+00		86.50	
PB-212	LLD<8.14E-01		LLD<8.14E-01		239.00	
PU-239	LLD<4.78E+03		LLD<4.78E+03		129.30	
PU-241	LLD<1.53E+05		LLD<1.53E+05		148.57	
RA-224	LLD<9.37E+00		LLD<9.37E+00		240.99	
RA-226	LLD<8.84E+00		LLD<8.84E+00		186.10	
RU-103	LLD<5.58E-01		LLD<5.58E-01		497.08	
RU103	LLD<5.87E-01		LLD<5.87E-01		497.08	
RURH106	LLD<8.39E+00		LLD<8.39E+00		621.80	
SB-125	LLD<1.92E+00		LLD<1.92E+00		427.89	
SB-125A	LLD<1.92E+00		LLD<1.92E+00		427.89	
SE-75	LLD<6.04E-01		LLD<6.04E-01		264.66	
SN-113	LLD<7.81E-01		LLD<7.81E-01		391.67	
SR-85	LLD<5.56E-01		LLD<5.56E-01		513.99	
TH-228	LLD<2.31E+01		LLD<2.31E+01		84.37	
TL-208	LLD<6.54E-01		LLD<6.54E-01		583.20	
U-235	LLD<5.93E-01		LLD<5.93E-01		185.71	
Y-88	LLD<4.24E-01		LLD<4.24E-01		1836.06	
ZN-65	LLD<1.41E+00		LLD<1.41E+00		1115.55	
ZR-95	LLD<6.99E-01		LLD<6.99E-01		756.73	
TOTAL	1.36E+02	+-3.05E+00	1.36E+02	+-3.05E+00		

STANDARD DEVIATION = 0.11

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.27E-08 UC/LI
TOTAL MEASURED ACTIVITY = 1.36E+02 (+-3.05E+00) UC/LI
% [illegible]H. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
246.03	123.03	265.	31.2	3.23E+00
2346.19	1172.83	101.	32.1	7.05E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1218.66	609.19	131.	32.9	5.25E+00
1822.17	910.87	74.	41.5	4.09E+00
2921.17	1460.26	554.	9.1	4.72E+01

WESTINGHOUSE HANFORD COMPANY Batch 2091

WHC-SD-WM-DP-057 REV O

222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No. [illegible]	Customer ID: [illegible]
Analysis: Cs Sr	Sample Prep: [illegible]

Instrument: WB3285	Procedure/ Rev: LA-505-121/Rev [illegible]
Technologist: [illegible]	Date: 11 /09/93
Starting Time: 1000 hrs	Temperature N/A
Ending Time: 1030 hrs	Chemist: [illegible]

Comments: Used 100ml sample size. Samples were golden yellow in appearance.

	Description	Lab ID		Description	Lab ID
1	Initial Lines check std	31201-5530	11		
2	Reagent blank	31202-5530	12		
3	sample	31203-5530	13		
4	sample duplicate	31204-5530	14		
5	sample triplicate	31205-5530	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
Lines check std	32B51 / 10ml			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: **LA-548-121**

DATE START: **6 DECEMBER 1993**

PREPARED BY: **P. P. Bachelor** P. P. Bachelor

DATE COMPLETE: **6 DECEMBER 1993**

	UNITS:	uCi/mL									
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	%REC	DET LIM	% CT ER
STD 32B51	J1301-553	CO-60	1.04E+02						102		2.9
		CS-134	6.77E+01						87		2.8
		CS-137	1.37E+02						104		2.1
BLANK	J1302-563	AM-241	<5.07E-04							5.07E-04	
		CO-60	<4.29E-04							4.29E-04	
		CS-137	<6.34E-04							6.34E-04	
	J1289										
SAMPLE	~~J1285~~-573	AM-241	1.27E-02	1.33E-02	1.31E-02	1.30E-02	5.0E-04	~~0.088~~	4.6	AR	
	AR 12-15-93	CO-60	2.78E-03	2.59E-03	3.49E-03	2.95E-03	7.8E-04	~~0.268~~	32	12-15-93	
		CS-137	1.07E-01	1.10E-01	1.10E-01	1.09E-01	2.8E-03	~~0.026~~	3.2		

NARRATIVE: [illegible] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

The results for the spike are in percent recovery.

GAMMA ENERGY ANALYSIS - UNDIGESTED SAMPLE

3695

Serial No	Sample Point	Date	Time Issued	Priority
J 1301.-5630	BECHTOLD	11- 8-93	8:47	18

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	% RECOVERY	E14157	0

Sample Size	Customer ID
?.100ml + 22 ml QH2O	STD

Remarks, Calculations, Results

COLX STD#
R901 STD VAL
RESULT % REC
R905 STD VAL
RESULT % REC

^{60}Co: $\frac{1.0216\ E+02}{1.04\ E+02} * 100 = 102\ \%$

^{134}Cs: $\frac{7.7810\ E+01}{6.77\ E+01} * 100 = 87.0\%$

^{137}Cs: $\frac{1.3138\ E+02}{1.37\ E+02} * 100 = 104\ \%$

C John

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 11-9-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11/9/93	1030	Bachelor, Leslie Dion 11/17/93

54-6800-061 (R-10-83)

3696

Serial No	Sample Point	Date	Time Issued	Priority
J 1302.-5630	BECHTOLD	11- 8-93	8:50	18

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	E14157	0

Sample Size	Customer ID
?.100ml + 22ml QH2O	BLK

Remarks, Calculations, Results

COUNT AS uCI/L NO PEAKS FOUND
LASER PRINTOUT

^{241}Am: <5.07E-4 uCi/ml
^{60}Co <4.29E-4 "
^{137}Cs <6.34E-4 "
^{154}Eu <1.51E-3 "
^{155}Eu <1.08E-3 "

C John

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 11-9-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11/9/93	1030	Bachelor, Leslie Dion

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

GAMMA ENERGY ANALYSIS - UNDIGESTED SAMPLE

3697

Serial No	Sample Point	Date	Time Issued	Priority
J 1289.-5730	BECHTOLD	11- 4-93	8:53	18

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	E14157	0

Sample Size	Customer ID
? .100ml+22ml QH2O	KE24A

Remarks, Calculations, Results: Sample

COUNT AS uCI/L
LASER PRINTOUT

241 Am: 1.27 E-02 µCi/mL
60 Co: 2.78 E-03 µCi/mL 11/11/93
137 Cs: 1.07 E-01 µCi/mL
154 Eu: <1.64E-03 "
155 Eu: < 1.35E-03 "

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 11-9-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11/9/93	1030	B Bachelor

54-6800-061 (R-10-83)

3699

Serial No	Sample Point	Date	Time Issued	Priority
J 1289.-5730	BECHTOLD	11- 4-93	9: 2	18

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	E14157	0

Sample Size	Customer ID
?.100ml+22ml QH2O	KE24A

Remarks, Calculations, Results: Duplicate

COUNT AS uCI/L
LASER PRINTOUT

241 Am: 1.33 E-02 µCi/mL
60 Co: 2.59 E-03 µCi/mL
137 Cs: 1.10 E-01 µCi/mL
154 Eu: <1.94E-03 "
155 Eu: <1.32E-03 "

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 11-9-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11/9/93	1030	B Bachelor

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

GAMMA ENERGY ANALYSIS - UNDIGESTED SAMPLE

3700

Serial No	Sample Point	Date	Time Issued	Priority
J 1289.-5730	BECHTOLD	11- 4-93	9: 2	18

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/ML	E14157	0

Sample Size	Customer ID
? 100 ml + 22 ml Q H_2O	KE24A

Remarks, Calculations, Results Triplicate

COUNT AS uCI/L
LASER PRINTOUT

^{241}Am: 1.31 E-02 µCi/mL

^{60}Co: 3.49 E-03 µCi/mL

^{137}Cs: 1.10 E-01 µCi/mL

^{154}Eu: <1.26E-03 "

^{155}Eu: <1.31E-03 "

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
		Raymond		
Hrs	Hrs	Hrs 11.10.93	Hrs	Hrs

Date	Time Completed	Lab Unit Supervisor
11/9/93	1030	R. Bachelor

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                       *
*              G A M M A   S P E C T R U M   A N A L Y S I S            *
*                                                                       *
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WHC-SD-WM-DP-057 REV 0

CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM WESTINGHOUSE HANFORD 09-NOV-93 18:41:15

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 41
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY:

SAMPLE DESCRIPTION: J1301-5530
GEOMETRY DESCRIPTION: 42847-A 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 9-NOV-93 AT 17:50:58

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3007. SECONDS
DEAD TIME: 0.23 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 20-OCT-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

222-S COUNTING ROOM WESTINGHOUSE HANFORD 09-NOV-93 18:41:15

P E A K A N A L Y S I S

WHC-SD-WM-DP-057 REV O

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	1126.51	563.14	1.45	692.	519.	16.0	CS-134, EU-152
2	1205.67	602.49	1.45	675.	264.	1.4	CS-134, BI-207
3	1209.37	604.55	1.50	796.	6219.	2.8	CS-134
4	1323.23	661.46	1.51	551.	10103.	2.1	CS-137
4B		661.41			81.	28.8	
5C	1591.57	795.60	1.65	441.	4310.	4.0	CS-134
6C	1603.71	801.67	1.65	404.	414.	12.9	CS-134
7	2346.34	1172.90	2.06	380.	5507.	2.9	CO-60
8	2664.84	1332.12	2.04	107.	4925.	2.9	CO-60
9	2730.38	1364.89	1.68	50.	116.	27.6	CS-134
10	2921.59	1460.44	2.18	40.	343.	9.3	K-40
10B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

SAMPLE: J1301-5530

DATA COLLECTED ON 9-NOV-93 AT 17:50:58
DELAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCI/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<8.47E-01		LLD<8.47E-01		59.54	
AM-243	LLD<5.40E-01		LLD<5.40E-01		74.67	
BA-133	LLD<1.22E+00		LLD<1.22E+00		356.02	
BA-140	LLD<3.36E+00		LLD<3.36E+00		537.27	
BI-212	LLD<6.75E+00		LLD<6.75E+00		727.20	
CEPR144	LLD<6.63E+00		LLD<6.63E+00		133.51	
CO-60	1.04E+02	+-3.18E+00	1.04E+02	+-3.18E+00	1332.50	[illegible]
					1173.24	[illegible]
CR-51	LLD<6.39E+00		LLD<6.39E+00		320.09	
CS-134	6.77E+01	+-2.80E+00	6.77E+01	+-2.80E+00	[illegible]	[illegible]
					[illegible]	[illegible]
CS-137	1.37E+02	+-3.18E+00	1.37E+02	+-3.18E+00	[illegible]	[illegible]
EU-152	LLD<2.48E+00		LLD<2.48E+00		1408.01	
EU-154	LLD<1.96E+00		LLD<1.96E+00		1274.45	
EU-154H	LLD<1.88E+00		LLD<1.88E+00		1274.60	
EU-155	LLD<1.71E+00		LLD<1.71E+00		105.31	
FE-59	LLD<2.24E+00		LLD<2.24E+00		1099.27	
I-131	LLD<9.10E-01		LLD<9.10E-01		364.48	
K-40	LLD<1.51E+01		LLD<1.51E+01		1460.75	
LA-140	LLD<5.63E-01		LLD<5.63E-01		1596.20	
MN-54	LLD<9.78E-01		LLD<9.78E-01		834.83	
NA-22	LLD<6.97E-01		LLD<6.97E-01		1274.55	
NB-94	LLD<8.32E-01		LLD<8.32E-01		702.63	
NB-95	LLD<8.54E-01		LLD<8.54E-01		765.78	
NP-237	LLD<2.60E+00		LLD<2.60E+00		86.50	
PB-212	LLD<1.12E+00		LLD<1.12E+00		238.60	
PU-239	LLD<6.33E+03		LLD<6.33E+03		129.30	
PU-241	LLD<1.97E+05		LLD<1.97E+05		148.57	
RA-224	LLD<1.25E+01		LLD<1.25E+01		240.99	
RA-226	LLD<1.26E+01		LLD<1.26E+01		186.10	
RU-106	LLD<8.81E-01		LLD<8.81E-01		497.08	
RU103	LLD<9.27E-01		LLD<9.27E-01		497.08	
RURH106	LLD<1.62E+01		LLD<1.62E+01		621.80	
SB-125	LLD<2.89E+00		LLD<2.89E+00		427.89	
SB-125A	LLD<2.85E+00		LLD<2.85E+00		427.89	
SE-75	LLD<8.64E-01		LLD<8.64E-01		264.66	
SN-113	LLD<1.26E+00		LLD<1.26E+00		391.67	
SR-85	LLD<8.36E-01		LLD<8.36E-01		513.99	
TH-228	LLD<2.78E+01		LLD<2.78E+01		84.37	
TL-208	LLD<1.10E+00		LLD<1.10E+00		583.20	
U-235	LLD<8.43E-01		LLD<8.43E-01		185.71	
Y-88	LLD<6.13E-01		LLD<6.13E-01		1836.06	
ZN-65	LLD<2.46E+00		LLD<2.46E+00		1115.05	
ZR-95	LLD<1.57E+00		LLD<1.57E+00		756.73	
TOTAL	3.09E+02	+-5.30E+00	3.09E+02	+-5.30E+00		

STANDARD DEVIATION = 0.10

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.42E-09 UC/LI
TOTAL MEASURED ACTIVITY = 3.09E+02 (+-5.30E+00) UC/LI

% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1126.52	563.14	515.	16.0	1.95E+01
1138.62	569.19	965.	13.0	3.68E+01
1603.71	801.67	414.	12.9	2.07E+01
2730.38	1364.89	116.	27.6	9.30E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
[illegible]	1150.24	543.	9.3	1.65E+01

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*                                                                           *
*                  G A M M A   S P E C T R U M   A N A L Y S I S            *
*                                                                           *
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CANBERRA SPECTRAN-F V2.06  SOFTWARE

222-S COUNTING ROOM WESTINGHOUSE HANFORD                 09-NOV-93  19:37:35

                    A N A L Y S I S   P A R A M E T E R S

MCA UNIT NUMBER:    2       /      ADC UNIT NUMBER: 3.0
DETECTOR NUMBER:     3      /      GEOMETRY NUMBER:  41
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:      5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY:

SAMPLE DESCRIPTION: J1302-5630
GEOMETRY DESCRIPTION:  42847-A 22CC LIQ
SAMPLE SIZE:   1.0000E-03 LI        / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON  9-NOV-93 AT 18:47:24

COLLECT LIVE TIME:     3000. SECONDS
        REAL TIME:     3001. SECONDS
        DEAD TIME:      0.03 %

 DECAYED TO       0. DAYS,  0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 20-OCT-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92
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222-S COUNTING ROOM WESTINGHOUSE HANFORD 09-NOV-93 19:37:35

P E A K A N A L Y S I S

WHC-SD-WM-DP-057 REV O

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	703.68	351.78	1.87	183.	91.	46.0	PB-214A
1B		351.90			109.	28.2	
2	1210.84	609.08	1.51	69.	161.	27.9	RT-214A
2B		609.19			122.	21.0	RU-103
3	1823.30	910.96	1.28	48.	96.	30.0	AC-228A
3B		910.98			84.	23.3	
4	2921.25	1460.30	1.84	36.	551.	9.1	K-40
4B		1460.38			611.	9.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 09-NOV-93 19:37:35

WHC-SD-WM-DP-057 REV O

SAMPLE: J1302-0630
DATA COLLECTED ON 9-NOV-93 AT 18:47:24
DELAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/Ml MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<5.07E-01		LLD<5.07E-01		59.54	
AM-243	LLD<3.91E-01		LLD<3.91E-01		74.67	
BA-133	LLD<5.43E-01		LLD<5.43E-01		356.02	
BA-140	LLD<1.43E+00		LLD<1.43E+00		537.27	
BI-212	LLD<2.62E+00		LLD<2.62E+00		727.20	
CEPR144	LLD<4.16E+00		LLD<4.16E+00		133.51	
CO-60	LLD<4.29E-01		LLD<4.29E-01		1332.50	
CR-51	LLD<2.80E+00		LLD<2.80E+00		320.09	
CS-134	LLD<4.36E-01		LLD<4.36E-01		795.84	
CS-137	LLD<6.34E-01		LLD<6.34E-01		661.67	
EU-152	LLD<1.88E+00		LLD<1.88E+00		1408.01	
EU-154	LLD<1.51E+00		LLD<1.51E+00		1274.45	
EU-154H	LLD<1.40E+00		LLD<1.40E+00		1274.45	
EU-155	LLD<1.08E+00		LLD<1.08E+00		105.31	
FE-59	LLD<8.25E-01		LLD<8.25E-01		1099.25	
I-131	LLD<3.81E-01		LLD<3.81E-01		364.48	
K-40	LLD<1.48E+01		LLD<1.48E+01		1460.75	
LA-140	LLD<1.80E-01		LLD<1.80E-01		1596.20	
[illegible]4	LLD<3.98E-01		LLD<3.98E-01		834.83	
NA-22	LLD<5.35E-01		LLD<5.35E-01		1274.55	
NB-94	LLD<3.53E-01		LLD<3.53E-01		702.63	
NB-95	LLD<3.86E-01		LLD<3.86E-01		765.78	
NP-237	LLD<1.66E+00		LLD<1.66E+00		86.50	
PB-212	LLD<5.96E-01		LLD<5.96E-01		238.00	
PU-239	LLD<3.99E+03		LLD<3.99E+03		129.30	
PU-241	LLD<1.24E+05		LLD<1.24E+05		148.57	
RA-224	LLD<6.82E+00		LLD<6.82E+00		240.99	
RA-226	LLD<6.73E+00		LLD<6.73E+00		186.10	
RU-103	LLD<3.24E-01		LLD<3.24E-01		497.08	
RU103	LLD<3.41E-01		LLD<3.41E-01		497.06	
RURH106	LLD<7.15E+00		LLD<7.15E+00		621.80	
SB-125	LLD<1.00E+00		LLD<1.00E+00		427.89	
SB-125A	LLD<1.00E+00		LLD<1.00E+00		427.89	
SE-75	LLD<4.15E-01		LLD<4.15E-01		264.66	
SN-113	LLD<4.74E-01		LLD<4.74E-01		391.67	
SR-89	LLD<4.33E-01		LLD<4.33E-01		913.99	
TH-228	LLD<1.80E+01		LLD<1.80E+01		84.37	
TL-208	LLD<5.54E-01		LLD<5.54E-01		583.20	
U-235	LLD<4.53E-01		LLD<4.53E-01		185.71	
Y-88	LLD<3.82E-01		LLD<3.82E-01		1836.06	
ZN-65	LLD<1.44E+00		LLD<1.44E+00		1115.55	
ZR-95	LLD<6.42E-01		LLD<6.42E-01		756.73	
TOTAL	0.00E-01	+-0.00E-01	0.00E-01	+-0.00E-01		

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

ALL DETECTED PEAKS WERE USED IN THE ANALYSIS

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
703.68	351.78	91.	46.0	2.26E+00
1010.24	607.08	161.	21.9	6.48E+00
[illegible]	[illegible]	[illegible]	30.0	3.34E+00
[illegible]	[illegible]	551.	9.1	4.67E+01

WHC-SD-WM-DP-057 REV O

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*                                                                       *
*                G A M M A   S P E C T R U M   A N A L Y S I S          *
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CANBERRA SPECTRAN-F V2.06  SOFTWARE

222-S COUNTING ROOM WESTINGHOUSE HANFORD                 09-NOV-93  21:11:50

                    A N A L Y S I S   P A R A M E T E R S

MCA UNIT NUMBER:    2      /      ADC UNIT NUMBER: 3.0
DETECTOR NUMBER:     3     /      GEOMETRY NUMBER:  41
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:      5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER ANI:
ANALYZED BY:

SAMPLE DESCRIPTION: E1289-5730
GEOMETRY DESCRIPTION:  42847-A 22CC LIQ
SAMPLE SIZE:    1.0000E-03 LI        / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON  9-NOV-93 AT 20:21:39

COLLECT LIVE TIME:     3000. SECONDS
        REAL TIME:     3002. SECONDS
        DEAD TIME:      0.07 %

 DECAYED TO       0. DAYS,  0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 20-OCT-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92
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222-S COUNTING ROOM WESTINGHOUSE HANFORD 09-NOV-93 21:11:50

P E A K A N A L Y S I S

WHC-SD-WM-DP-057 REV O

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	118.68	59.48	1.08	724.	1445.	7.2	AM-241,U-237, EU-155
2	245.93	122.98	1.27	931.	287.	31.8	EU-152,CO-57, EU-154A
3	1218.51	609.12	1.17	141.	169.	25.6	BI-214A,
3B		609.19			122.	21.0	RU-103
4	1323.24	661.47	1.56	209.	7956.	2.3	CS-137
4B		661.41			81.	28.8	
5	2346.33	1172.89	1.72	70.	169.	22.1	CO-60
6	2664.62	1332.01	2.14	43.	131.	23.9	CO-60
7	2921.49	1460.42	2.29	24.	543.	9.0	K-40
7B		1460.58			611.	3.5	

ERROR QUOTATION AT 1.9* SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 13-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 09-NOV-93 21:11:30

SAMPLE: E1289-5730

WHC-SD-WM-DP-057 REV O

DATA COLLECTED ON 9-NOV-93 AT 20:21:39
DELAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN UCI/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (MEV) EXPECT	DIFF
AM-241	1.27E+01	+-9.15E-01	1.27E+01	+-9.15E-01	59.54	-0.06
AM-243	LLD<4.49E-01		LLD<4.49E-01		74.67	
BA-133	LLD<7.91E-01		LLD<7.91E-01		356.02	
BA-140	LLD<2.04E+00		LLD<2.04E+00		537.27	
BI-212	LLD<4.05E+00		LLD<4.05E+00		727.20	
CEPR144	LLD<5.04E+00		LLD<5.04E+00		133.51	
CO-60	2.78E+00	+-6.64E-01	2.78E+00	+-6.64E-01	1332.50	-0.49
					1173.24	-0.54
CR-51	LLD<3.98E+00		LLD<3.98E+00		320.09	
CS-134	LLD<5.31E-01		LLD<5.31E-01		795.86	
CS-137	1.07E+02	+-2.70E+00	1.07E+02	+-2.70E+00	661.65	-0.13
EU-152	LLD<1.69E+00		LLD<1.69E+00		1408.01	
EU-154	LLD<1.64E+00		LLD<1.64E+00		1274.45	
EU-154H	LLD<1.55E+00		LLD<1.55E+00		1274.80	
EU-155	LLD<1.35E+00		LLD<1.35E+00		105.31	
FE-59	LLD<9.63E-01		LLD<9.63E-01		1099.25	
I-131	LLD<5.63E-01		LLD<5.63E-01		364.48	
K-40	LLD<1.46E+01		LLD<1.46E+01		1460.75	
[illegible]40	LLD<4.57E-01		LLD<4.57E-01		1596.20	
M[illegible]4	LLD<4.43E-01		LLD<4.43E-01		834.83	
NA-22	LLD<5.83E-01		LLD<5.83E-01		1274.50	
NB-94	LLD<4.34E-01		LLD<4.34E-01		702.63	
NB-95	LLD<4.40E-01		LLD<4.40E-01		765.78	
NP-237	LLD<1.99E+00		LLD<1.99E+00		86.50	
PB-212	LLD<7.72E-01		LLD<7.72E-01		239.00	
PU-239	LLD<4.66E+03		LLD<4.66E+03		129.30	
PU-241	LLD<1.50E+05		LLD<1.50E+05		148.57	
RA-224	LLD<9.07E+00		LLD<9.07E+00		240.99	
RA-226	LLD<8.70E+00		LLD<8.70E+00		186.10	
RU-103	LLD<5.58E-01		LLD<5.58E-01		497.08	
RU103	LLD<5.87E-01		LLD<5.87E-01		497.08	
RURH106	LLD<8.97E+00		LLD<8.97E+00		621.80	
SB-125	LLD<1.80E+00		LLD<1.80E+00		427.89	
SB-125A	LLD<1.80E+00		LLD<1.80E+00		427.89	
SE-75	LLD<5.88E-01		LLD<5.88E-01		264.66	
SN-113	LLD<7.55E-01		LLD<7.55E-01		391.67	
SR-85	LLD<5.64E-01		LLD<5.64E-01		513.99	
TH-228	LLD<2.26E+01		LLD<2.26E+01		84.37	
TL-208	LLD<6.43E-01		LLD<6.43E-01		583.20	
U-235	LLD<5.79E-01		LLD<5.79E-01		185.71	
Y-88	LLD<2.80E-01		LLD<2.80E-01		1836.06	
ZN-65	LLD<1.39E+00		LLD<1.39E+00		1115.53	
ZR-95	LLD<7.75E-01		LLD<7.75E-01		756.73	
T[illegible]L	1.23E+02	+-2.93E+00	1.23E+02	+-2.93E+00		

STANDARD DEVIATION = 0.19

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 9.84E-09 UC/LI
TOTAL MEASURED ACTIVITY = 1.23E+02 (+-2.93E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
245.93	122.98	287.	31.8	3.50E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1228.91	609.12	169.	20.6	6.78E+00
2921.49	1460.42	543.	9.0	4.63E+01

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*                                                                       *
*              G A M M A   S P E C T R U M   A N A L Y S I S            *
*                                                                       *
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CANBERRA SPECTRAN-F V2.06  SOFTWARE

222-S COUNTING ROOM WESTINGHOUSE HANFORD                 09-NOV-93  22:20:23

                    A N A L Y S I S   P A R A M E T E R S

MCA UNIT NUMBER:    2      /      ADC UNIT NUMBER: 3.0
DETECTOR NUMBER:    3      /      GEOMETRY NUMBER:  41
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:      5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.9A SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY:

SAMPLE DESCRIPTION: J1289-5730
GEOMETRY DESCRIPTION:  42B47-A 22CC LIQ
SAMPLE SIZE:    1.0000E-03 LI        / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON  9-NOV-93 AT 21:30:12

COLLECT LIVE TIME:     3000. SECONDS
        REAL TIME:     3003. SECONDS
        DEAD TIME:      0.10 %

 DECAYED TO       0. DAYS,  0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 20-OCT-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92
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222-S COUNTING ROOM WESTINGHOUSE HANFORD 09-NOV-93 22:20:23

P E A K A N A L Y S I S

WHC-SD-WM-DP-057 REV O

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	118.90	59.49	1.04	730.	1520.	6.9	AM-241,U-237, EU-155
2	245.97	123.00	1.18	788.	[illegible]	[illegible]	FE-[illegible], EU-1044
3	1218.52	609.12	1.23	154.	178.	36.3	BI-214A,
3B		609.19			122.	21.0	RU-103
4	1323.19	661.45	1.51	198.	8162.	2.2	CS-137
4B		661.41			81.	28.8	
5	2346.53	1173.00	2.03	60.	154.	22.7	CO-60
6	2664.41	1331.91	1.22	46.	122.	25.9	CO-60
7	2921.49	1460.43	2.35	32.	537.	9.2	K-40
7B		1460.58			611.	8.7	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 09-NOV-93 22:20:13

SAMPLE: J1289-5730

WHC-SD-WM-DP-057 REV O

DATA COLLECTED ON 9-NOV-93 AT 21:30:12

DELAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uC/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY (CORRESPONDING) EXPECT	DIFF
AM-241	1.33E+01	+-9.30E-01	1.33E+01	+-9.30E-01	59.54	-0.05
AM-243	LLD<4.34E-01		LLD<4.34E-01		74.67	
BA-133	LLD<7.78E-01		LLD<7.78E-01		356.02	
BA-140	LLD<1.93E+00		LLD<1.93E+00		537.27	
BI-212	LLD<4.05E+00		LLD<4.05E+00		727.20	
CEPR144	LLD<4.97E+00		LLD<4.97E+00		133.51	
CO-60	2.59E+00	+-6.71E-01	2.59E+00	+-6.71E-01	1332.50	-0.[illegible]
					1173.24	-0.[illegible]
CR-51	LLD<4.21E+00		LLD<4.21E+00		320.08	
CS-134	LLD 5.06E-01		LLD<5.06E-01		795.84	
CS-137	1.10E+02	+-2.[illegible]3E+00	1.10E+02	+-2.[illegible]3E+00	[illegible]	-0.[illegible]
EU-152	LLD<1.36E+00		LLD<1.36E+00		1408.01	
EU-154	LLD<1.94E+00		LLD<1.94E+00		1274.45	
EU-154H	LLD<1.84E+00		LLD<1.84E+00		1274.80	
EU-155	LLD<1.32E+00		LLD<1.32E+00		105.31	
FE-59	LLD<9.63E-01		LLD<9.63E-01		1099.25	
I-131	LLD<5.75E-01		LLD<5.75E-01		364.48	
K-40	LLD 1.47E+01		LLD<1.47E+01		1460.75	
L[illegible]-40	LLD<5.02E-01		LLD<5.02E-01		1596.[illegible]	
MN-54	LLD<4.11E-01		LLD<4.11E-01		834.83	
NA-22	LLD<6.90E-01		LLD<6.90E-01		1274.50	
NB-94	LLD<4.42E-01		LLD<4.42E-01		702.63	
NB-95	LLD<4.44E-01		LLD<4.44E-01		765.78	
NP-237	LLD<2.06E+00		LLD<2.06E+00		86.50	
PB-212	LLD<7.72E-01		LLD<7.72E-01		239.00	
PU-239	LLD<4.85E+03		LLD<4.85E+03		129.30	
PU-241	LLD<1.50E+05		LLD<1.50E+05		148.57	
RA-224	LLD<9.11E+00		LLD<9.11E+00		240.99	
RA-226	LLD<8.74E+00		LLD<8.74E+00		186.10	
RU-103	LLD<5.52E-01		LLD<5.52E-01		497.08	
RU103	LLD<5.81E-01		LLD<5.81E-01		497.08	
RURH106	LLD<8.55E+00		LLD<8.55E+00		621.80	
SB-125	LLD<1.88E+00		LLD<1.88E+00		427.89	
SB-125A	LLD<1.88E+00		LLD<1.88E+00		427.89	
SE-75	LLD<5.72E-01		LLD<5.72E-01		264.66	
SN-113	LLD<7.90E-01		LLD<7.90E-01		391.67	
SR-89	LLD<5.54E-01		LLD<5.54E-01		909.99	
TH-228	LLD<2.25E+01		LLD<2.25E+01		84.37	
TL-208	LLD<6.54E-01		LLD<6.54E-01		583.20	
U-235	LLD<5.81E-01		LLD<5.81E-01		185.71	
Y-88	LLD<3.35E-01		LLD<3.35E-01		1836.06	
ZN-65	LLD<1.40E+00		LLD<1.40E+00		1115.55	
ZR-95	LLD<6.81E-01		LLD<6.81E-01		756.73	
T[illegible]L	1.26E+02	+-2.96E+00	1.26E+02	+-2.96E+00		

STANDARD DEVIATION = 0.25

EBAR = ***** MEV/DISINTEGRATION

MAXIMUM PERMISSABLE ACTIVITY = 1.01E-08 UC/LI

TOTAL MEASURED ACTIVITY = 1.26E+02 (+-2.96E+00) UC/LI

% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
245.97	123.00	302.	27.4	3.68E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1316.52	609.12	125.	33.3	5.15E+00
2921.49	1460.43	547.	9.3	4.57E+01

Raymond 11.10.93

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*                                                                     *
*              G A M M A   S P E C T R U M   A N A L Y S I S          *
*                                                                     *
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CANBERRA SPECTRAN-F V2.06  SOFTWARE

222-S COUNTING ROOM WESTINGHOUSE HANFORD              09-NOV-93  23:18:24

                    A N A L Y S I S   P A R A M E T E R S

MCA UNIT NUMBER:    2      /      ADC UNIT NUMBER: 3.0
DETECTOR NUMBER:     3     /      GEOMETRY NUMBER:  41
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:      5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER ANI:
ANALYZED BY:

SAMPLE DESCRIPTION: J1289-5730
GEOMETRY DESCRIPTION:  42847-A 22CC LIQ
SAMPLE SIZE:    1.0000E-03 LI        / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON  9-NOV-93 AT 22:28:10

COLLECT LIVE TIME:     3000. SECONDS
        REAL TIME:     3003. SECONDS
        DEAD TIME:      0.10 %

 DECAYED TO       0. DAYS,  0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 20-OCT-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92
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222-S COUNTING ROOM WESTINGHOUSE HANFORD 09-NOV-93 23:18:24

P E A K A N A L Y S I S

WHC-SD-WM-DP-057 REV O

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	118.98	59.50	1.02	724.	1498.	7.0	AM-241,U-237, EU-155
2	246.11	123.07	0.90	775.	330.	25.0	EU-152,CO-57, EU-154A
3	1166.38	583.06	1.28	168.	86.	49.5	EU-154,
3B		583.13			94.	24.1	TL-208
4	1218.62	609.17	1.95	163.	141.	31.4	BI-214A,
4B		609.19			122.	21.0	RU-103
5	1323.27	661.48	1.57	204.	8162.	2.2	CS-137
5B		661.41			81.	28.8	
6	2347.00	1173.23	1.91	75.	158.	23.7	CO-60
7	2664.76	1332.06	2.61	23.	163.	18.0	CO-60
8	2921.95	1460.66	2.15	34.	564.	9.3	K-40
8B		1460.58			611.	5.5	
9	3528.24	1763.26	2.26	12.	74.	35.1	BI-214C
9B		1764.79			47.	23.6	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 09-NOV-93 23:18:24

WHC-SD-WM-DP-057 REV O

SAMPLE: J1289-5730
DATA COLLECTED ON 9-NOV-93 AT 22:28:10
DELAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN UCI/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	1.31E+01	+-9.24E-01	1.31E+01	+-9.24E-01	59.54	-0.01
AM-243	LLD<4.44E-01		LLD<4.44E-01		74.67	
BA-133	LLD<8.03E-01		LLD<8.03E-01		356.02	
BA-140	LLD<2.01E+00		LLD<2.01E+00		537.27	
BI-212	LLD<4.22E+00		LLD<4.22E+00		727.20	
CEPR144	LLD<5.09E+00		LLD<5.09E+00		133.51	
CO-60	3.49E+00	+-6.30E-01	3.49E+00	+-6.30E-01	1332.50	-0.44
					1173.24	-0.01
CR-51	LLD<4.10E+00		LLD<4.10E+00		320.09	
CS-134	LLD<5.01E-01		LLD<5.01E-01		797.54	
CS-137	1.10E+02	+-2.74E+00	1.10E+02	+-2.74E+00	661.63	-0.17
EU-152	LLD<3.01E+00		LLD<3.01E+00		1408.01	
EU-154	LLD<1.26E+00		LLD<1.26E+00		1274.45	
EU-154H	LLD<1.17E+00		LLD<1.17E+00		1274.80	
EU-155	LLD<1.31E+00		LLD<1.31E+00		105.31	
FE-59	LLD<9.40E-01		LLD<9.40E-01		1099.25	
I-131	LLD<5.82E-01		LLD<5.82E-01		364.48	
K-40	LLD<1.46E+01		LLD<1.46E+01		1460.75	
LA-140	LLD<4.33E-01		LLD<4.33E-01		1596.20	
MN-54	LLD<4.54E-01		LLD<4.54E-01		834.83	
NA-22	LLD<4.49E-01		LLD<4.49E-01		1274.55	
NB-94	LLD<4.17E-01		LLD<4.17E-01		702.63	
NB-95	LLD<4.40E-01		LLD<4.40E-01		765.78	
NP-237	LLD<2.01E+00		LLD<2.01E+00		86.50	
PB-212	LLD<7.73E-01		LLD<7.73E-01		239.00	
PU-239	LLD<4.75E+03		LLD<4.75E+03		129.30	
PU-241	LLD<1.53E+05		LLD<1.53E+05		148.57	
RA-224	LLD<8.73E+00		LLD<8.73E+00		240.99	
RA-226	LLD<8.91E+00		LLD<8.91E+00		186.10	
RU-103	LLD<5.21E-01		LLD<5.21E-01		497.08	
RU103	LLD<5.48E-01		LLD<5.48E-01		497.08	
RURH106	LLD<9.61E+00		LLD<9.61E+00		621.80	
SB-125	LLD<1.83E+00		LLD<1.83E+00		427.89	
SB-125A	LLD<1.83E+00		LLD<1.83E+00		427.89	
SE-75	LLD<5.77E-01		LLD<5.77E-01		264.66	
SN-113	LLD<7.98E-01		LLD<7.98E-01		391.67	
SR-89	LLD<5.92E-01		LLD<5.92E-01		513.99	
TH-228	LLD<2.25E+01		LLD<2.25E+01		84.37	
TL-208	LLD<6.52E-01		LLD<6.52E-01		583.20	
U-235	LLD<5.96E-01		LLD<5.96E-01		185.71	
Y-88	LLD<4.96E-01		LLD<4.96E-01		1836.06	
ZN-65	LLD<1.43E+00		LLD<1.43E+00		1115.55	
ZR-95	LLD<6.68E-01		LLD<6.68E-01		756.73	
TOTAL	1.27E+02	+-2.96E+00	1.27E+02	+-2.96E+00		

STANDARD DEVIATION = 0.20

222

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 9.37E-09 UC/LI
TOTAL MEASURED ACTIVITY = 1.27E+02 (+-2.96E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
246.11	123.07	330.	25.0	4.03E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1166.38	583.06	86.	49.3	3.32E+00
1218.60	609.17	141.	31.4	5.65E+00
2921.85	1460.66	534.	9.3	4.55E+01
3523.24	1763.76	54.	35.1	5.39E+00

OA 22

WESTINGHOUSE HANFORD COMPANY Batch 2095

WHC-SD-WM-DP-057 REV O 222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No. J 1285	Customer ID: LAD 11-30-93 Bechtold ~~KE13A~~ 105 KE Basin
Analysis: Pu 239/40	Sample Prep: DIRECT

Instrument: WB537237	Procedure/ Rev: LA-503-156 D0
Technologist: Joelm Van Sant	Date: 11-12-93 12-13-93
Starting Time: 0900	Temperature 25°C
Ending Time: 1445	Chemist: L Fritts

Comments: Sample Triplicate seemed to plate a lot more than Sample + Dup

~~OUT FOR RERUN~~
LAD 12-1-93

	Description	Lab ID		Description	Lab ID
1	LCMS	J1284.-5581	11		
2	BLANK	J1300.-5681	12		
3	Sample	J1285.-5791	13		
4	Sample Duplicate	J1285.-5791	14		
5	Sample Triplicate	J1285.-5791	15		
6	Spike	J1285.-5981	16		
7	Spike Duplicate	J1285.-5981	17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	AR001 .1mL-10-.1mL			
Spike	77848 .1mL			

A-6000-881 (03/92)

QA

ANALYTICAL BATCH SUMMARY SHEET

METHOD: **LA-503-156**

DATE START: **November 12, 1993**

PREPARED BY: **L.L. Fritts** LL Fritts 11.22.93 / 12.1.93

DATE COMPLETE: **November 22, 1993**

	UNITS:	uCi/mL									
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	%REC	DET LIM	% CT ER
STD 63B43	J1284	Pu-239/40	1.38E+2						105.7	1.45E-2	2.0
BLANK	J1300	Pu-239/40	<8.46E-6						5.9	8.46E-6	100.0
KE13A	J1285	Pu-239/40	6.54E-2	6.60E-2	6.47E-2	6.54E-2	1.30E-3	2.0	2.2	6.02E-3	4.5
									0.6	1.31E-2	11.5
									6.6	6.28E-3	3.2
KE13A	J1285	239 Spike	111.5	105.9					24.0	8.67E-3	1.0
									12.4	8.60E-3	1.3
STD 63B43	J1284	Pu-238	<6.25E-2						N/A	6.25E-2	100.0
BLANK	J1300	Pu-238	<1.52E-4						5.9	1.52E-4	100.0
KE13A	J1285	Pu-238	<8.83E-2	<3.46E-1	<2.98E-2	N/A	N/A	N/A	2.2	8.83E-2	100.0
									0.6	3.46E-1	100.0
									6.6	2.99E-2	100.0

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

The results for the spike are in percent recovery.

No rerun requested: Tracer recoveries are low but precision and spike recoveries are good!!

ANALYTICAL BATCH SUMMARY SHEET

METHOD: **LA-503-156**

DATE START: **November 12, 1993**

PREPARED BY: **L.L. Fritts** LL Fritts 11-22-93

DATE COMPLETE: **November 22, 1993**

	UNITS:	uCi/mL									
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	%REC	DET LIM	% CT ER
STD 63B43	J1284	Pu-239/40	1.38E+2						105.7	1.45E-2	2.0
BLANK	J1300	Pu-239/40	<8.46E-6						5.9	8.46E-6	100.0
KE13A	J1285	Pu-239/40	6.54E-2	6.60E-2	6.47E-2	6.54E-2	1.30E-3	2.0	2.2	6.02E-3	4.5
									0.6	1.31E-2	11.5
									6.6	6.28E-3	3.2
KE13A	J1285	239 Spike	111.5	105.9					24.0	8.67E-3	1.0
									12.4	8.60E-3	1.3
STD 63B43	J1284	Pu-238	<6.25E-2						N/A	6.25E-2	100.0
BLANK	J1300	Pu-238	<1.52E-4						5.9	1.52E-4	100.0
KE13A	J1285	Pu-238	<8.83E-2	<3.46E-1	<2.98E-2	N/A	N/A	N/A	2.2	8.83E-2	100.0
									0.6	3.46E-1	100.0
									6.6	2.99E-2	100.0

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

The results for the spike are in percent recovery.

Rerun requested: Tracer recoveries are very low.

Rerun cancelled -- Data looks good and out of Pu-236 tracer for the rerun!

LL Fritts
12-1-93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV 0

6 6783

Serial No	Sample Point	Date	Time Issued	Priority
J 1284.-5561	BECHTOLD	11- 4-93	8:47	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	% RECOVERY	E14157	0

Sample Size: ? .1mL-10-.1mL + .100mL Spike

Customer ID: STD

Remarks Calculations Results: 77843

EDP R211 AR001 "AEA" - ACCM ATTACH PRINTOUT

STD# 63343 RESULT 138

STD VAL. 130.5 %REC ~~106 %~~ 105.7% 11.22.93

~~OUT FOR RERUN~~ LHD 12-1-93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs 1495	Hrs	Hrs	Hrs	Hrs
Date 11-12-93	Time Completed 14:45	Lab Chief		

54 6800-06 (R-10 83)

Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	STANDARD 0.494
J1284-5581	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0
Batch ID	Sample D.F. (DF)	101	Pu 239 AEA Frac. (C239)	0.474
2095	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	1426
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	1
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	10.69
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	10.26
11/12/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted − Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * ie to the power of ((−ln2 * Decay Time) / 1040.95)

Pu 236 Tracer Recovery = (Total AT Counts / TC − Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) − Bkg * 2 * C238) − (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	1.38E+02

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.38E-01
Relative Counting Error	=	2.0%
Pu-238 µCi/mL	=	< 6.25E-02
Relative Counting Error	=	100.0%
Pu 236 Tracer Recovery	=	14.6%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	1.45E-02	Pu 238	=	6.25E-02

Data Entry by:		Date:	22-Nov-93
Approved by:		Date:	November 22, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#2 11-12-93. J1284-5581

1426 -1
30

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

8 8544 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1300.-5681	BECHTOLD	11- 4-93	15:23	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
? 1mL + .100mL Spike	BLK

Remarks, Calculations, Results

REAGENT BLANK 77843

COUNT AS uCI/L <8.46X10^{-6} µCi/ml

ATTACH PRINTOUT

~~CUT FOR RERUN~~

12-1-93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs 1445	Hrs	Hrs	Hrs	Hrs
Date 11-12-93	Time Completed 1445	Lab Supervisor		

54-6800-061 (4-10-83)

Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	BLANK 0.841
J1300-5681	Sample Volume in mL (SS)	1	Pu 238 AEA Frac. (C238)	0
Batch ID	Sample D.F. (DF)	1	Pu 239 AEA Frac. (C239)	0
2095	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	483
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	5
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	3.86
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	0
11/12/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of {(-ln2 * Decay Time) / 1040.95 })

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	< 8.46E-03

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	< 8.46E-06
Relative Counting Error	=	100.0%
Pu-238 µCi/mL	=	< 1.52E-04
Relative Counting Error	=	100.0%
Pu 236 Tracer Recovery	=	5.9%

NOTE: Pu 239/240 Reported result is a LESS THAN value using 0.05 for the Pu-239/240 peak height.

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	8.46E-06	Pu 238	=	1.52E-04

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	November 22, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#1 11-12-93

J1300-5681

483 -5
30

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

5 5883

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5781	BECHTOLD	11- 4-93	8:48	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
2 1ml-10-.05mL + .100mL Spike	KE13A

Remarks Calculations Results sample 77843

COUNT AS uCI/L

6.54×10^{-2} µCi/m ATTACH PRINTOUT

~~CUT FOR RERUN~~
12-1-93 LAD

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs 1445	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Initials
11-12-93	1445	

54-(30-061 (9-10-83)

Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

				SAMPLE
Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	0.26
J1285-5781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.543
2095	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	529
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	4
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	1.55
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	3.23
11/12/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of ((-ln2 * Decay Time) / 1040.95))

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	6.54E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	6.54E-02
Relative Counting Error	=	4.5%
Pu-238 µCi/mL	=	< 8.83E-02
Relative Counting Error	=	100.0%
Pu 236 Tracer Recovery	=	2.2%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	6.02E-03	Pu 238	=	8.83E-02

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	November 22, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#3 11-12-93

J1285-5781

529/30 -4

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV 0

2 7330

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5781	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
?1mL-10-.05mL + .100mL Spike	KE13A

Remarks, Calculations, Results

COUNT AS uCI/L duplicate 77B43

6.60×10^{-2} uCi/mL "AEA" - 480MIN MACH PRINTOUT

LAD 12-1-93

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs 1495	Hrs	Hrs	Hrs	Hrs
Date 11-12-93	Time Completed 1445			

54-6800-061 (A-10 831)

Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	SAMPLE 0.119
J1285-5781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.251
2095	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	378
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	5
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	0.23
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	0.49
11/12/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of {(-ln2 * Decay Time) / 1040.95 })

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / ((C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	6.60E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	6.60E-02
Relative Counting Error	=	11.5%
Pu-238 µCi/mL	=	< 3.46E-01
Relative Counting Error	=	100.0%
Pu 236 Tracer Recovery	=	0.6%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	1.31E-02	Pu 238	=	3.46E-01

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	November 22, 1993

Form 1 Rev. 1.4

233

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#1 11-12-93

J1285-5781

328/30 -5

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

4 4961 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5781	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
?1mL-10-.05mL + .100mL Spike	KE13A

Remarks Calculations Results triplicate 77B43

COUNT AS uCI/L

6.47×10^{-2} uCi/ml

"AEA" - 490000

ATTACH PRINTOUT

~~OUT FOR RERUN~~

LAD 12-1-93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs 1445	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Supv.
11-12-93	1445	

54-8600-061 (R/10-83)

Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	0.249
J1285-5781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.104
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.515
2095	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	1415
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	5
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	3.02
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	1.27
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	6.26
11/12/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

SAMPLE

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of {(-ln2 * Decay Time) / 1040.95 })

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	6.47E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	6.47E-02
Relative Counting Error	=	3.2%
Pu-238 µCi/mL	=	< 2.98E-02
Relative Counting Error	=	4.8%
Pu 236 Tracer Recovery	=	6.6%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	6.28E-03	Pu 238	=	2.98E-02

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	November 22, 1993

Form 1 Rev. 1.4

235

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#1 11-12-93

J1285-5781

1415/30 -5

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3 3730

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5981	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/24	LA-503-156	% RECOVERY	E14157	0

Sample Size: 63B43 — Customer ID: 4E13A

.1mL-10-.05mL + .100mL Std + .200mL Sp

Remarks, Calculations, Results

SAMPLE SPIKED ID spike cup 77B43

SPIKE ID

SPIKE VOLUME

COUNT AS uCI/L

LAD 12-1-93

~~CUT FOR RERUN~~

$$\frac{(96.1-66.0)\left(\frac{101}{.1}/\frac{11}{.05}\right)(100)}{130.5} = 105.9\%$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs 1445	Hrs	Hrs	Hrs	Hrs
Date 11-12-93	Time Completed 1445	Lab Unit Mgr		

54-5200-061 (8/10/93)

Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	0.361
J1285-5981	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.064
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.56
2095	Tracer Volume in mL (SPKV)	0.2	Total AT Counts	6407
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	4
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	31.92
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	5.68
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	49.54
11/12/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

CHK EXT NO.

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of {(-ln2 * Decay Time) / 1040.95 })

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = {(Total AT Counts / TC) - Bkg * 2 * C238} - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	9.71E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	9.71E-02
Relative Counting Error	=	1.0%
Pu-238 µCi/mL	=	8.46E-03
Relative Counting Error	=	2.1%
Pu 236 Tracer Recovery	=	24.0%

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	8.67E-03	Pu 238	=	8.27E-03

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	November 22, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#3 11-12-93

J1285-5981

6407 -4
30

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

2 2387 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5981	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/24	LA-503-156	% RECOVERY	E14157	0

Sample Size: ?1mL-10-.05mL + .100mL St + .200mL Spk — Customer ID: KE13A

68B43 77B43

Remarks, Calculations, Results

SAMPLE SPIKED ID

SPIKE ID

SPIKE VOLUME

COUNT AS uCI/L

~~OUT FOR RERUN~~ LAD 12-1-93

11/14/93 ~~49.5~~

ATTACH PRINTOUT

$\frac{(97.1 - 65.4)(\frac{.01}{.1} / \frac{11}{.05})(100)}{130.5} = 111.5\%$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs 1445	Hrs	Hrs	Hrs	Hrs
Date 11-12-93	Time Completed 1445	Lab Unit		

54-6800-06 (R-10-83)

Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	0.364
J1285-5981	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.065
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.559
2095	Tracer Volume in mL (SPKV)	0.2	Total AT Counts	3259
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	1
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	19.24
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	3.46
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	29.55
11/12/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

CHK EXT NO.

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of {(-ln2 * Decay Time) / 1040.95 })

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	9.61E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	9.61E-02
Relative Counting Error	=	1.3%
Pu-238 µCi/mL	=	< 1.60E-02
Relative Counting Error	=	2.7%
Pu 236 Tracer Recovery	=	12.4%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	8.60E-03	Pu 238	=	1.60E-02

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	November 22 1993

Form 1 Rev. 1.4

239

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#2 11-12-93

J1285-5981

3259
30 -1

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G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT **WHC-SD-WM-DP-057 REV O**

SAMPLE
[illegible]-5581
File ID: 6a6793.CHF

Counted on: 11/13/93 @19:23
Detector: AEA6
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	[illegible] Initial	[illegible] Final
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	26.[illegible]	22.557	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err 2σ95	d/m	Activity [illegible]
1	Cm243	0.494	5.786	5.797	-.011	0.11	10.69	2.7	114.1	[illegible]
	Cm244		5.796	5.797	-.001				83.3	[illegible]
2	[illegible]	[illegible]	[illegible]	5.162	-.01	0.10	10.26	2.[illegible]	[illegible]	[illegible]
	[illegible]		[illegible]	5.162	-.01				[illegible]	[illegible]
		-----					---------			
Totals:		[illegible]	(--valid peaks only--)				20.95			

DETECTOR CALIBRATION
Energy(MEV) = 1.102 + (0.0047)*Channel
Energy range (MeV): 4.102 TO 6.508
Efficiency = 0.1283 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	10386.0	100.000
Smoothed	10389.1	100.029
Composite fit	10056.7	[illegible]
Residuals	329.3	3.171

Analyzed by: EMB

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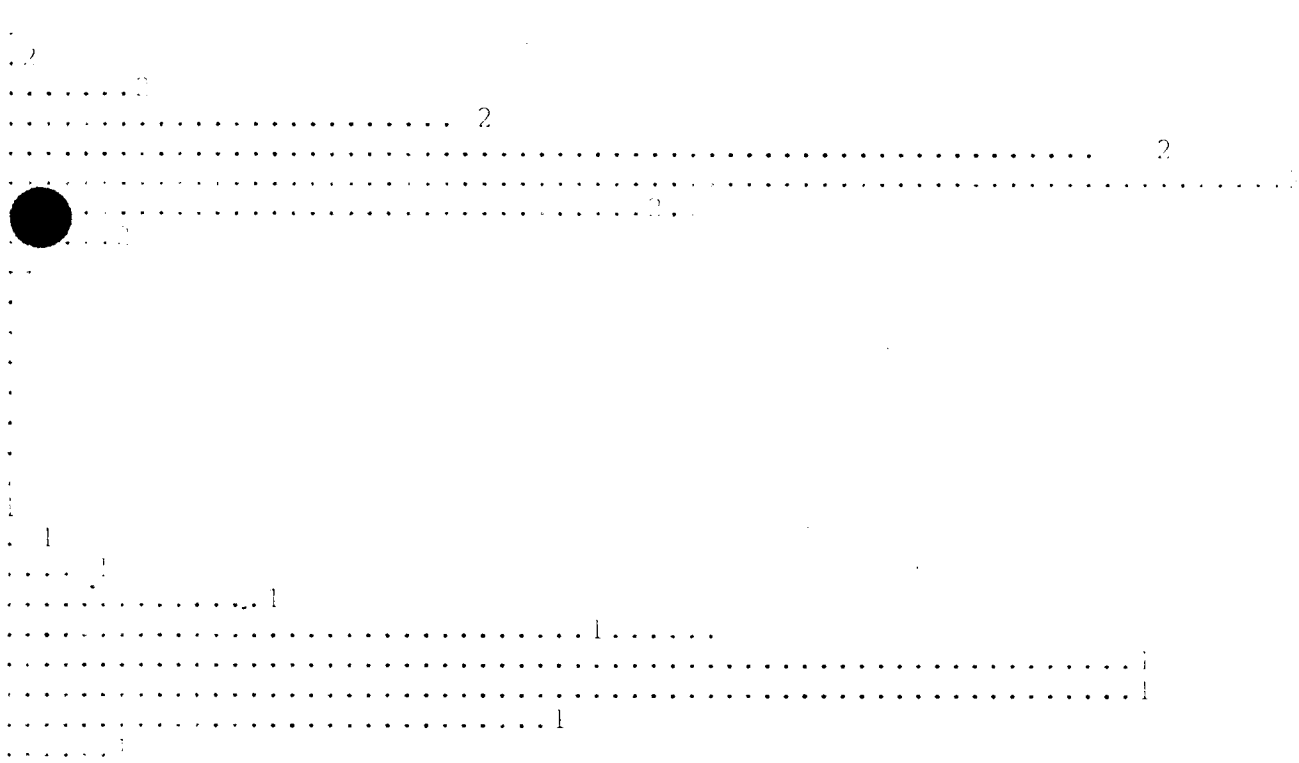

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Raw Data Dump for AEA Spectrum: 6a6793.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
31	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
41	1.	0.	1.	0.	0.	0.	0.	1.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	1.	0.	[illegible]
61	0.	1.	0.	0.	1.	0.	1.	0.	[illegible]	[illegible]
71	[illegible]	[illegible]	0.	0.	0.	0.	1.	1.	0.	[illegible]
[illegible]	[illegible]	1.	0.	1.	0.	0.	0.	0.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	2.	0.	0.	0.	1.	1.	0.	[illegible]
101	0.	1.	0.	1.	0.	2.	0.	0.	1.	[illegible]
111	0.	0.	1.	0.	1.	0.	2.	1.	0.	[illegible]
121	0.	0.	0.	0.	0.	0.	2.	3.	0.	1.
131	0.	1.	2.	1.	2.	0.	0.	1.	1.	1.
141	1.	1.	1.	0.	2.	2.	2.	2.	1.	1.
151	0.	2.	1.	3.	2.	3.	1.	1.	3.	0.
161	0.	2.	1.	2.	1.	1.	1.	0.	2.	1.
171	2.	5.	1.	1.	5.	1.	2.	1.	0.	2.
181	2.	0.	4.	3.	[illegible]	1.	3.	5.	[illegible]	[illegible]
191	[illegible]	8.	[illegible]	4.	3.	9.	11.	9.	[illegible]	[illegible]
201	11.	16.	25.	31.	25.	25.	39.	44.	[illegible]	[illegible]
211	61.	67.	97.	92.	92.	110.	151.	159.	170.	[illegible]
221	[illegible]	151.	211.	211.	257.	218.	219.	192.	202.	[illegible]
231	[illegible]	[illegible]	112.	120.	117.	93.	75.	69.	[illegible]	[illegible]
241	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.	1.	1.	[illegible]	[illegible]
251	[illegible]	1.	[illegible]	[illegible]	[illegible]	5.	[illegible]	2.	[illegible]	[illegible]
261	3.	3.	[illegible]	9.	[illegible]	6.	2.	5.	[illegible]	[illegible]
271	[illegible]	2.	2.	3.	[illegible]	4.	1.	4.	[illegible]	[illegible]
281	[illegible]	[illegible]	5.	[illegible]	[illegible]	2.	7.	[illegible]	[illegible]	[illegible]
291	[illegible]	[illegible]	[illegible]	6.	[illegible]	2.	3.	[illegible]	[illegible]	[illegible]
[illegible]	2.	[illegible]	2.	[illegible]	[illegible]	[illegible]	[illegible]	1.	[illegible]	[illegible]
[illegible]	2.	[illegible]	[illegible]	1.	[illegible]	[illegible]	4.	[illegible]	[illegible]	[illegible]
321	[illegible]	10.	6.	2.	[illegible]	2.	3.	12.	[illegible]	[illegible]
331	[illegible]	16.	14.	19.	20.	23.	24.	26.	[illegible]	[illegible]
341	56.	58.	41.	78.	76.	82.	98.	110.	[illegible]	[illegible]
351	170.	165.	161.	161.	162.	182.	204.	210.	[illegible]	[illegible]
361	[illegible]	130.	194.	196.	[illegible]	173.	130.	125.	[illegible]	[illegible]
371	[illegible]	73.	69.	12.	[illegible]	28.	30.	18.	[illegible]	[illegible]
381	[illegible]	[illegible]	[illegible]	1.	[illegible]	2.	2.	[illegible]	[illegible]	[illegible]
391	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
401	[illegible]	0.	0.	0.	[illegible]	0.	0.	1.	[illegible]	[illegible]
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	1.	0.	0.	0.	[illegible]
431	0.	1.	0.	2.	0.	0.	1.	0.	0.	[illegible]
441	1.	1.	0.	0.	1.	0.	1.	0.	1.	0.
451	0.	0.	0.	1.	0.	1.	1.	1.	0.	0.
461	0.	1.	0.	0.	0.	1.	2.	1.	6.	0.
471	1.	2.	2.	1.	0.	1.	2.	1.	0.	[illegible]
481	0.	0.	0.	0.	0.	1.	0.	0.	1.	1.
491	[illegible]	2.	0.	2.	[illegible]	0.	[illegible]	1.	[illegible]	[illegible]
501	0.	0.								

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Westinghouse Hanford Co.

INTEGRAL ALPHA ENERGY ANALYSIS
Rev. 1.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV 0

SAMPLE
J1300-5681
File ID: 8a8544.CNF

Counted on: 11/13/93 @19:24
Detector: AEA8
Geometry number: 1
Count time: 28800. sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	118.7	118.7	362.655	362.655	16.000	6.918	8.000	3.2[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak Radionuclide	AEA Fraction	Peak Centroid Exp.	Peak Centroid Cal.	Peak Centroid Diff.	FWHM	Count Rate c/m	Eff 2σ%	Time min	Conc. [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3.86	4.6	[illegible]	[illegible]
[illegible]		5.786	5.777	0.009				47.0	0.21[illegible]
Totals:	0.841	<--valid peaks only-->				3.86			

DETECTOR CALIBRATION
Energy(MEV) = 1.109 + (0.0016)*Channel
Energy range (MeV): 1.109 TO 6.[illegible]
Efficiency = 0.1123 CPM DPM

TOTAL PEAK DATA:

Item	Total	% Recovery
Raw spectrum	2202.0	100.000
Smoothed	2202.0	100.000
Composite fit	1851.0	84.061
Residuals	351.0	15.939

Analyzed by:
[illegible]

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Spectrum 8a8544.CNF

Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 798.1

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Raw Data Dump for AEA Spectrum: 8a8544.CNF

WHC-SD-WM-DP-057 REV O

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	0.	0.	2.
21	1.	2.	0.	1.	0.	0.	0.	2.	0.	0.
31	0.	0.	2.	1.	0.	0.	0.	1.	0.	0.
[illegible]	[illegible]	[illegible]	0.	3.	[illegible]	3.	0.	1.	[illegible]	[illegible]
[illegible]	1.	0.	[illegible]	2.	[illegible]	0.	1.	[illegible]	[illegible]	
61	[illegible]	0.	[illegible]	1.	[illegible]	1.	[illegible]			
71	1.	[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	2.	[illegible]	1.	1.	0.	1.	[illegible]	[illegible]	
91	1.	0.	0.	1.	2.	0.	2.	0.	1.	[illegible]
101	1.	0.	1.	1.	2.	0.	0.	1.	3.	1.
111	0.	1.	1.	3.	0.	2.	0.	0.	1.	1.
121	0.	0.	0.	0.	2.	0.	0.	1.	2.	0.
131	0.	1.	2.	3.	0.	1.	1.	0.	1.	0.
141	0.	0.	1.	0.	0.	1.	0.	0.	4.	0.
151	0.	0.	1.	2.	0.	0.	0.	0.	0.	1.
161	0.	2.	0.	0.	3.	0.	2.	1.	0.	1.
171	3.	1.	0.	0.	0.	1.	0.	2.	[illegible]	[illegible]
[illegible]	1.	3.	1.	0.	[illegible]	1.	1.	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.	0.	1.	[illegible]	[illegible]	[illegible]
[illegible]	3.	3.	3.	1.	0.	0.	0.	3.	1.	[illegible]
231	0.	2.	0.	2.	3.	2.	1.	3.	0.	0.
[illegible]	[illegible]	0.	2.	1.	1.	2.	5.	1.	1.	1.
[illegible]	[illegible]	1.	2.	0.	1.	0.	1.	2.	0.	1.
[illegible]	[illegible]	[illegible]	2.	0.	0.	0.	0.	2.	0.	[illegible]
251	0.	1.	2.	1.	2.	3.	3.	1.	1.	[illegible]
261	5.	3.	2.	5.	6.	2.	1.	3.	0.	[illegible]
271	1.	3.	1.	0.	0.	0.	0.	1.	2.	[illegible]
[illegible]	1.	1.	3.	3.	1.	3.	0.	0.	1.	
[illegible]	[illegible]	[illegible]	[illegible]	2.	[illegible]	1.	1.	2.		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	3.	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]	1.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	1.	3.	0.	0.	2.	0.	0.	[illegible]	[illegible]	[illegible]
[illegible]	0.	2.	3.	1.	3.	1.	1.	1.	0.	2.
[illegible]	2.	5.	6.	6.	7.	13.	19.	24.	28.	39.
[illegible]	10.	40.	48.	65.	64.	74.	97.	95.	90.	113.
361	115.	145.	120.	128.	109.	90.	67.	44.	39.	28.
[illegible]	11.	6.	4.	1.	0.	0.	0.	0.	0.	[illegible]
[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
[illegible]	[illegible]	0.	0.	0.	[illegible]	0.	0.	0.	0.	
[illegible]	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]	[illegible]
411	0.	0	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
421	0.	0.	0.	0.	0.	1.	0.	0.	[illegible]	[illegible]
[illegible]	[illegible]	0.	0.	0.	0.	1.	0.	1.	[illegible]	[illegible]
[illegible]	[illegible]	0.	0.	0.	0.	0.	0.	0.	1.	[illegible]
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
471	1.	1.	1.	0.	1.	2.	3.	1.	3.	0.
481	0.	0.	1.	0.	1.	0.	1.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
501	0.	0.								

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Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

SAMPLE
[illegible]
File ID: [illegible]5383.CNF

Counted on: 11/13/93 @19:22
Detector: AEA5
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	[illegible] Initial	[illegible] Final
1	[illegible]	26.7	[illegible]	[illegible]	20.000	11.031	[illegible]	[illegible]
2	[illegible]	79.1	[illegible]	[illegible]	20.000	[illegible]	[illegible]	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Exp.	AEA Obs.	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	2sigma err %	[illegible]	[illegible]
1	Cm243	0.268	0.268	5.786	5.767	0.019	[illegible]	1.55	7.2	[illegible]	[illegible]
	Pu238			5.756	5.767	-.011				[illegible]	[illegible]
2	Pu239	0.543	0.543	5.113	5.168	-.055	[illegible]	3.23	[illegible]	[illegible]	[illegible]
	Pu240			5.144	5.168	-.024				[illegible]	[illegible]
Totals:		0.802	<--valid peaks only-->					4.78			

DETECTOR CALIBRATION
Energy(MEV) = 4.110 + (0.0046)*Channel
Energy range (MeV): 4.110 TO 6.465
Efficiency = 0.1362 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	2359.0	100.000
Smoothed	2859.0	100.000
Composite fit	2294.3	80.249
Residuals	564.7	19.751

Analyzed by: _____
EMB

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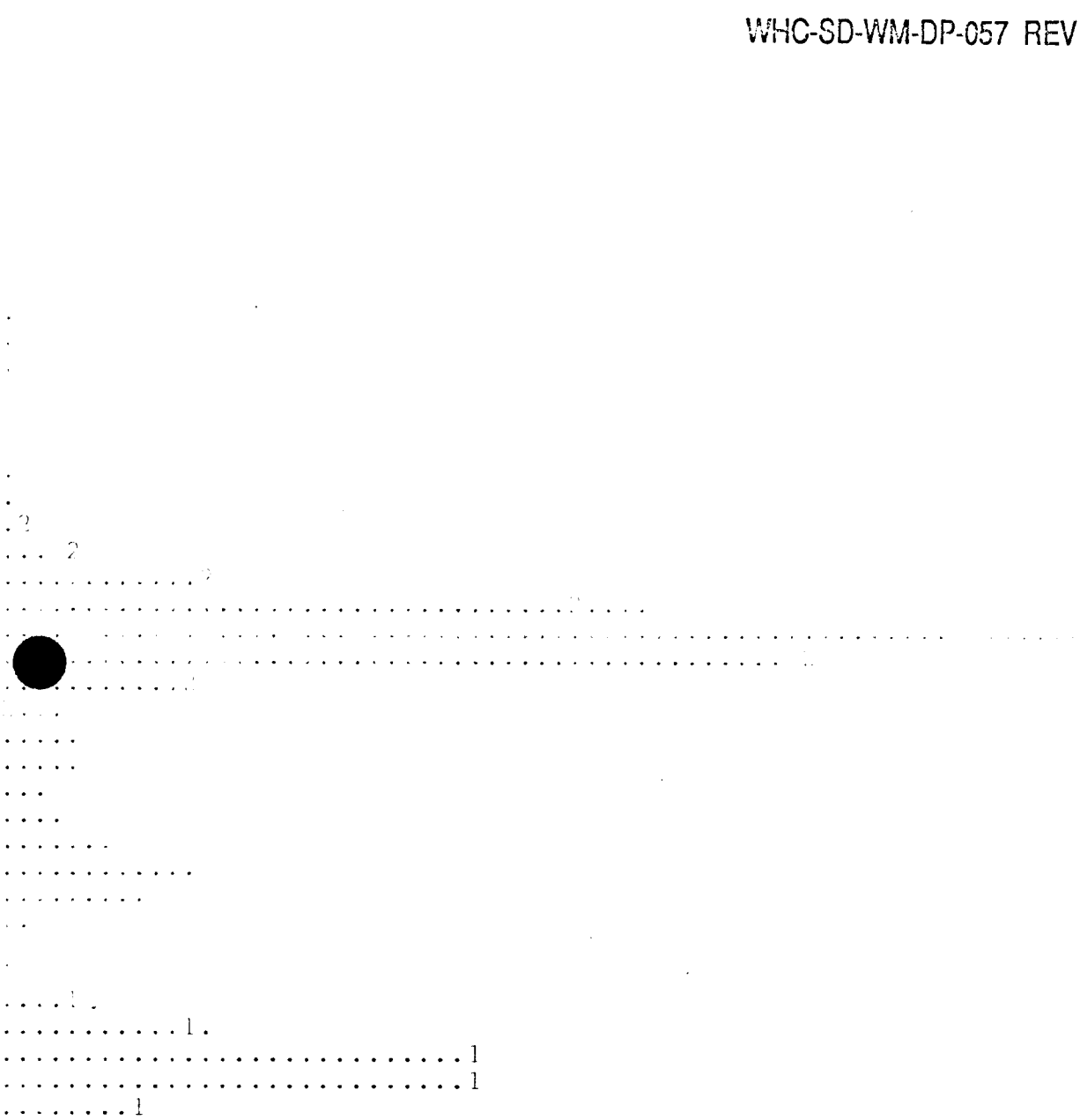
Spectrum 5a5883.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 571.7



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Raw Data Dump for AEA Spectrum: 5a5883.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
21	0.	1.	2.	1.	0.	2.	2.	0.	0.	0.
31	1.	0.	1.	0.	2.	1.	0.	0.	1.	0.
11	1.	0.	1.	0.	0.	1.	0.	0.	0.	[illegible]
51	0.	0.	0.	0.	0.	1.	1.	0.	1.	[illegible]
61	1.	0.	0.	0.	1.	0.	2.	0.	0.	1.
[illegible]	[illegible]	0.	0.	1.	0.	1.	0.	0.	0.	0.
[illegible]	[illegible]	2.	3.	0.	1.	0.	0.	2.	0.	2.
[illegible]	[illegible]	0.	1.	0.	0.	1.	0.	1.	1.	1.
[illegible]	[illegible]	0.	1.	2.	0.	1.	2.	1.	1.	[illegible]
111	0.	1.	1.	1.	3.	0.	0.	0.	1.	2.
121	0.	0.	1.	0.	2.	0.	1.	1.	1.	2.
131	0.	3.	0.	0.	3.	1.	0.	0.	2.	0.
141	2.	1.	4.	2.	3.	1.	0.	0.	3.	0.
151	0.	1.	1.	1.	0.	0.	1.	0.	2.	3.
161	1.	0.	0.	0.	0.	1.	1.	2.	0.	1.
171	2.	0.	1.	0.	1.	1.	1.	1.	1.	1.
181	0.	2.	2.	1.	1.	1.	2.	2.	2.	[illegible]
191	1.	1.	1.	1.	2.	2.	0.	2.	1.	1.
201	2.	2.	3.	3.	2.	5.	4.	6.	8.	[illegible]
211	[illegible]	11.	12.	19.	18.	20.	37.	32.	40.	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	70.	92.	74.	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10.	14.	[illegible]	[illegible]	
241	11.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6.	[illegible]	[illegible]	[illegible]
251	1.	4.	3.	4.	8.	8.	3.	[illegible]	[illegible]	[illegible]
261	6.	7.	6.	3.	8.	3.	11.	1.	[illegible]	[illegible]
271	7.	5.	4.	4.	0.	3.	4.	1.	2.	[illegible]
281	1.	2.	5.	6.	6.	6.	2.	5.	10.	[illegible]
291	11.	5.	5.	8.	11.	16.	10.	11.	16.	[illegible]
[illegible]	[illegible]	10.	11.	18.	11.	9.	12.	13.	10.	
[illegible]	[illegible]	3.	3.	2.	1.	1.	2.	1.	0.	[illegible]
[illegible]	1.	1.	0.	0.	0.	2.	1.	2.	0.	[illegible]
[illegible]	[illegible]	2.	1.	2.	2.	3.	1.	3.	[illegible]	[illegible]
[illegible]	1.	6.	7.	10.	11.	7.	12.	19.	[illegible]	[illegible]
[illegible]	[illegible]	21.	21.	32.	[illegible]	31.	33.	25.	[illegible]	[illegible]
361	10.	35.	31.	24.	44.	27.	22.	19.	[illegible]	[illegible]
371	8.	5.	4.	3.	0.	2.	0.	1.	[illegible]	[illegible]
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	1.	0.	0.	1.	1.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	1.	1.	0.	[illegible]
441	0.	0.	0.	0.	0.	0.	0.	0.	1.	[illegible]
451	0.	0.	0.	0.	1.	0.	0.	1.	0.	[illegible]
461	2.	0.	1.	0.	0.	0.	1.	1.	[illegible]	[illegible]
471	1.	1.	1.	0.	0.	2.	1.	0.	[illegible]	
481	0.	2.	1.	0.	1.	1.	1.	0.	[illegible]	[illegible]
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
511	0.	0.								

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Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
J1285-5781
File ID: 7a7330.CNF

Counted on: 11/13/93 @19:23
Detector: AEA7
Geometry number: 1
Count time: 28805. Sec

PEAK ANALYSIS

Peak	Peak height		Peak center		FWHM		Tau	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	5.5	5.5	364.569	364.285	12.000	5.349	6.000	1.37[illegible]
[illegible]	23.9	23.9	266.324	263.860	14.000	8.266	7.000	[illegible]
[illegible]	12.5	12.5	233.261	233.261	20.000	3.[illegible]	[illegible]	[illegible]
1	3.9	3.9	148.027	116.050	14.000	7.00[illegible]	[illegible]	[illegible]

PEAK RESULTS
Peak Error Limit: 25.

		AEA	Peak Centroid				Count	Serr		Activity
	Isotope	Frac	Exp.	Obs.	Diff.	FWHM	Rate c/m	@95	d/m	nCi/ea
[illegible]	[illegible]	0.119	5.706	5.809	-.0220	0.03	0.23	18.6	2.7	[illegible]
[illegible]	Cm244		5.796	5.808	-.012				2.8	[illegible]
[illegible]	Am242	0.415	5.276	5.336	-.0600	0.04	0.81	10.0	6.9	[illegible]
[illegible]		0.251		5.192		0.02	0.49	13.3	4.1	[illegible]
1	Np237	0.079	1.781	1.783	-.0020	0.03	0.15	22.[illegible]	1.[illegible]	[illegible]
Totals:		0.861	(--valid peaks only--)				1.68			

DETECTOR CALIBRATION
Energy(MEV) = 4.096 + (0.0047)*Channel
Energy range (MeV): 4.096 TO 6.503
Efficiency = 0.1173 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	932.0	100.000
Smoothed	927.8	99.5[illegible]
Composite fit	805.7	86.447
Residuals	126.3	13.553

Analyzed by: _____
EMB

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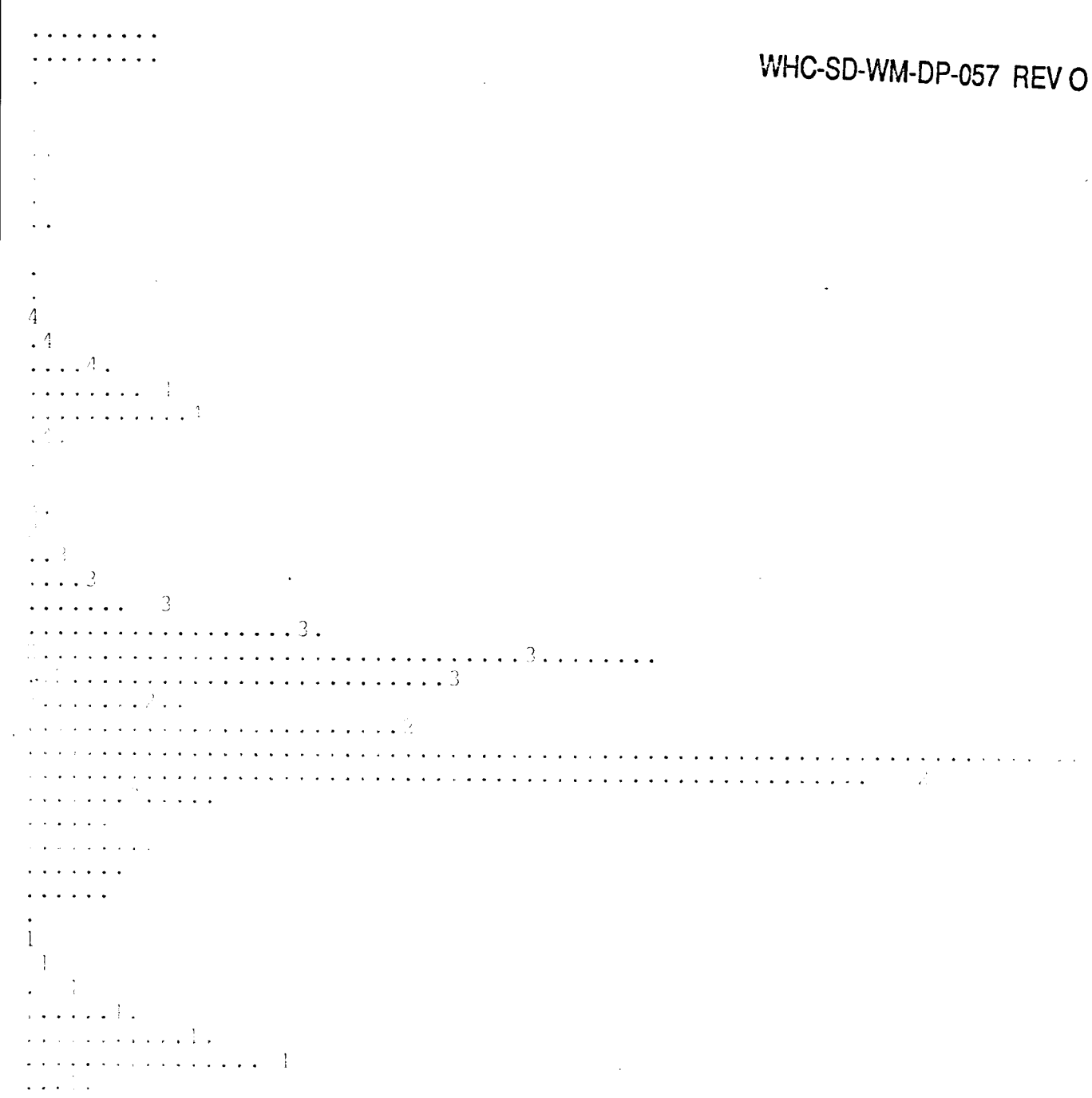
Spectrum 7a7330.CHF

Legend: 'Raw'= .... Modeled Peaks = 1,2,.., etc Display



WHC-SD-WM-DP-057 REV O

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Raw Data Dump for AEA Spectrum: 7a7330.CNF

[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	2.	2.	1.
21	3.	4.	3.	5.	1.	6.	4.	1.	3.	[illegible]
[illegible]	2.	1.	0.	0.	0.	0.	0.	0.	0.	[illegible]
[illegible]	0.	0.	0.	0.	0.	0.	0.	1.	3.	[illegible]
[illegible]	1.	1.	0.	0.	0.	0.	0.	1.	0.	[illegible]
61	2.	0.	1.	2.	1.	0.	0.	1.	0.	[illegible]
[illegible]	1.	0.	0.	0.	0.	1.	0.	0.	1.	[illegible]
[illegible]	[illegible]	1.	[illegible]	[illegible]	[illegible]	0.	0.	2.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	0.	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	1.	1.	0.	0.	1.	0.	1.	[illegible]
111	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
121	0.	0.	1.	0.	0.	3.	0.	1.	1.	2.
131	2.	2.	1.	4.	1.	1.	4.	0.	3.	2.
141	1.	2.	4.	4.	3.	4.	7.	1.	3.	4.
151	1.	2.	1.	1.	0.	0.	2.	0.	0.	2.
161	0.	1.	0.	0.	2.	0.	0.	0.	1.	0.
171	1.	0.	0.	1.	0.	0.	0.	0.	2.	[illegible]
181	1.	0.	0.	0.	0.	0.	0.	1.	1.	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	0.	1.	1.	[illegible]	[illegible]
201	1.	1.	0.	1.	0.	1.	2.	5.	0.	[illegible]
[illegible]	1.	[illegible]	1.	3.	5.	0.	1.	8.	1.	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8.	15.	17.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	17.	7.	[illegible]	11.	1.	5.	[illegible]	[illegible]
[illegible]	[illegible]	1.	1.	1.	[illegible]	4.	2.	6.	[illegible]	[illegible]
[illegible]	[illegible]	10.	10.	8.	[illegible]	7.	14.	14.	[illegible]	[illegible]
[illegible]	21.	23.	17.	23.	26.	19.	17.	18.	[illegible]	[illegible]
271	[illegible]	4.	[illegible]	4.	[illegible]	1.	1.	2.	[illegible]	1.
[illegible]	1.	[illegible]	[illegible]	[illegible]	[illegible]	2.	2.	2.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	[illegible]	2.	2.	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	0.	0.	0.	0.	[illegible]	0.	0.	[illegible]	[illegible]	[illegible]
331	0.	0.	0.	0.	0.	0.	0.	1.	[illegible]	[illegible]
341	1.	1.	0.	0.	2.	1.	4.	2.	2.	[illegible]
[illegible]	[illegible]	3.	1.	3.	1.	2.	7.	2.	4.	0.
[illegible]	1.	3.	3.	9.	5.	3.	4.	7.	0.	1.
[illegible]	[illegible]	3.	2.	0.	1.	0.	0.	0.	0.	[illegible]
[illegible]	[illegible]	[illegible]	0.	0.	[illegible]	0.	0.	0.	[illegible]	[illegible]
[illegible]	[illegible]	2.	3.	0.	[illegible]	0.	0.	0.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	0.	0.	[illegible]	[illegible]	[illegible]
111	0.	0.	0.	0.	[illegible]	0.	0.	0.	[illegible]	[illegible]
121	0.	0.	1.	0.	[illegible]	0.	0.	0.	[illegible]	[illegible]
131	0.	0.	0.	0.	[illegible]	0.	0.	0.	[illegible]	[illegible]
141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	0.	0.	1.	1.	1.	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	0.	0.	1.	0.	0.	0.	[illegible]
[illegible]	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
[illegible]	1.	0.								

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G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT **WHC-SD-WM-DP-057 REV O**

SAMPLE
[illegible]-5781
File ID: [illegible]1961.CHF

Counted on: 11/13/93 @19:22
Detector: AEA4
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
42	10.5	10.5	[illegible]	193.171	[illegible]	[illegible]	[illegible]	[illegible]
5	7.2	7.2	181.508	180.077	10.000	1.391	[illegible]	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak #	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err		Activity d/m	Activity [illegible]
1	Pu236	0.213	5.756	5.756	0.0000	0.02	1.02	5.1		[illegible]	[illegible]
2	Am241	0.101	5.480	5.483	-.0080	0.03	1.27	5.1		[illegible]	[illegible]
	Pu238		5.499	5.188	0.011					[illegible]	[illegible]
3	Pu239	0.515	5.113	5.153	-.0100	0.03	6.26	3.6		[illegible]	[illegible]
	Pu240		5.144	5.153	-.009					89.2	[illegible]
4		????		4.973			0.52	25.9			
5		0.039		4.912		0.01	0.48	16.2		6.9	0.31E-0[illegible]
		---					---				
Totals:		0.908	<--valid peaks only-->				11.03				

DETECTOR CALIBRATION
Energy(MEV) = 1.084 + (0.0046)*Channel
Energy range (MeV): 4.084 TO 6.439
Efficiency = 0.0697 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	5832.0	100.000
Smoothed	5832.0	100.000
Composite fit	5545.6	95.089
Residuals	286.4	4.911

Analyzed by:

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Spectrum 4a4961.CNF

Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 1032.2

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Raw Data Dump for AEA Spectrum: 1a4961.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.
21	1.	0.	2.	0.	1.	2.	2.	1.	0.	0.
31	1.	0.	0.	1.	1.	0.	2.	0.	1.	1.
41	0.	1.	0.	1.	2.	1.	3.	1.	1.	1.
51	2.	1.	2.	0.	0.	1.	2.	2.	0.	0.
61	0.	3.	0.	1.	1.	2.	2.	0.	2.	1.
71	0.	1.	0.	0.	0.	2.	1.	1.	1.	2.
81	2.	2.	1.	3.	[illegible]	2.	1.	0.	2.	[illegible]
91	1.	2.	1.	3.	4.	1.	4.	[illegible]	1.	[illegible]
101	0.	1.	4.	2.	5.	5.	3.	3.	0.	[illegible]
111	1.	3.	2.	0.	3.	6.	2.	2.	2.	[illegible]
121	3.	3.	4.	3.	2.	4.	1.	3.	2.	0.
131	4.	1.	8.	2.	5.	4.	3.	2.	6.	5.
141	4.	3.	2.	6.	6.	5.	7.	5.	7.	6.
151	5.	0.	3.	0.	8.	4.	3.	5.	3.	5.
161	4.	6.	7.	6.	7.	4.	6.	9.	6.	1.
171	5.	7.	7.	5.	11.	7.	9.	8.	12.	19.
181	11.	14.	16.	10.	9.	12.	8.	7.	10.	[illegible]
191	12.	11.	21.	15.	19.	10.	16.	13.	17.	[illegible]
201	21.	20.	22.	20.	19.	21.	16.	32.	33.	[illegible]
211	[illegible]	21.	[illegible]	31.	[illegible]	42.	36.	19.	[illegible]	[illegible]
221	69.	86.	83.	84.	[illegible]	101.	127.	[illegible]	[illegible]	[illegible]
231	[illegible]	[illegible]	[illegible]	102.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
241	[illegible]	[illegible]	[illegible]	3.	[illegible]	3.	1.	[illegible]	[illegible]	[illegible]
251	6.	1.	4.	6.	3.	1.	5.	3.	5.	[illegible]
261	8.	4.	4.	7.	9.	3.	3.	3.	8.	9.
271	3.	1.	6.	9.	7.	10.	6.	5.	5.	7.
281	6.	3.	0.	3.	9.	6.	8.	8.	12.	15.
291	10.	14.	14.	20.	14.	21.	15.	26.	18.	[illegible]
[illegible]	[illegible]	[illegible]	38.	35.	[illegible]	30.	29.	30.	[illegible]	[illegible]
[illegible]	[illegible]	3.	5.	4.	2.	3.	1.	1.	[illegible]	[illegible]
[illegible]	8.	7.	3.	8.	5.	3.	4.	7.	[illegible]	[illegible]
321	[illegible]	10.	2.	11.	[illegible]	9.	[illegible]	11.	[illegible]	[illegible]
331	18.	11.	17.	15.	14.	25.	14.	23.	[illegible]	[illegible]
341	31.	41.	51.	48.	51.	18.	51.	45.	60.	[illegible]
351	85.	76.	104.	78.	104.	61.	56.	24.	17.	10.
361	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	1.	1.	0.	0.	0.	0.	0.	0.	0.	[illegible]
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
421	0.	0.	0.	0.	0.	1.	0.	0.	0.	[illegible]
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
461	0.	1.	0.	0.	0.	0.	0.	0.	0.	[illegible]
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
481	0.	1.	1.	0.	0.	0.	0.	0.	0.	[illegible]
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
J1285-5981
File ID: 2a2387.CNF

Counted on: 11/13/93 @19:20
Detector: AEA2
Geometry number: 1
Count time: 28806. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	742.6	742.6	361.005	361.005	20.000	14.059	10.000	5.657
2	131.9	131.9	303.638	303.537	18.000	13.397	9.000	5.108
3	1224.9	1224.9	230.295	230.294	18.000	13.627	9.000	6.528

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/m
1	Cm243	0.361	5.786	5.782	0.004	0.07	31.92	1.6	382.9	0.172E-03
	Cm244		5.796	5.782	0.014				279.5	0.126E-03
2	Am241	0.064	5.480	5.512	-.032	0.06	5.68	3.9	52.9	0.238E-04
	Pu238		5.499	5.512	-.013				69.1	0.311E-04
3	Pu239	0.560	5.143	5.167	-.024	0.06	49.54	1.3	433.8	0.195E-03
	Pu240		5.144	5.167	-.023				433.8	0.195E-03
		---					---			
Totals:		0.986	<--valid peaks only-->				87.15			

DETECTOR CALIBRATION
Energy(MEV) = 4.085 + (0.0047)*Channel
Energy range (MeV): 4.085 TO 6.491
Efficiency = 0.1142 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	42438.0	100.000
Smoothed	42437.6	99.999
Composite fit	41838.7	98.588
Residuals	599.3	1.412

Analyzed by: _____
EMB

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Spectrum 2a2387.CNF
1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 9083.4


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3
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2
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1
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.........................................1
...........  1
1
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Raw Data Dump for AEA Spectrum: 2a2387.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	1.	2.	1.
21	0.	0.	0.	3.	0.	1.	1.	1.	1.	0.
31	1.	1.	1.	1.	0.	1.	2.	0.	2.	0.
41	0.	1.	1.	1.	0.	0.	2.	3.	2.	1.
51	3.	2.	1.	2.	2.	0.	1.	1.	2.	2.
61	2.	1.	2.	3.	0.	2.	1.	2.	2.	1.
71	1.	2.	2.	4.	1.	1.	0.	1.	1.	2.
81	1.	1.	0.	0.	1.	1.	4.	2.	1.	1.
91	2.	1.	3.	1.	1.	4.	1.	0.	[illegible]	[illegible]
101	2.	0.	0.	2.	4.	2.	1.	3.	3.	[illegible]
111	0.	0.	3.	1.	3.	2.	3.	1.	1.	[illegible]
121	3.	1.	4.	0.	1.	2.	1.	3.	2.	2.
131	6.	0.	2.	2.	2.	3.	3.	3.	6.	2.
141	2.	3.	3.	1.	6.	4.	1.	1.	4.	4.
151	1.	5.	1.	2.	3.	2.	7.	7.	4.	5.
161	5.	8.	7.	10.	5.	5.	10.	7.	10.	4.
171	14.	4.	9.	12.	11.	7.	13.	11.	12.	17.
181	23.	17.	22.	15.	17.	18.	17.	16.	21.	25.
191	23.	23.	26.	26.	24.	24.	33.	17.	31.	[illegible]
201	49.	29.	42.	46.	54.	47.	62.	97.	84.	[illegible]
211	124.	160.	193.	213.	227.	324.	364.	445.	[illegible]	[illegible]
221	668.	754.	911.	997.	1014.	1081.	1207.	1272.	[illegible]	
231	1279.	1209.	1088.	959.	956.	832.	686.	491.	[illegible]	
241	216.	200.	105.	82.	49.	24.	15.	17.	11.	[illegible]
251	6.	6.	8.	5.	7.	7.	8.	5.	1.	6.
261	7.	11.	4.	3.	9.	9.	6.	10.	7.	5.
271	10.	5.	6.	9.	10.	8.	9.	7.	10.	10.
281	12.	17.	15.	17.	19.	24.	28.	34.	47.	53.
291	56.	58.	73.	70.	76.	98.	116.	125.	123.	[illegible]
301	132.	136.	132.	114.	132.	131.	113.	109.	[illegible]	[illegible]
311	66.	46.	44.	33.	27.	22.	8.	24.	[illegible]	[illegible]
321	12.	15.	16.	18.	14.	14.	17.	20.	[illegible]	[illegible]
331	23.	23.	21.	29.	25.	41.	41.	49.	[illegible]	[illegible]
341	113.	111.	127.	142.	166.	201.	257.	313.	[illegible]	[illegible]
351	433.	480.	535.	564.	618.	681.	725.	778.	803.	[illegible]
361	764.	741.	758.	723.	687.	528.	482.	411.	284.	[illegible]
371	180.	121.	78.	40.	29.	24.	14.	4.	5.	3.
381	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	2.	0.	0.	0.	0.	0.	0.	0.	1.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	1.	0.	0.	1.	0.	1.	1.	0.	1.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
451	1.	0.	0.	0.	0.	1.	0.	0.	0.	[illegible]
461	1.	0.	0.	2.	0.	1.	0.	1.	0.	2.
471	3.	3.	1.	1.	1.	1.	2.	2.	2.	[illegible]
481	1.	0.	0.	2.	0.	0.	2.	0.	0.	0.
491	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
511	0.	0.								

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G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

[illegible]
[illegible]
File ID: [illegible]

Counted on: 11/13/93 @19:21
Detector: AEA3
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	[illegible]	[illegible]
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	111.7	111.7	293.[illegible]	293.263	12.696	.269	[illegible]	[illegible]
3	20.5	20.5	259.032	258.869	14.000	5.744	[illegible]	.966
4	1044.6	1044.6	224.846	224.841	12.000	5.757	6.000	[illegible].332

PEAK RESULTS
Peak Error Limit: 25%

Peak	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Cbn.	Peak Centroid Diff.	Count Rate CPM	Sens [illegible]	[illegible]	[illegible]
1	Cm241	[illegible]	5.796	5.791	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Cm243		5.796	5.791	.008			[illegible]	[illegible]
2	Pu239	0.065	5.499	5.521	-.0220.02	3.16	4.8	[illegible]	[illegible]
	Am241		5.480	5.521	-.041			24.7	[illegible]
3		0.022		5.336	0.03	1.18	8.5	8.0	[illegible]
4	Pu239	0.559	5.143	5.176	-.0330.03	29.55	1.7	198.6	0.895E-04
	Pu240		5.144	5.176	-.032			198.6	0.895E-04
Totals:		1.011	<--valid peaks only-->			53.43			

DETECTOR CALIBRATION
Energy(MEV) = 4.119 + (0.0017)*Channel
Energy range (MeV): 4.119 TO 6.526
Efficiency = 0.1488 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	25367.0	100.000
Smoothed	25367.0	100.000
Composite fit	25652.1	101.124
Residuals	-285.1	-1.124

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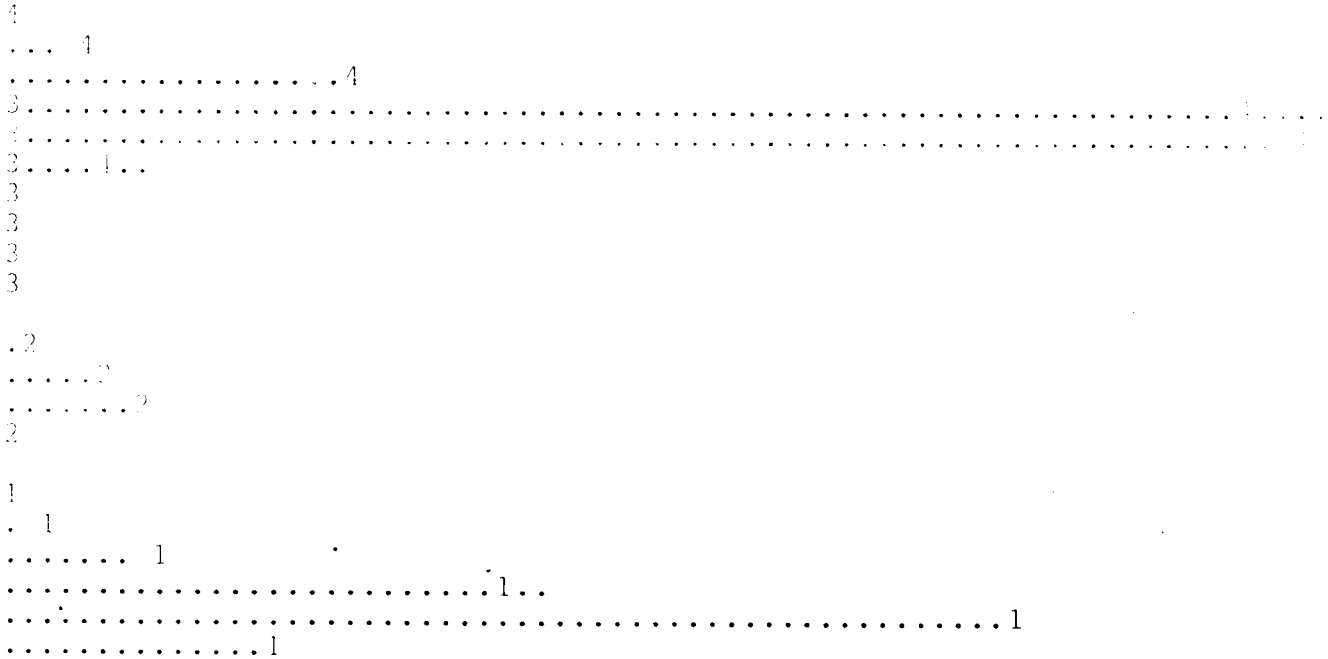
Analyzed by:
[illegible]

Spectrum 3a3730.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 5858.3



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Raw Data Dump for AEA Spectrum: 3a3730.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	2.	0.	[illegible]
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	1.	0.	1.	0.	0.	0.	1.	0.	0.
[illegible]	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
[illegible]	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
61	1.	0.	0.	1.	0.	0.	0.	0.	0.	0.
71	1.	0.	0.	1.	0.	0.	0.	0.	0.	0.
81	0.	1.	0.	0.	0.	0.	0.	0.	0.	1.
91	0.	2.	0.	0.	0.	0.	0.	0.	0.	[illegible]
101	0.	0.	0.	0.	0.	0.	0.	1.	0.	
111	0.	1.	0.	0.	0.	1.	0.	0.	2.	[illegible]
121	0.	1.	0.	0.	1.	0.	2.	0.	1.	[illegible]
131	1.	3.	1.	2.	3.	0.	3.	3.	0.	[illegible]
141	4.	1.	3.	4.	0.	0.	0.	0.	0.	1.
151	1.	3.	0.	0.	0.	0.	0.	0.	0.	2.
161	0.	0.	2.	1.	2.	1.	0.	2.	1.	1.
171	3.	1.	0.	4.	2.	2.	1.	0.	2.	3.
181	2.	1.	0.	1.	2.	1.	1.	1.	1.	2.
191	[illegible]	7.	4.	8.	8.	9.	11.	9.	7.	[illegible]
201	10.	14.	18.	31.	27.	46.	51.	74.	101.	167.
211	128.	192.	237.	283.	[illegible]	397.	455.	534.	655.	[illegible]
221	866.	1002.	1072.	1140.	[illegible]	1113.	968.	811.	[illegible]	
231	211.	135.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
241	3.	2.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
251	12.	16.	17.	14.	15.	24.	12.	[illegible]	[illegible]	[illegible]
261	13.	19.	17.	10.	10.	5.	3.	4.	[illegible]	[illegible]
271	5.	0.	3.	4.	4.	2.	1.	9.	5.	[illegible]
281	12.	14.	17.	18.	24.	29.	33.	48.	40.	[illegible]
291	66.	74.	83.	86.	114.	109.	116.	123.	128.	135.
301	[illegible]	60.	53.	27.	19.	[illegible]	4.	1.	0.	0.
[illegible]	0.	2.	1.	1.	0.	1.	0.	0.	2.	[illegible]
[illegible]	0.	2.	4.	2.	5.	3.	7.	4.	4.	[illegible]
321	8.	10.	10.	11.	20.	26.	34.	30.	11.	[illegible]
341	74.	113.	145.	201.	211.	251.	310.	295.	[illegible]	[illegible]
351	414.	514.	564.	602.	677.	751.	680.	655.	[illegible]	[illegible]
361	302.	168.	100.	56.	21.	[illegible]	1.	1.	[illegible]	[illegible]
371	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	1.	0.	0.	0.	1.	0.	1.	2.	[illegible]
471	2.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
481	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
491	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
511	0.	0.								

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OA 35

WHC-SD-WM-DP-057 REV O

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

Batch 2268

ANALYTICAL BATCH

Lab Segment Serial No. J1286	Customer ID: KE20B
Analysis: Pu 239/40	Sample Prep: DIRECT

Instrument: WB 537237	Procedure/ Rev: LA 503-156 / D01-3 AP 44
Technologist: John VanSant	Date: 11-29-93
Starting Time: 0830	Temperature 25°C
Ending Time: 1515	Chemist: L Hills

Comments:

	Description	Lab ID
1	BLK	J1302-561
2	Standard	J1301-551
3	Sample	J1286-571
4	Sample Duplicate	J1286-571
5	Sample Triplicate	J1286-571
6	Spike	J1286-591
7	Spike Duplicate	J1286-591
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	638A3 .100mL	10 - .100mL		
Spike	778A3 .100mL			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

WHC-SD-WM-DP-057 REV 0

METHOD: LA-503-156

DATE START: November 29, 1993

PREPARED BY: L.L. Fritts LL Fritts 12.8.93

DATE COMPLETE: December 8, 1993

	UNITS:	uCi/mL									
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	%REC	DET LIM	% CT ER
STD 63B43	J1301	Pu-239/40	1.41E+2						108.0	1.50E-2	1.1
BLANK	J1302	Pu-239/40	<8.65E-4						28.7	8.65E-4	100.0
KE20B	J1286	Pu-239/40	1.16E-2	1.15E-2	1.21E-2	1.17E-2	6.43E-4	5.5	8.7	1.84E-3	2.9
									51.1	1.50E-3	1.5
									17.6	1.64E-3	2.1
KE20B	J1286	239 Spike	106.9	97.1					46.4	3.05E-3	0.9
									63.2	3.26E-3	0.7
STD 63B43	J1301	Pu-238	<1.69E-2						N/A	1.69E-2	3.5
BLANK	J1302	Pu-238	<3.45E-3						28.7	3.45E-3	8.4
KE20B	J1286	Pu-238	<1.14E-2	<1.94E-3	<5.62E-3	N/A	N/A	N/A	8.7	1.14E-2	4.1
									51.1	1.94E-3	2.7
									17.6	5.62E-3	3.7

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

The results for the spike are in percent recovery.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

A2 2431 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1301.-5581	BECHTOLD	11- 8-93	8:47	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	% RECOVERY	E14157	1

Sample Size	Customer ID
7.100-10-.100 + .100 mL Spike	STD

Remarks Calculations Results

SDP RC11 AR001 77B43 RERUN

STD# 63B43 RESULT 141

STD VAL. 130.5 %REC 108.0%

ATTACH PRINTOUT "AEA" - ASCMIN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	MBrown		
Hrs	Hrs	Hrs	Hrs	Hrs
	11-29-93		E. Contreras	
Date	Time Completed	Lab Coll Mgr		
11-29-93		LBFritts	E. Contreras	

54-6800-061 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/30/93	Pu 236 AEA Frac. (C236)	0.473
J1301-5581	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0.024
Batch ID	Sample D.F. (DF)	101	Pu 239 AEA Frac. (C239)	0.469
2268	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	5530
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
1	Tracer Book No.	77B43	Background in cpm (Bkg)	7
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	34.4
J.VANSANT	Pu-236 Preparation Value	3226	Pu 238 Counts	1.77
Date	Pu-236 Decay Corr'd Value	3122.44	Pu 239 Counts	34.16
11/29/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

				STANDARD
Serial No.	Date Counted	11/30/93	Pu 236 AEA Frac. (C236)	0.473
J1301-5581	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0.024
Batch ID	Sample D.F. (DF)	101	Pu 239 AEA Frac. (C239)	0.469
2268	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	5530
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
1	Tracer Book No.	77B43	Background in cpm (Bkg)	7
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	34.4
J.VANSANT	Pu-236 Preparation Value	3226	Pu 238 Counts	1.77
Date	Pu-236 Decay Corr'd Value	3122.44	Pu 239 Counts	34.16
11/29/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted − Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * e to the power of {(−ln2 * Decay Time) / 1040.95 }

Pu 236 Tracer Recovery = (Total AT Counts / TC − Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) − Bkg * 2 * C238) − (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	1.41E+02

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.41E-01
Relative Counting Error	=	1.1%
Pu-238 µCi/mL	=	< 1.69E-02
Relative Counting Error	=	3.5%
Pu 236 Tracer Recovery	=	53.7%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	1.50E-02	Pu 238	=	1.69E-02

Data Entry by:	Date: 12-6-93 06-Dec-93
Approved by: LBFritts	Date: December 8, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#1 VC 11-29-93

J1301-5581

5530/30 - 7

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#6 6836 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1302.-5681	BECHTOLD	11- 8-93	8:50	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	1

Sample Size 1-10-.1ml 12-8-93 + .100ml Spike

Customer ID BLK

Remarks, Calculations, Results

REAGENT BLANK

COUNT AS uCI/L

77B43

RERUN

<8.65 X 10^-4 µCi/mL "AEA" - 480MIN

ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	M Brown		
Hrs	Hrs 11-29-93	Hrs	Hrs E. Castrevo	Hrs
Date 11-29-93	Time Completed	Lab Unit Supervisor	E. Castrevo	

54-6800-061 (R 10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/30/93	Pu 236 AEA Frac (C236)	BLANK 0.894
J1302-5681	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac (C238)	0.013
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac (C239)	0
2268	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	1716
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
1	Tracer Book No.	77B43	Background in cpm (Bkg)	7
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	20.6
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0.3
Date	Pu-236 Decay Corr'd Value	3122.44	Pu 239 Counts	0
11/29/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of)(-ln2 * Decay Time) / 1040.95)

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	< 8.65E-01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	< 8.65E-04
Relative Counting Error	=	100.0%
Pu-238 µCi/mL	=	< 3.45E-03
Relative Counting Error	=	8.4%
Pu 236 Tracer Recovery	=	28.7%

NOTE: Pu 239/240 Reported result is a LESS THAN value using 0.05 for the Pu-239/240 peak height.

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	8.65E-04	Pu 238	=	3.45E-03

Data Entry by:		Date:	08-Dec-93
Approved by:		Date:	December 8, 1993

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#1 VR 11-29-93

1716 - 7
30

J1302 5681

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#5 5928

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5781	BECHTOLD	11- 4-93	8:58	13

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu238/40	LA-503-156	uCi/ML	E14157	1

Sample Size	Customer ID
1mL-10-100mL + 100mL Spike	KE30B

Remarks Calculations Results: Sample 77B43

COUNT AS uCi/L

"AEA" - 480MIN RERUN

ATTACH PRINTOUT

1.16 X 10 uCi/ml

1mL 8mHNO3

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond			
Hrs	Hrs	Hrs	Hrs	Hrs
	11-29-93		E. Cabrera	
Date	Time Completed	Lab Unit Mgr		
11-29-93			E. Cabrera	

54-6800-061 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

				SAMPLE
Serial No.	Date Counted	11/30/93	Pu 236 AEA Frac. (C236)	0.42
J1286-5781	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0.111
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.315
2268	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	1089
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
1	Tracer Book No.	77B43	Background in cpm (Bkg)	4
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	5.85
J.VANSANT	Pu-236 Preparation Value	3226	Pu 238 Counts	1.55
Date	Pu-236 Decay Corr'd Value	3122.44	Pu 239 Counts	4.38
11/29/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * le to the power of {(-ln2 * Decay Time) / 1040.95 }

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	1.16E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.16E-02
Relative Counting Error	=	2.9%
Pu-238 µCi/mL	=	< 1.14E-02
Relative Counting Error	=	4.1%
Pu 236 Tracer Recovery	=	8.7%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	1.84E-03	Pu 238	=	1.14E-02

Data Entry by:	Date: 12-6-93 06-Dec-93
Approved by:	Date: December 8, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#3 R 11.29 93

$\frac{1089}{30}$ - 4

J1286-5781

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#4 4005

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5781	BECHTOLD	11- 4-93	8:58	18

Determination	Method-Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	2

Sample Size	Customer ID
1mL-10-100ml + .100mL Spike	KE20B

Remarks Calculations Results

COUNT AS uCi/L (Sample Prep) 77B43 RERUN

1.15×10^{-2} uCi/mL OUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	M Bivin		
Hrs	Hrs	Hrs	Hrs	Hrs
	11-29-93		E. Contreras	
Date	Time Completed	Lab Unit Mgr		
11-29-93			E. Contreras	

54-6800-061 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.				SAMPLE
J1286-5781	Date Counted	11/30/93	Pu 236 AEA Frac. (C236)	0.515
	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0.077
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.382
2268	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	4676
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
1	Tracer Book No.	77B43	Background in cpm (Bkg)	1
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	22.34
J.VANSANT	Pu-236 Preparation Value	3226	Pu 238 Counts	3.34
Date	Pu-236 Decay Corr'd Value	3122.44	Pu 239 Counts	16.55
11/29/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of {(-ln2 * Decay Time) / 1040.95 })

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	1.15E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.15E-02
Relative Counting Error	=	1.5%
Pu-238 µCi/mL	=	< 1.94E-03
Relative Counting Error	=	2.7%
Pu 236 Tracer Recovery	=	51.1%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	1.50E-03	Pu 238	=	1.94E-03

Data Entry by:	Date: 12-6-93 06-Dec-93
Approved by:	Date: December 8, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#2 VR 11.29.93
4676 -1
30

J1286-5781

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

B8 3583

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5781	BECHTOLD	11- 4-93	8:58	10

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	3

Sample Size	Customer ID
1mL-10- 100mL + .100mL Spike	KE20P

Remarks Calculations Results

COUNT AS ABOVE Sample Triplicate 77B43

1.21×10^{-2} uCi/ml

AEA 420 MIN PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	M Blom		
Hrs	Hrs	Hrs	Hrs	Hrs
	11-29-93		E. Contreras	
Date	Time Completed	Lab Supervisor		
11-29-93			E Contreras	

54-6800-061 (R 10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No	Date Counted	11/30/93	Pu 236 AEA Frac. (C236)	0.472
J1286-5781	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0.078
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.369
2268	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	1870
Rerun No	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
1	Tracer Book No.	77B43	Background in cpm (Bkg)	4
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	10.67
J.VANSANT	Pu-236 Preparation Value	3226	Pu 238 Counts	1.77
Date	Pu-236 Decay Corr'd Value	3122.44	Pu 239 Counts	8.35
11/29/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

SAMPLE

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of ((-ln2 * Decay Time) / 1040.95))

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	1.21E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.21E-02
Relative Counting Error	=	2.1%
Pu-238 µCi/mL	=	< 5.62E-03
Relative Counting Error	=	3.7%
Pu 236 Tracer Recovery	=	17.6%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	1.64E-03	Pu 238	=	5.62E-03

Data Entry by:	Date: 12-6-93 06-Dec-93
Approved by:	Date: December 8, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#3 R 11.29.93

$\frac{1870}{30} - 4$

J1286-5781

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#7 7370 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5981	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/24	LA-503-156	% RECOVERY	E14157	1

Sample Size	Customer ID
63B43 ?1m-1D- .100mL + .100mL-1D-.100 Std	KE20B

Remarks, Calculations, Results

SAMPLE SPIKED ID 77B43 + .200mL Spike 77B43

SPIKE ID 63B43

SPIKE VOLUME
COUNT AS uCI/L .200mL

RERUN

106.9 % Rec.

"ASSY" - 43046114
ATTACH PRINTOUT

Analyst	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	MSiv...		
Hrs	Hrs	Hrs	Hrs	Hrs
	11-29-93		E. Cartwright	
Date	Time Completed	Lab Chief		
11-29-93			E. Cartwright	

54 6800-061 (R-10 83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/30/93	Pu 236 AEA Frac. (C236)	0.508	CHK EXT NO.
J1286-5981	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0	
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.44	
2268	Tracer Volume in mL (SPKV)	0.2	Total AT Counts	8580	
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30	
1	Tracer Book No.	77B43	Background in cpm (Bkg)	1	
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	55.74	
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0	
Date	Pu-236 Decay Corr'd Value	3122.44	Pu 239 Counts	48.25	
11/29/93	Pu-238 Tracer Value	133	AEA Count Time in min	480	

Decay Time = Date Counted − Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * le to the power of ((-ln2 * Decay Time) / 1040.95))

Pu 236 Tracer Recovery = (Total AT Counts / TC − Bkg) * 2 * (236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = ((239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / ((236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) − Bkg * 2 * (238)) − (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	2.68E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	2.68E-02
Relative Counting Error	=	0.9%
Pu-238 µCi/mL	=	< 2.14E-03
Relative Counting Error	=	100.0%
Pu 236 Tracer Recovery	=	46.4%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	3.05E-03	Pu 238	=	2.14E-03

Data Entry by:	C.A. Clark	Date:	06-Dec-93
Approved by:		Date:	December 8, 1993

Form 1 Rev. 1.4 275 Page 1 of 1

(26.5 - 11.6) (1/1) (1/1) = 106.9

~~130~~ 130.5 12-15-93

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#2 VR 11.29.93

8580-1
30

J1286-5981

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#3 3496 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5981	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/24	LA-503-156	% RECOVERY	E14157	2

Sample Size: ?/mL-10-.100mL + .100mL-10-.100mL Sp 63B43

Customer ID: KE2CB

Remarks, Calc. Spike Dup

SAMPLE SPIKED ID 77B43 Spike + .200mL 77B43

SPIKE ID 63B43 std

SPIKE VOLUME .200mL

COUNT AS uCI/L

97.1 % Rec.

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond M Brown			
Hrs	Hrs	Hrs	Hrs	Hrs
	11.29.93		E. Cartrevas	
Date	Time Completed	Lab Supervisor		
11-29-93			E. Cartrevas	

54-6800-061 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/30/93	Pu 236 AEA Frac. (C236)	0.475	CHK EXT NO.
J1286-5981	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0.062	
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.388	
2268	Tracer Volume in mL (SPKV)	0.2	Total AT Counts	12679	
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30	
1	Tracer Book No.	77B43	Background in cpm (Bkg)	7	
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	92.69	
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	12.01	
Date	Pu-236 Decay Corr'd Value	3122.44	Pu 239 Counts	75.81	
11/29/93	Pu-238 Tracer Value	133	AEA Count Time in min	480	

Decay Time = Date Counted − Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of {(−ln2 * Decay Time) / 1040.95 })

Pu 236 Tracer Recovery = (Total AT Counts / TC − Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) − Bkg * 2 * C238) − (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	2.53E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	2.53E-02
Relative Counting Error	=	0.7%
Pu-238 µCi/mL	=	2.72E-03
Relative Counting Error	=	1.4%
Pu 236 Tracer Recovery	=	63.2%

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	3.26E-03	Pu 238	=	1.57E-03

Data Entry by:	CA Clark	Date:	06-Dec-93
Approved by:		Date:	December 8, 1993

Form 1 Rev. 1.4 277 Page 1 of 1

97.1 %

(25.3 - 11.5) (12/11) (100) / 130.5

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#1 VC 11.29.93
12679 - 7
30

J1286-5981

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Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
J 1301-5581
File ID: 2a2431.CNF

WHC-SD-WM-DP-057 REV 0

Counted on: 11/30/93 @ 3:30
Detector: AEA2
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	774.0	774.0	359.493	359.493	20.000	15.278	10.000	6.056
2	28.6	28.6	300.723	300.035	22.000	21.220	11.000	4.665
3	29.9	29.9	261.779	261.572	24.000	17.984	12.000	5.361
4	822.3	822.3	228.705	228.689	20.000	13.649	10.000	5.940

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Cm243	0.473	5.786	5.761	0.025	0.07	34.40	1.5	402.7	0.181E-03
	Pu236		5.756	5.761	-.005				300.0	0.135E-03
2	Am241	0.024	5.480	5.481	-.001	0.10	1.77	7.8	16.1	0.726E-05
	Pu238		5.499	5.481	0.018				21.1	0.948E-05
3	Am243	0.021	5.276	5.300	-.024	0.08	1.55	8.3	13.4	0.603E-05
	Pu240		5.144	5.300	-.156				13.2	0.597E-05
4	Pu239	0.469	5.143	5.146	-.003	0.06	34.16	1.5	292.0	0.132E-03
	Pu240		5.144	5.146	-.002				292.0	0.132E-03
Totals:		0.988	<--valid peaks only-->				71.89			

BEST AVAILABLE COPY

DETECTOR CALIBRATION
Energy(MEV) = 4.071 + (0.0047)*Channel
Energy range (MeV): 4.071 TO 6.477
Efficiency = 0.1170 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	34936.0	100.000
Smoothed	34936.0	100.000
Composite fit	34509.9	98.780
Residuals	426.1	1.220

Analyzed by: _____

Spectrum 2a2431.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 6346.9


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BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 2a2431.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	3.	1.	0.
21	2.	1.	1.	2.	1.	0.	0.	2.	0.	1.
31	0.	0.	0.	2.	0.	0.	1.	0.	1.	2.
41	2.	1.	2.	2.	2.	0.	2.	1.	0.	0.
51	2.	1.	2.	0.	2.	0.	2.	3.	3.	4.
61	0.	1.	2.	1.	2.	1.	0.	1.	2.	0.
71	1.	0.	1.	3.	0.	1.	1.	2.	3.	3.
81	1.	4.	2.	1.	1.	1.	1.	1.	2.	0.
91	1.	1.	2.	1.	1.	2.	0.	0.	1.	3.
101	1.	4.	0.	1.	1.	1.	4.	0.	1.	1.
111	3.	1.	1.	2.	5.	3.	2.	1.	1.	2.
121	1.	2.	2.	4.	2.	1.	2.	0.	1.	3.
131	2.	2.	1.	0.	3.	2.	3.	3.	2.	3.
141	6.	5.	2.	1.	2.	2.	3.	3.	7.	3.
151	2.	4.	5.	4.	6.	7.	4.	1.	7.	2.
161	6.	7.	2.	10.	4.	7.	7.	6.	10.	3.
171	2.	5.	10.	8.	5.	9.	12.	8.	13.	9.
181	15.	7.	7.	14.	13.	20.	22.	13.	17.	14.
191	19.	15.	20.	27.	21.	28.	18.	28.	19.	32.
201	30.	46.	45.	43.	49.	55.	78.	92.	107.	94.
211	142.	166.	181.	238.	280.	305.	338.	377.	453.	480.
221	550.	603.	614.	706.	857.	858.	876.	890.	833.	875.
231	798.	746.	683.	646.	431.	425.	307.	271.	185.	144.
241	114.	60.	49.	45.	26.	15.	27.	17.	16.	16.
251	24.	22.	12.	16.	26.	26.	22.	28.	31.	36.
261	34.	37.	35.	30.	27.	28.	28.	22.	21.	22.
271	19.	23.	20.	12.	12.	16.	15.	10.	6.	5.
281	10.	14.	14.	8.	17.	16.	12.	21.	16.	17.
291	21.	21.	26.	32.	34.	17.	26.	30.	33.	29.
301	36.	25.	32.	28.	26.	25.	27.	15.	31.	11.
311	17.	19.	13.	13.	15.	12.	11.	14.	11.	15.
321	20.	27.	19.	18.	21.	20.	35.	30.	32.	33.
331	43.	36.	54.	68.	41.	60.	76.	87.	88.	123.
341	120.	172.	177.	226.	247.	294.	351.	351.	423.	467.
351	488.	600.	617.	651.	693.	729.	826.	834.	798.	806.
361	782.	751.	700.	698.	570.	480.	433.	346.	244.	158.
371	99.	113.	65.	44.	27.	21.	11.	7.	1.	1.
381	0.	2.	0.	0.	0.	0.	0.	0.	0.	1.
391	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
401	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.
411	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.
421	0.	0.	0.	1.	0.	0.	0.	1.	1.	1.
431	0.	1.	2.	0.	0.	0.	1.	0.	1.	0.
441	0.	0.	0.	0.	0.	0.	0.	1.	1.	2.
451	0.	0.	0.	0.	1.	1.	0.	0.	0.	1.
461	0.	0.	0.	1.	2.	3.	3.	1.	0.	1.
471	0.	2.	1.	0.	3.	2.	2.	1.	1.	2.
481	1.	4.	1.	1.	1.	1.	0.	0.	0.	0.
491	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

Zulleb
11-30-93

SAMPLE
J 1302-5681
File ID: 6a6836.CNF

Counted on: 11/30/93 @ 3:34
Detector: AEA6
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	354.2	354.2	358.050	358.050	26.000	26.159	13.000	7.924
2	10.4	10.4	296.307	295.877	32.000	8.654	16.000	16.249
3	11.6	11.6	282.583	281.969	16.000	6.794	8.000	12.087
4	28.4	28.4	258.547	258.535	22.000	20.488	11.000	3.942
5?	6.6	6.6	251.526	250.351	6.000	0.666	3.000	0.482

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Cm243	0.894	5.786	5.769	0.017	0.12	20.60	2.0	216.7	0.976E-04
	Pu236		5.756	5.769	-.013				161.4	0.727E-04
2	Am241	0.013	5.480	5.477	0.003	0.04	0.30	22.8	2.5	0.112E-05
	Pu238		5.499	5.477	0.022				3.2	0.146E-05
3	Th228	0.013	5.430	5.411	0.019	0.03	0.30	22.8	3.3	0.147E-05
4	Am243	0.081	5.276	5.301	-.025	0.10	1.87	7.0	14.5	0.651E-05
	Pu240		5.144	5.301	-.157				14.4	0.642E-05
5		????		5.263			0.10	98.9		
Totals:		1.002	<--valid peaks only-->				23.08			

BEST AVAILABLE COPY

DETECTOR CALIBRATION
Energy(MEV) = 4.086 + (0.0047)*Channel
Energy range (MeV): 4.086 TO 6.493
Efficiency = 0.1302 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	11056.0	100.000
Smoothed	11059.3	100.030
Composite fit	11125.1	100.625
Residuals	-69.1	-0.625

Analyzed by: _____
MB

WHC-SD-WM-DP-057 REV O

BEST AVAILABLE COPY

Spectrum 6a6836.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 2661.8

WHC-SD-WM-DP-057 REV O

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BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 6a6836.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	1.	0.	1.	0.	0.	0.	0.	1.	0.
31	1.	0.	0.	0.	0.	0.	0.	1.	3.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	1.	0.	0.	0.	0.	1.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	0.	1.	1.	0.	0.	0.	1.	1.	0.	0.
81	1.	0.	0.	2.	0.	0.	1.	0.	0.	0.
91	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
101	1.	1.	1.	0.	0.	0.	1.	0.	0.	1.
111	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
121	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
131	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
141	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.
151	1.	0.	2.	1.	0.	1.	3.	0.	2.	1.
161	0.	3.	2.	0.	2.	3.	3.	0.	1.	0.
171	2.	0.	0.	1.	0.	0.	1.	0.	1.	2.
181	1.	0.	1.	2.	1.	0.	0.	2.	0.	0.
191	2.	2.	0.	2.	2.	2.	3.	0.	1.	1.
201	2.	2.	2.	3.	2.	0.	0.	2.	1.	4.
211	2.	2.	2.	2.	2.	1.	4.	2.	8.	1.
221	8.	1.	4.	4.	4.	4.	6.	7.	3.	3.
231	6.	5.	6.	7.	4.	7.	13.	13.	19.	11.
241	15.	16.	20.	17.	18.	18.	21.	18.	29.	23.
251	37.	27.	28.	19.	26.	28.	23.	29.	32.	32.
261	21.	24.	15.	19.	19.	22.	18.	15.	12.	10.
271	11.	11.	9.	5.	7.	8.	9.	17.	9.	9.
281	13.	15.	15.	12.	11.	11.	11.	12.	9.	10.
291	16.	10.	10.	8.	12.	13.	17.	10.	9.	12.
301	4.	8.	6.	7.	11.	11.	5.	7.	7.	9.
311	9.	10.	14.	13.	14.	13.	11.	10.	22.	8.
321	25.	21.	17.	25.	24.	33.	33.	34.	40.	41.
331	47.	73.	53.	70.	75.	67.	96.	103.	98.	126.
341	127.	145.	166.	172.	197.	193.	241.	267.	257.	274.
351	315.	319.	310.	329.	336.	341.	353.	391.	354.	354.
361	299.	298.	302.	248.	254.	220.	229.	182.	173.	145.
371	123.	104.	105.	64.	55.	32.	32.	20.	23.	19.
381	8.	5.	6.	2.	1.	3.	3.	2.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	1.	0.	0.	0.	0.	0.	1.	0.	0.	0.
411	1.	0.	0.	0.	1.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.
431	0.	0.	3.	0.	1.	0.	1.	0.	0.	0.
441	0.	0.	1.	1.	0.	0.	0.	1.	0.	0.
451	0.	1.	0.	0.	0.	1.	0.	1.	1.	1.
461	0.	0.	0.	0.	1.	0.	2.	0.	5.	4.
471	4.	5.	4.	0.	3.	2.	2.	1.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	2.	1.
491	0.	0.	0.	3.	3.	13.	16.	1.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

Pu 11-30-93

SAMPLE
J 1286-5781
File ID: 5a5928.CNF

WHC-SD-WM-DP-057 REV O

Counted on: 11/30/93 @ 3:33
Detector: AEA5
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	119.0	119.0	361.765	362.092	20.000	13.405	10.000	3.725
2	21.0	21.0	305.074	303.446	26.000	25.960	13.000	4.170
3	12.6	12.6	264.769	263.529	18.000	10.992	9.000	1.146
4	103.7	103.7	231.399	230.157	16.000	11.476	8.000	4.058
5	5.7	5.7	152.481	154.883	18.000	64.722	9.000	7.436

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Cm243	0.420	5.786	5.786	0.000	0.06	5.85	3.7	57.0	0.257E-04
	Cm244		5.796	5.786	0.010				41.6	0.187E-04
2	Am241	0.111	5.480	5.510	-.030	0.12	1.55	8.1	11.7	0.528E-05
	Pu238		5.499	5.510	-.011				15.3	0.689E-05
3	Am243	0.082	5.276	5.323	-.047	0.05	1.14	9.8	8.2	0.367E-05
4	Pu239	0.315	5.143	5.166	-.023	0.05	4.38	4.6	31.2	0.140E-04
	Pu240		5.144	5.166	-.022				31.2	0.140E-04
5	Np237	0.046	4.640	4.812	-.172	0.30	0.65	13.8	76.7	0.345E-04
	Np237		4.781	4.812	-.031				5.3	0.238E-05
Totals:		0.975	<--valid peaks only-->				13.56			

BEST AVAILABLE COPY

DETECTOR CALIBRATION
Energy(MEV) = 4.084 + (0.0047)*Channel
Energy range (MeV): 4.084 TO 6.491
Efficiency = 0.1406 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	6680.0	100.000
Smoothed	6680.0	100.000
Composite fit	6510.6	97.465
Residuals	169.4	2.535

Analyzed by: _____
MB

BEST AVAILABLE COPY

Spectrum 5a5928.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 805.4


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BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 5a5928.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	2.	1.	1.
21	0.	1.	1.	4.	2.	2.	0.	2.	1.	1.
31	2.	0.	1.	1.	2.	1.	0.	0.	1.	0.
41	2.	0.	1.	0.	1.	0.	1.	0.	3.	1.
51	1.	1.	0.	0.	1.	1.	1.	1.	2.	4.
61	0.	0.	3.	0.	1.	1.	1.	1.	0.	0.
71	0.	0.	2.	1.	0.	1.	1.	2.	3.	1.
81	0.	3.	1.	2.	4.	2.	2.	0.	4.	5.
91	2.	1.	1.	2.	2.	1.	2.	0.	3.	2.
101	3.	2.	4.	2.	5.	2.	2.	5.	2.	5.
111	3.	0.	1.	2.	5.	2.	1.	3.	1.	2.
121	4.	1.	6.	4.	6.	3.	3.	2.	2.	4.
131	4.	1.	1.	6.	3.	3.	3.	1.	3.	4.
141	5.	8.	6.	5.	6.	5.	8.	3.	5.	5.
151	7.	9.	4.	5.	6.	5.	5.	7.	2.	2.
161	2.	0.	5.	6.	5.	9.	5.	2.	8.	6.
171	7.	6.	5.	7.	6.	6.	5.	4.	13.	5.
181	10.	5.	7.	4.	5.	9.	9.	10.	14.	9.
191	10.	5.	9.	9.	9.	8.	13.	22.	12.	15.
201	13.	10.	14.	13.	19.	12.	17.	20.	18.	16.
211	23.	26.	32.	32.	26.	44.	37.	41.	46.	54.
221	56.	68.	83.	76.	91.	86.	102.	115.	113.	109.
231	129.	100.	97.	89.	81.	70.	67.	48.	39.	27.
241	20.	23.	12.	12.	12.	10.	10.	3.	5.	10.
251	10.	11.	14.	10.	14.	20.	7.	15.	18.	18.
261	14.	12.	15.	20.	16.	12.	17.	14.	17.	9.
271	14.	10.	8.	6.	6.	8.	8.	7.	4.	6.
281	14.	6.	6.	16.	9.	10.	11.	10.	15.	13.
291	16.	10.	21.	20.	12.	17.	20.	26.	28.	17.
301	13.	26.	24.	24.	23.	20.	20.	22.	17.	21.
311	18.	15.	15.	11.	8.	8.	8.	13.	10.	9.
321	14.	10.	15.	11.	12.	8.	13.	11.	14.	12.
331	16.	14.	23.	12.	16.	20.	23.	23.	25.	28.
341	24.	31.	21.	42.	34.	44.	43.	58.	68.	62.
351	81.	89.	92.	80.	95.	105.	117.	112.	139.	120.
361	99.	139.	100.	115.	101.	83.	88.	66.	53.	38.
371	31.	21.	11.	10.	6.	5.	3.	4.	1.	1.
381	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
391	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
411	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
431	1.	0.	1.	1.	0.	0.	0.	1.	2.	1.
441	0.	0.	0.	1.	0.	0.	1.	0.	0.	1.
451	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.
471	1.	0.	1.	0.	0.	0.	2.	1.	2.	1.
481	0.	0.	2.	0.	1.	0.	0.	1.	0.	1.
491	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
J 1286-5781
File ID: 4a4005.CNF

Counted on: 11/30/93 @ 3:33
Detector: AEA4
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	556.3	556.3	362.203	362.203	12.000	5.241	6.000	1.449
2	72.4	72.4	305.024	304.817	12.000	4.256	6.000	0.919
3	462.5	462.5	230.978	230.975	14.000	6.322	7.000	2.277

PEAK RESULTS
Peak Error Limit: 25%

Peak	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Cm244	0.515	5.796	5.782	0.014	0.02	22.34	1.9	265.3	0.120E-03
	Cm243		5.786	5.782	0.004				363.5	0.164E-03
2	Pu238	0.077	5.499	5.512	-.013	0.02	3.34	5.3	55.1	0.248E-04
	Am241		5.480	5.512	-.032				42.2	0.190E-04
3	Pu239	0.382	5.143	5.165	-.022	0.03	16.55	2.2	196.5	0.885E-04
	Pu240		5.144	5.165	-.021				196.5	0.885E-04
		---					---			
Totals:		0.974	<--valid peaks only-->				42.23			

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DETECTOR CALIBRATION
Energy(MEV) = 4.080 + (0.0047)*Channel
Energy range (MeV): 4.080 TO 6.486
Efficiency = 0.0842 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	20813.0	100.000
Smoothed	20813.0	100.000
Composite fit	20272.2	97.402
Residuals	540.8	2.598

Analyzed by: _____
MB

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                    Spectrum 4a4005.CNF
1 Legend:  Raw = ....  Modeled Peaks = 1,2,.., etc     Display Max.:     3528.3

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BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 4a4005.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	1.	2.	0.
21	2.	0.	0.	1.	3.	0.	0.	1.	0.	0.
[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	0.	0.	0.	0.	0.	1.	1.	0.	0.	1.
51	1.	0.	1.	2.	0.	0.	1.	0.	0.	0.
61	1.	0.	1.	1.	0.	0.	1.	0.	0.	0.
71	0.	0.	1.	0.	0.	1.	1.	0.	0.	[illegible]
81	0.	0.	1.	1.	0.	1.	1.	1.	0.	[illegible]
91	0.	0.	0.	1.	0.	1.	2.	0.	1.	[illegible]
101	2.	0.	2.	1.	1.	1.	2.	0.	1.	1.
111	0.	0.	1.	0.	1.	1.	1.	2.	2.	3.
121	1.	2.	2.	1.	2.	0.	2.	1.	1.	4.
131	1.	2.	0.	5.	2.	2.	1.	4.	3.	4.
141	8.	2.	4.	3.	5.	4.	9.	4.	10.	5.
151	1.	3.	3.	6.	4.	6.	3.	1.	3.	1.
161	6.	4.	5.	4.	9.	7.	6.	3.	4.	0.
171	3.	10.	1.	5.	7.	7.	7.	6.	6.	6.
181	11.	13.	5.	11.	9.	14.	11.	15.	7.	14.
191	19.	22.	10.	24.	24.	28.	33.	24.	21.	[illegible]
201	36.	44.	41.	45.	55.	39.	49.	56.	50.	[illegible]
211	73.	74.	88.	100.	117.	109.	143.	148.	168.	[illegible]
221	208.	245.	234.	286.	340.	347.	392.	383.	461.	[illegible]
231	515.	503.	445.	371.	308.	204.	131.	93.	48.	[illegible]
241	12.	5.	4.	6.	4.	5.	4.	7.	6.	8.
251	14.	9.	14.	15.	18.	13.	13.	12.	9.	17.
261	19.	14.	32.	16.	36.	24.	25.	37.	27.	7.
271	14.	17.	10.	11.	6.	6.	16.	13.	13.	15.
281	12.	21.	22.	18.	23.	23.	24.	27.	24.	44.
291	35.	37.	60.	36.	51.	70.	61.	63.	67.	56.
301	71.	79.	72.	73.	84.	102.	66.	66.	[illegible]	[illegible]
[illegible]	22.	11.	8.	17.	11.	16.	8.	11.	[illegible]	[illegible]
321	12.	25.	23.	23.	22.	28.	28.	31.	32.	[illegible]
331	38.	49.	40.	57.	60.	68.	68.	83.	77.	91.
341	100.	115.	111.	114.	147.	163.	160.	218.	214.	255.
351	309.	362.	401.	385.	384.	415.	467.	432.	441.	513.
361	620.	599.	627.	562.	473.	354.	214.	130.	39.	22.
371	10.	0.	2.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	1.	0.	0.	[illegible]
441	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
461	0.	0.	0.	1.	1.	0.	1.	0.	0.	0.
471	0.	0.	1.	0.	0.	2.	0.	0.	0.	0.
481	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 2.01

WHC-SD-WM-DP-057 REV O

DATA REDUCTION REPORT

Initial: 11-30-93

SAMPLE
J 1286-5781
File ID: 8a8583.CNF

Counted on: 11/30/93 @ 3:35
Detector: AEA8
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	315.7	315.7	362.894	362.894	14.000	6.604	7.000	2.728
2	49.3	49.3	304.965	304.932	12.000	6.132	6.000	2.163
3	24.3	24.3	264.493	264.406	16.000	7.350	8.000	1.891
4	260.5	260.5	231.461	231.442	16.000	6.725	8.000	3.176

PEAK RESULTS

Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Cm244	0.472	5.796	5.793	0.003	0.03	10.67	2.7	83.6	0.377E-04
	Cm243		5.786	5.793	-.007				114.6	0.516E-04
2	Pu238	0.078	5.499	5.521	-.022	0.03	1.77	6.8	19.3	0.868E-05
	Am241		5.480	5.521	-.041				14.8	0.665E-05
3	Am243	0.048	5.276	5.331	-.055	0.03	1.09	9.0	8.6	0.389E-05
4	Pu239	0.369	5.143	5.176	-.033	0.03	8.35	3.1	65.5	0.295E-04
	Pu240		5.144	5.176	-.032				65.5	0.295E-04
Totals:		0.967	<--valid peaks only-->				21.89			

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DETECTOR CALIBRATION

Energy(MEV) = 4.088 + (0.0047)*Channel
Energy range (MeV): 4.088 TO 6.494
Efficiency = 0.1276 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	10866.0	100.000
Smoothed	10866.0	100.000
Composite fit	10505.9	96.686
Residuals	360.1	3.314

Analyzed by: MB

Spectrum 8a8583.CNF

Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 2163.4


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BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 8a8583.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	2.	3.	6.
21	2.	1.	5.	1.	5.	6.	4.	6.	3.	2.
31	0.	0.	1.	0.	2.	0.	2.	3.	0.	0.
41	0.	1.	1.	0.	0.	1.	1.	1.	0.	1.
51	0.	3.	1.	0.	3.	0.	1.	0.	0.	1.
61	1.	0.	1.	0.	0.	1.	0.	0.	0.	1.
71	0.	1.	3.	2.	2.	0.	1.	1.	0.	0.
81	1.	2.	0.	1.	0.	2.	1.	0.	1.	0.
91	4.	0.	2.	0.	0.	0.	0.	0.	0.	0.
101	1.	4.	1.	1.	1.	0.	1.	2.	0.	3.
111	1.	0.	0.	0.	1.	0.	3.	0.	2.	0.
121	0.	1.	1.	3.	1.	0.	1.	0.	3.	2.
131	2.	2.	2.	1.	1.	3.	1.	2.	3.	2.
141	2.	1.	0.	4.	1.	4.	2.	2.	6.	4.
151	7.	4.	5.	3.	1.	1.	4.	0.	3.	4.
161	1.	5.	2.	6.	2.	4.	0.	2.	2.	4.
171	1.	0.	4.	5.	4.	5.	8.	2.	4.	5.
181	3.	2.	8.	4.	2.	6.	8.	3.	5.	5.
191	6.	12.	7.	6.	7.	8.	11.	4.	7.	10.
201	17.	15.	10.	14.	13.	12.	12.	20.	22.	20.
211	28.	21.	20.	17.	36.	33.	55.	53.	62.	90.
221	96.	101.	116.	136.	175.	190.	229.	218.	255.	284.
231	300.	279.	273.	243.	197.	138.	92.	77.	52.	23.
241	23.	8.	5.	6.	8.	6.	7.	8.	12.	8.
251	11.	16.	11.	9.	13.	16.	12.	17.	10.	17.
261	17.	21.	32.	30.	28.	26.	20.	23.	15.	18.
271	8.	11.	1.	5.	3.	6.	2.	5.	6.	5.
281	4.	6.	5.	9.	7.	7.	9.	9.	14.	12.
291	19.	12.	22.	33.	27.	28.	21.	22.	34.	36.
301	31.	42.	49.	44.	72.	38.	46.	42.	31.	16.
311	13.	10.	12.	7.	7.	6.	3.	3.	9.	5.
321	5.	9.	3.	8.	8.	9.	5.	11.	16.	7.
331	5.	9.	9.	15.	25.	11.	20.	20.	22.	21.
341	21.	29.	25.	40.	47.	42.	55.	60.	94.	95.
351	117.	123.	134.	168.	161.	222.	204.	219.	254.	260.
361	320.	336.	373.	331.	284.	239.	229.	168.	95.	60.
371	23.	11.	4.	6.	1.	1.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	1.	0.	0.	0.	0.	0.	0.	2.	1.	0.
491	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

11-30-93

SAMPLE
J 1286-5981
File ID: 7a7370.CNF

WHC-SD-WM-DP-057 REV O

Counted on: 11/30/93 @ 3:35
Detector: AEA7
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	665.8	665.8	350.960	351.264	28.000	27.862	14.000	13.936
2	566.6	566.6	220.362	219.535	26.000	27.440	13.000	13.7[illegible]
3?	8.7	8.7	73.740	73.309	128.000	1.000	64.000	[illegible]
4?	7.1	7.1	27.596	25.877	12.000	14.917	6.000	16.686

PEAK RESULTS
Peak Error Limit: 25%

P	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Ra224	0.508	5.680	5.704	-.024	0.13	55.74	1.2	606.3	0.273E-03
	Pu236		5.756	5.704	0.052				581.6	0.262E-03
2	Pu239	0.440	5.143	5.098	0.045	0.13	48.25	1.3	493.4	0.222E-03
	Pu240		5.144	5.098	0.046				493.4	0.222E-03
3		????		4.426			0.61	13.0		
4		????		4.208			0.27	24.9		
Totals:		0.948	<--valid peaks only-->				103.99			

BEST AVAILABLE COPY

DETECTOR CALIBRATION
Energy(MEV) = 4.089 + (0.0046)*Channel
Energy range (MeV): 4.089 TO 6.444
Efficiency = 0.0978 CPM/DPM

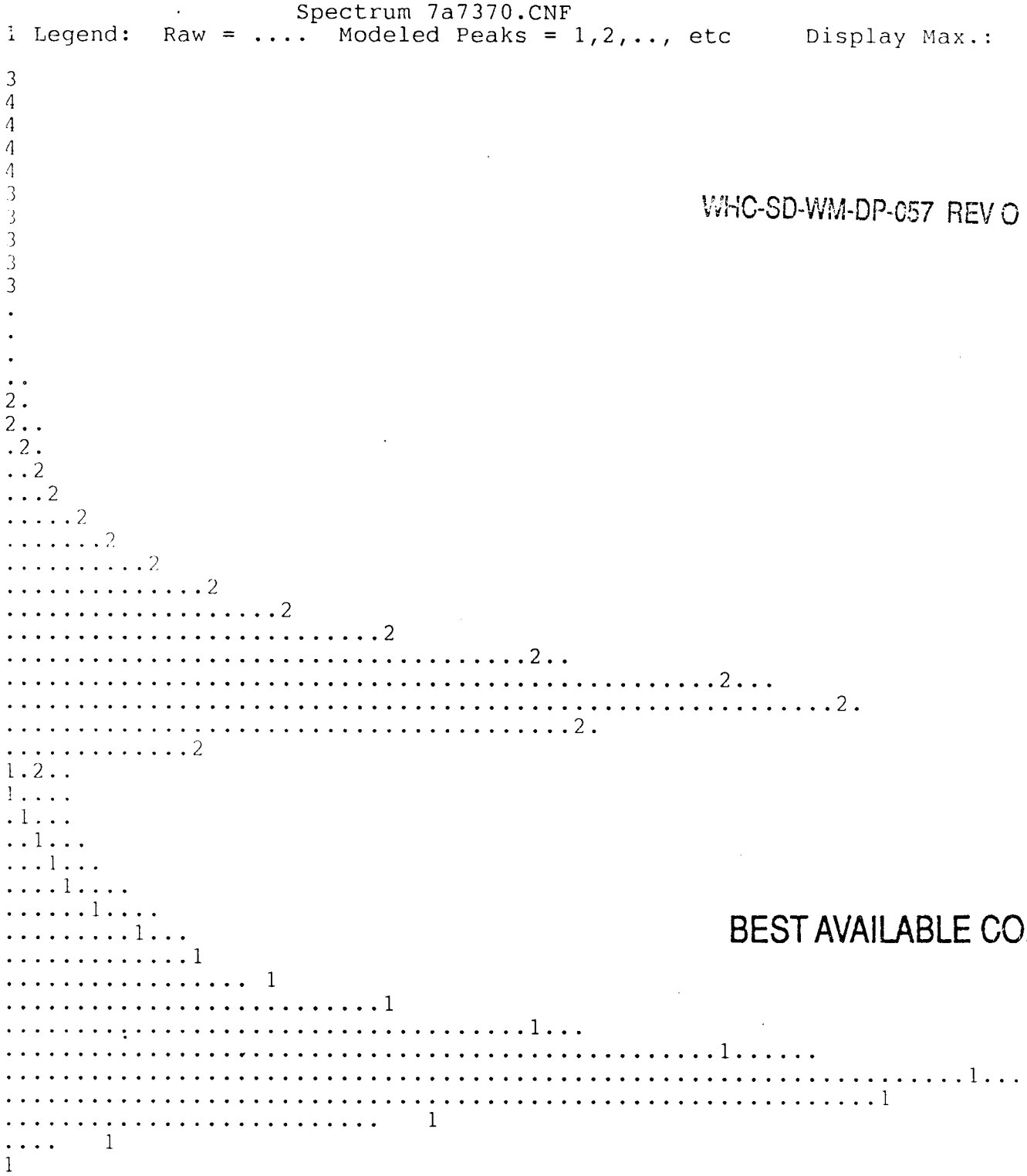
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	52630.0	100.000
Smoothed	52626.0	99.992
Composite fit	50340.3	95.649
Residuals	2289.7	4.351

Analyzed by: _____
MB

Spectrum 7a7370.CNF

Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 5220.4



WHC-SD-WM-DP-057 REV O

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Raw Data Dump for AEA Spectrum: 7a7370.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	4.	4.	12.
21	5.	10.	11.	7.	9.	8.	13.	8.	4.	8.
31	6.	4.	7.	9.	10.	18.	4.	14.	10.	7.
41	4.	6.	6.	13.	6.	9.	6.	8.	9.	7.
51	8.	11.	13.	13.	11.	4.	10.	9.	10.	9.
61	10.	13.	7.	14.	7.	9.	10.	12.	11.	7.
71	11.	12.	12.	11.	12.	12.	10.	7.	6.	10.
81	13.	11.	7.	10.	14.	16.	9.	13.	15.	13.
91	16.	17.	14.	18.	14.	15.	13.	24.	15.	19.
101	17.	14.	18.	18.	11.	23.	16.	20.	22.	21.
111	24.	19.	18.	18.	23.	25.	23.	20.	24.	17.
121	24.	33.	32.	34.	27.	27.	33.	34.	33.	25.
131	31.	37.	27.	32.	30.	29.	32.	20.	32.	37.
141	52.	34.	39.	38.	39.	39.	47.	39.	45.	44.
151	54.	48.	54.	50.	67.	60.	66.	49.	56.	58.
161	67.	59.	70.	76.	78.	78.	79.	95.	70.	79.
171	95.	107.	125.	106.	105.	120.	102.	133.	118.	125.
181	131.	157.	162.	157.	163.	168.	171.	216.	200.	194.
191	216.	205.	228.	227.	238.	265.	281.	288.	295.	309.
201	356.	369.	348.	365.	363.	413.	405.	407.	434.	520.
211	510.	495.	524.	520.	530.	580.	544.	602.	547.	503.
221	571.	551.	529.	523.	475.	460.	420.	370.	346.	281.
231	255.	234.	193.	167.	128.	109.	97.	67.	57.	[illegible].
241	43.	35.	49.	46.	39.	51.	51.	40.	51.	51.
251	40.	56.	48.	53.	54.	45.	51.	66.	46.	55.
261	63.	52.	51.	42.	53.	65.	53.	57.	52.	57.
271	70.	50.	64.	64.	57.	72.	77.	75.	78.	67.
281	81.	97.	87.	87.	101.	97.	95.	89.	113.	105.
291	118.	117.	117.	116.	109.	113.	101.	127.	114.	117.
301	143.	138.	106.	137.	126.	122.	105.	111.	133.	125.
311	128.	159.	139.	174.	149.	157.	156.	198.	201.	192.
321	224.	251.	278.	271.	274.	258.	266.	308.	332.	365.
331	357.	365.	392.	444.	458.	422.	458.	497.	523.	519.
341	569.	567.	588.	623.	642.	691.	708.	675.	639.	655.
351	688.	660.	644.	629.	610.	568.	545.	509.	476.	395.
361	359.	330.	243.	222.	160.	146.	110.	69.	57.	36.
371	19.	12.	5.	1.	2.	0.	1.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	1.	0.	0.	0.	1.	1.	0.
481	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	4.	0.								

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Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
J 1286-5981
File ID: 3a3496.CNF

WHC-SD-WM-DP-057 REV O

Counted on: 11/30/93 @ 3:32
Detector: AEA3
Geometry number: 1
Count time: 28805. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	2793.1	2793.1	365.090	365.090	14.000	5.743	7.000	2.2[illegible]
2	244.0	244.0	307.229	307.153	16.000	12.777	8.000	[illegible]
3	72.3	72.3	268.925	268.241	16.000	7.361	8.000	1.4[illegible]
4	2466.3	2466.3	233.153	233.146	14.000	6.131	7.000	3.063
5?	21.4	21.4	131.713	131.706	146.000	1.000	73.000	0.100
6?	1.1	1.1	116.278	115.133	6.000	0.000	3.000	5.637
7?	2.7	2.7	95.408	93.685	6.000	1.077	3.000	0.279

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Cm244	0.475	5.796	5.778	0.018	0.03	92.69	0.9	624.6	0.281E-03
	Cm243		5.786	5.778	0.008				855.6	0.385E-03
2	Am241	0.062	5.480	5.506	-.026	0.06	12.01	2.7	86.1	0.388E-04
	Pu238		5.499	5.506	-.007				112.4	0.506E-04
3	Am243	0.020	5.276	5.323	-.047	0.03	3.86	5.3	26.3	0.118E-04
4	Pu239	0.388	5.143	5.158	-.015	0.03	75.81	1.0	510.9	0.230E-03
	Pu240		5.144	5.158	-.014				510.9	0.230E-03
5		????		4.681			1.68	6.9		
6		????		4.603			0.00	1000.		
7		????		4.503			0.09	82.8		
Totals:		0.944	<--valid peaks only-->				184.37			

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DETECTOR CALIBRATION
Energy(MEV) = 4.062 + (0.0047)*Channel
Energy range (MeV): 4.062 TO 6.469
Efficiency = 0.1484 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	93737.0	100.000
Smoothed	93737.0	100.000

Composite fit	89362.3	95.333
Residuals	4374.7	4.667

Analyzed by: _____
MB

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Spectrum 3a3496.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 20017.2

WHC-SD-WM-DP-057 REV O

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Raw Data Dump for AEA Spectrum: 3a3496.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	1.	5.	2.
21	9.	4.	5.	5.	3.	4.	3.	7.	0.	4.
[illegible]	3.	3.	0.	1.	4.	6.	3.	5.	5.	7.
[illegible]	1.	4.	2.	2.	3.	2.	0.	4.	6.	1.
51	5.	4.	6.	7.	2.	3.	5.	4.	5.	0.
61	6.	7.	4.	4.	6.	8.	9.	7.	2.	4.
71	9.	4.	9.	3.	8.	3.	6.	7.	4.	6.
81	14.	12.	5.	6.	5.	10.	10.	12.	5.	6.
91	7.	10.	9.	8.	16.	3.	13.	10.	4.	9.
101	9.	10.	15.	10.	10.	10.	11.	11.	12.	12.
111	10.	10.	13.	14.	17.	17.	12.	20.	9.	10.
121	15.	19.	13.	24.	15.	16.	14.	18.	15.	23.
131	20.	21.	18.	22.	17.	10.	10.	22.	25.	23.
141	19.	28.	21.	25.	23.	28.	18.	39.	28.	35.
151	30.	40.	35.	39.	39.	36.	50.	28.	35.	27.
161	42.	37.	34.	44.	48.	32.	49.	41.	42.	46.
171	47.	51.	46.	55.	49.	61.	60.	64.	57.	66.
181	72.	58.	68.	70.	78.	81.	85.	69.	74.	78.
191	91.	89.	90.	94.	87.	114.	91.	103.	94.	95.
201	110.	114.	119.	125.	133.	135.	138.	171.	179.	186.
211	180.	204.	227.	215.	287.	281.	328.	386.	464.	534.
221	608.	696.	842.	916.	1113.	1240.	1460.	1728.	1942.	2312.
231	2505.	2700.	2794.	2709.	2407.	2109.	1663.	1145.	738.	469.
241	269.	143.	96.	43.	21.	24.	27.	21.	28.	25.
251	35.	28.	36.	47.	43.	44.	38.	48.	43.	45.
261	54.	40.	64.	66.	72.	103.	91.	98.	86.	99.
271	85.	80.	58.	53.	48.	49.	33.	39.	40.	35.
281	35.	62.	52.	65.	57.	70.	59.	87.	78.	76.
291	89.	89.	91.	98.	119.	114.	156.	155.	168.	161.
301	164.	181.	186.	260.	257.	246.	266.	287.	239.	219.
[illegible]	174.	159.	106.	97.	75.	80.	82.	69.	88.	93.
321	91.	98.	98.	101.	90.	97.	111.	95.	135.	122.
331	118.	123.	150.	152.	139.	148.	177.	181.	167.	181.
341	175.	188.	200.	234.	258.	298.	376.	368.	459.	581.
351	674.	857.	999.	1144.	1363.	1409.	1537.	1715.	1786.	1927.
361	2189.	2390.	2774.	3121.	3116.	3070.	2716.	2336.	1757.	1180.
371	686.	358.	206.	80.	39.	10.	4.	2.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
421	0.	1.	0.	0.	0.	0.	1.	0.	0.	0.
431	0.	0.	1.	0.	0.	0.	0.	1.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	1.	0.	0.	0.	0.	2.	1.	0.	0.	2.
471	1.	3.	4.	1.	2.	4.	1.	2.	2.	3.
481	4.	1.	1.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
511	0.	0.								

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QA
2L

WHC-SD-WM-DP-057 REV 0 WESTINGHOUSE HANFORD COMPANY Batch 2096

222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No. J 1286	Customer ID: 11-30-93 LAD ~~KE Basin~~ Bechtel 105 KE Basin
Analysis: Pu 239/40	Sample Prep: DIRECT

Instrument: WB537237	Procedure/ Rev: LA 503-156 D-0
Technologist: John VanSant	Date: 11-10-93
Starting Time: 0730	Temperature 25°C
Ending Time: 1330	Chemist: L Fritts

Comments: CUT FOR RERUN

	Description	Lab ID
1	LCMS J	1301-5581
2	BLK J	1302-5681
3	Sample J	1286-5781
4	Duplicate J	1286-5781
5	Triplicate J	1286-5781
6	Spike J	1286-5981
7	Spike Duplicate J	1286-5981
8		
9		
10		

	Description	Lab ID
11		
12		
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20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
AR-001	63B43			
Pu Spike	77B43			

A-6000-881 (03/92)

0A

ANALYTICAL BATCH SUMMARY SHEET

METHOD: **LA-503-156**

DATE START: **November 10, 1993**

PREPARED BY: **L.L. Fritts** LLFritts 11 22 93

DATE COMPLETE: **November 22, 1993**

	UNITS:	uCi/mL									
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	%REC	DET LIM	% CT ER
STD 63B43	J1301	Pu-239/40	1.35E+2						103.4	1.68E-2	1.9
BLANK	J1302	Pu-239/40	2.58E-3						25.7	1.89E-3	4.0
KE20B	J1286	Pu-239/40	1.28E-2	1.21E-2	1.26E-2	1.25E-2	7.21E-4	5.8	12.3	2.65E-3	3.0
									17.5	2.45E-3	2.5
									9.9	2.66E-3	3.4
KE20B	J1286	239 Spike	104.1	98.2					45.6	3.94E-3	1.1
									69.9	3.72E-3	1.1
STD 63B43	J1301	Pu-238	<5.53E-2						N/A	5.53E-2	3.0
BLANK	J1302	Pu-238	<7.72E-3						25.7	7.72E-3	3.7
KE20B	J1286	Pu-238	<1.61E-2	<1.13E-2	<1.99E-2	N/A	N/A	N/A	12.3	1.61E-2	6.0
									17.5	1.13E-2	5.2
									9.9	1.99E-2	6.6

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

The results for the spike are in percent recovery.

Rerun requested: There appears to be some contamination in the blank.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV O

9 1358

Serial No	Sample Point	Date	Time Issued	Priority
J 1301-5581	BECHTOLL	11-8-93	8:47	13

Determination	Method Standard	Result Units	Charge Code	Reruns
PU239/240	LA-503-156	% RECOVERY	E11157	0

Sample Size	Customer ID
.1ml - 10 - .1mL	STD

Remarks Calculations Results

ITEM R011 AE-01

STD# 63B43 ABSOLUTE 1.35 E+2 µCi/L

STD VAL. 1.305 E+2 %REC 103.4 %

.1ml Spike 77B43

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D.H. Wilkin	Em Bacca	Raymond	
Hrs 1330	Hrs	Hrs	Hrs 11.12.93	Hrs
Date 11-10-93	Time Completed	Lab		

54-6800-061 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/11/93	Pu 236 AEA Frac. (C236)	STANDARD 0.428
J1301-5581	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0.11
Batch ID	Sample D.F. (DF)	101	Pu 239 AEA Frac. (C239)	0.401
2096	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	1975
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	5
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	11.6
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	2.99
Date	Pu-236 Decay Corr'd Value	3162.20	Pu 239 Counts	10.88
11/10/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of {(-ln2 * Decay Time) / 1040.95 })

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-236 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	1.35E+02

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.35E-01
Relative Counting Error	=	1.9%
Pu-238 µCi/mL	=	< 5.53E-02
Relative Counting Error	=	3.0%
Pu 236 Tracer Recovery	=	16.5%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	1.68E-02	Pu 238	=	5.53E-02

Data Entry by:		Date:	12-Nov-93
Approved by:		Date:	November 22, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#1 11-10-93 DM

$\frac{1975}{30}$ -5

J1301-5581

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

10 3264 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1302.-5681	BECHTOLD	11- 8-93	8:50	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
? ~~1mL~~ .05 ML	BLK

Remarks Calculations Results

REAGENT BLANK

COUNT AS uCI/L

.1mL Spike 77B43

2.58x10-3 uCi/mL

ATTACH FORM CUT

CUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs 1330	Hrs	Hrs	Hrs 11-12-93	Hrs
Date 11-10-93	Time Completed	Lab Director		

54-6800-061 (R 10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/11/93	Pu 236 AEA Fmc (C236)	BLANK
J1302-5681	Sample Volume in mL (SS)	0.05	Pu 238 AEA Fmc (C238)	0
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Fmc (C239)	0.068
2096	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	1503
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	1
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	17.33
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	1.71
Date	Pu-236 Decay Corr'd Value	3162.20	Pu 239 Counts	1.42
11/10/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * ie to the power of ((-ln2 * Decay Time) / 1040.95))

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = (Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-236 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / (Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	2.58E+00

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	2.58E-03
Relative Counting Error	=	4.0%
Pu-238 µCi/mL	=	< 7.72E-03
Relative Counting Error	=	3.7%
Pu 236 Tracer Recovery	=	25.7%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	1.89E-03	Pu 238	=	7.72E-03

Data Entry by:		Date:	22-Nov-93
Approved by:		Date:	November 22, 1993

Form 1 Rev. 1.4

#2 11-10-93 DM

$\frac{1503}{30}$ -1

J1302-5681

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

11 3242 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5781	BECHTOLD	11- 4-93	8:51	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size 1-10- 11-22-93 ? .05ml

Customer ID KE20B

Remarks Calculations Results

COUNT AS uCi/L sample

.1ml spike 77B43

"AEA" - 480MIN

ATTACH PRINTOUT

1.28×10^{-2} uCi/ml

CUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
			Raymond	
Hrs 1330	Hrs	Hrs	Hrs 11-12-93	Hrs
Date 11-10-93	Time Completed	Lab Supervisor		

54-6800-061 (R 10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/11/93	Pu 236 AEA Fmc. (C236)	SAMPLE 0.592
J1286-5781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Fmc. (C238)	0.047
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Fmc. (C239)	0.242
2096	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	1107
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	4
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	7.81
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0.62
Date	Pu-236 Decay Corr'd Value	3162.20	Pu 239 Counts	3.19
11/10/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * le to the power of ((-ln2 * Decay Time) / 1040.95))

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-236 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / (Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS

Relative Counting Error = Square Root of (1/Pu 236 Counts) + (1 / Pu 236 or 239/240 Counts) * 100

Pu-239/240 µCi/L	=	1.28E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.28E-02
Relative Counting Error	=	3.0%
Pu-238 µCi/mL	=	< 1.61E-02
Relative Counting Error	=	6.0%
Pu 236 Tracer Recovery	=	12.3%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	2.65E-03	Pu 238	=	1.61E-02

Data Entry by:		Date:	22-Nov-93
Approved by:		Date:	November 22, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#3 11-10-93 Dm

$\frac{1107}{30} - 4$

J1286-5781

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#10 22665 WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5781	BECHTOLD	11- 4-93	8:58	18

Determination	Method-Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
1-10 — 11-22-93 ? .05ml	KE20B

Remarks, Calculations, Results

COUNT AS uCI/L Duplicate

.1ml Spike 77B43

1.21 X 10^-2 uCi/ml

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D.H.Milicia	Raymond	D.H.Milicia	
Hrs 1330	Hrs	Hrs 11-12-93	Hrs	Hrs
Date 11-10-93	Time Completed	Lab Unit Mgr		

54-6800-061 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/12/93	Pu 236 AEA Frac. (C236)	SAMPLE 0.638
J1286-5781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.044
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.247
2096	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	1448
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	5
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	12.03
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0.84
Date	Pu-236 Decay Corr'd Value	3160.09	Pu 239 Counts	4.66
11/10/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * e to the power of ((-ln2 * Decay Time) / 1040.95)

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	1.21E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.21E-02
Relative Counting Error	=	2.5%
Pu-238 µCi/mL	=	< 1.13E-02
Relative Counting Error	=	5.2%
Pu 236 Tracer Recovery	=	17.5%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	2.45E-03	Pu 238	=	1.13E-02

Data Entry by:		Date:	22-Nov-93
Approved by:		Date:	November 22, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#1 11-10-93 [illegible]

1448/30 -5

J1286-5781

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#11 3244 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5781	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size 1-10- 11.22.93 .05 mL

Customer ID KE20B

Remarks Calculations Results Triplicate

COUNT AS uCI/L

.1mL Spike 77343

1.26 x 10^-2 uCi/ml

CUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
		Raymond		
Hrs	Hrs	Hrs	Hrs	Hrs
1530		11.12.93		
Date	Time Completed	Lab Unit Mgr		
11-10-93				

54-0800-064 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/12/93	Pu 236 AEA Frac. (C236)	SAMPLE
J1286-5781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.589
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.045
2096	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	0.237
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	830
0	Tracer Book No.	77B43	Background in cpm (Bkg)	30
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	1
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	6.43
Date	Pu-236 Decay Corr'd Value	3160.09	Pu 239 Counts	0.49
11/10/93	Pu-238 Tracer Value	133	AEA Count Time in min	2.59
				480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * ie to the power of {(-ln2 * Decay Time) / 1040.95 }

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-236 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	1.26E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.26E-02
Relative Counting Error	=	3.4%
Pu-238 µCi/mL	=	< 1.99E-02
Relative Counting Error	=	6.8%
Pu 236 Tracer Recovery	=	9.9%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	2.66E-03	Pu 238	=	1.99E-02

Data Entry by:		Date:	22-Nov-93
Approved by:		Date:	November 22, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-057 REV 0

#2 11-10-93 DM

$\frac{830}{30}$ -1

J1286-5781

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#9 1360 WHC-SD-WM-DP-057 REV.0

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5981	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/24	LA-503-156	% RECOVERY	E14157	0

Sample Size	Customer ID
? .05 mL 1-10- 11.22.93 (63843) + .100-10-.100 + (77843) 11-22-93 .100 Spike	KE20B

Remarks Calculations Results

SAMPLE SPIKED ID .1mL 63843 3H

SPIKE ID 77843

SPIKE VOLUME .2mL

COUNT AS uCI/L

$$\frac{(42.4-12.8)(\frac{101}{1})(\frac{1}{.100})(.100)}{130.5} = 104.1$$

$$\frac{(7.72-1.16)(\frac{101}{1})(\frac{1}{.100})(.100)}{130.5} = 253.8\%$$

11-22-93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D H Milian	D H Milian		
Hrs 1330	Hrs	Hrs	Hrs	Hrs
Date 11-10-93	Time Completed	Lab Unit Mgr		

54-6800-061 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/12/93	Pu 236 AEA Frac. (C236)	0.397
J1286-5981	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.032
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.538
2096	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	5563
Rerun No.	Digest. D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77843	Background in cpm (Bkg)	4
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	32.32
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	2.57
Date	Pu-236 Decay Corr'd Value	3160.09	Pu 239 Counts	43.81
11/10/93	Pu-236 Tracer Value	133	AEA Count Time in min	480

CHK EXT NO.

Decay Time = Date Counted − Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * ie to the power of ((-ln2 * Decay Time) / 1040.95)

Pu 236 Tracer Recovery = (Total AT Counts / TC − Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) − Bkg * 2 * C238) − (Pu-236 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / (Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	4.24E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	4.24E-02
Relative Counting Error	=	1.1%
Pu-238 µCi/mL	=	< 4.35E-03
Relative Counting Error	=	3.0%
Pu 236 Tracer Recovery	=	45.6%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	3.94E-03	Pu 238	=	4.35E-03

Data Entry by:		Date:	22-Nov-93
Approved by:		Date:	November 22, 1993

Form 1 Rev. 1.4

#3 11-10-93 DM

5563/30 -4

J1286-5981

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#4 4953 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1286.-5981	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/24	LA-503-156	% RECOVERY	E14157	0

Sample Size: ? .05mL (1-10 - 11-22-93) (63343) + .100-10-.100 (77343) + .100 Spike 11-22-93

Customer ID: ~~RECOR~~ OUT FOR RERUN

Remarks, Calculations, Results

SAMPLE SPIKED ID .1mL 63343 STD

SPIKE ID 77843

SPIKE VOLUME .2mL

COUNT AS uCI/L

$$\frac{(40.0-12.1)\left(\frac{10.1}{.1}\right)\left(\frac{.1}{.05}\right)(100)}{130.5} = 98.2$$

$$\frac{(7.26-1.10)\left(\frac{10.1}{.1}\right)\left(\frac{1}{.05}\right)(100)}{130.5} = 238.4\%$$

11-22-93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D.H. Milicia			
Hrs	Hrs	Hrs	Hrs	Hrs
1330				
Date	Time Completed	Lab Or		
11-10-93				

54-(R00-061 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/11/93	Pu 236 AEA Frac. (C236)	0.421	CHK EXT NO.
J1286-5981	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.034	
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.537	
2096	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	7994	
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30	
0	Tracer Book No.	77B43	Background in cpm (Bkg)	4	
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	30.77	
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	2.46	
Date	Pu-236 Decay Corr'd Value	3162.20	Pu 239 Counts	39.28	
11/10/93	Pu-238 Tracer Value	133	AEA Count Time in min	480	

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * ie to the power of ((-ln2 * Decay Time) / 1040.95)

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	4.00E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	4.00E-02
Relative Counting Error	=	1.1%
Pu-238 µCi/mL	=	< 2.84E-03
Relative Counting Error	=	3.0%
Pu 236 Tracer Recovery	=	69.9%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	3.72E-03	Pu 238	=	2.84E-03

Data Entry by:		Date:	22-Nov-93
Approved by:		Date:	November 22, 1993

Form 1 Rev. 1.4

#3 11-10-93 Dm

7994/30 -4

J 1286-5981

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Raymond
11-12-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

[illegible]
[illegible]
File ID: 9a1358.CNF

WHC-SD-WM-DP-057 REV O

Counted on: 11/11/93 @19:25
Detector: AEA9
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Area Initial	Area Final
[illegible]	376.2	376.2	365.259	365.259	10.000	2.919	[illegible]	[illegible]
[illegible]	13.7	13.7	307.940	307.495	76.000	485.593	38.000	117.21
2	16.4	16.4	267.507	267.399	10.000	1.580	5.000	[illegible]
4	399.7	399.7	232.262	232.257	12.000	3.325	6.000	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	Err 95%	Area	[illegible]
1	Cm244	0.428	5.796	5.795	[illegible]	0.01	11.60	2.6	92.[illegible]	[illegible]
	Cm243		5.786	5.795	-.009				113.[illegible]	[illegible]
2	Am241	0.110	5.480	5.529	-.049	2.23	2.99	11.4	22.7	0.102E-04
	Pu238		5.499	5.529	-.030				29.7	0.134E-04
3		0.015		5.345		0.01	0.40	22.9	2.9	0.130E-05
4	Pu240	0.101	5.144	5.183	-.039	0.02	10.88	2.7	77.6	0.350E-04
		---					---			
Totals:		0.954	<--valid peaks only-->				25.87			

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DETECTOR CALIBRATION
Energy(MEV) = 4.115 + (0.0046)*Channel
Energy range (MeV): 4.115 TO 6.470
Efficiency = 0.1402 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	13015.0	100.000
Smoothed	13015.0	100.000
Composite fit	12420.6	95.433
Residuals	594.4	4.567

Analyzed by: _____
EMB

Spectrum 9a1358.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 2431.2

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Raw Data Dump for AEA Spectrum: 9a1368.CNF

WHC-SD-WM-DP-057 REV O

1	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
11	1.	1.	2.	1.	0.	2.	0.	0.	0.	2.
21	0.	0.	1.	0.	0.	0.	0.	0.	0.	1.
31	0.	2.	1.	1.	0.	0.	0.	0.	1.	1.
41	1.	0.	1.	0.	0.	1.	2.	0.	0.	2.
51	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
61	3.	1.	2.	0.	2.	0.	2.	2.	1.	3.
71	[illegible]	1.	0.	0.	2.	1.	0.	0.	2.	[illegible]
81	[illegible]	0.	0.	0.	1.	2.	1.	1.	[illegible]	
91	[illegible]	[illegible]	[illegible]	1.	[illegible]	[illegible]	[illegible]	[illegible]		
101	[illegible]	2.	[illegible]	1.	[illegible]	2.	[illegible]	1.	[illegible]	[illegible]
111	[illegible]	3.	4.	0.	0.	2.	1.	2.	[illegible]	[illegible]
121	3.	0.	2.	3.	3.	2.	7.	4.	3.	3.
131	4.	5.	0.	4.	3.	6.	4.	4.	3.	8.
141	5.	4.	6.	2.	2.	3.	7.	6.	4.	5.
151	5.	4.	3.	3.	4.	6.	3.	4.	10.	9.
161	7.	11.	4.	8.	7.	6.	8.	5.	7.	6.
171	14.	12.	12.	14.	12.	7.	6.	13.	9.	10.
181	13.	22.	8.	10.	13.	19.	16.	15.	21.	18.
191	[illegible]	21.	29.	24.	13.	33.	27.	30.	[illegible]	[illegible]
201	[illegible]	33.	29.	44.	50.	47.	41.	52.	[illegible]	[illegible]
211	[illegible]	56.	[illegible]	[illegible]	[illegible]	70.	72.	[illegible]	[illegible]	
221	[illegible]	123.	[illegible]	[illegible]	[illegible]	[illegible]	201.	[illegible]	[illegible]	
231	[illegible]	174.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
241	[illegible]	3.	4.	2.	2.	6.	3.	7.	[illegible]	[illegible]
251	8.	7.	10.	12.	12.	18.	11.	22.	10.	[illegible]
261	11.	16.	15.	17.	24.	17.	31.	32.	28.	14.
271	11.	11.	6.	7.	2.	2.	3.	2.	4.	9.
281	6.	6.	6.	8.	6.	9.	4.	6.	8.	9.
291	8.	10.	2.	7.	10.	8.	12.	10.	8.	10.
301	[illegible]	9.	10.	1.	16.	13.	19.	17.	12.	[illegible]
311	11.	14.	10.	7.	15.	18.	13.	17.	13.	[illegible]
321	13.	17.	13.	19.	[illegible]	26.	25.	21.	[illegible]	
331	[illegible]	27.	23.	[illegible]	[illegible]	19.	31.	[illegible]	[illegible]	
341	[illegible]	56.	56.	51.	68.	65.	67.	67.	75.	[illegible]
351	100.	120.	140.	186.	183.	216.	235.	184.	177.	[illegible]
361	208.	256.	321.	355.	472.	461.	363.	259.	100.	[illegible]
371	2.	0.	0.	0.	0.	0.	0.	0.	0.	1.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	1.	0.	0.	0.	0.	0.	[illegible]
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
471	0.	0.	0.	0.	1.	1.	0.	1.	0.	0.
481	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
501	0.	0.								

BEST AVAILABLE COPY

Raymond
11/18/93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV 0

[illegible]
[illegible]
File N: [illegible]a2264.CHF

Counted on: 11/11/93 @19:25
Detector: AEA10
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	[illegible]
[illegible]	321.	[illegible]	[illegible]	[illegible]	16.00	[illegible]	[illegible]
[illegible]	18.2	18.2	264.396	[illegible]	26.000	[illegible]	[illegible]
[illegible]	22.2	22.2	227.968	227.126	16.000	8.859	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

[illegible]	[illegible]	MEV Frac	Peak Control Exp.	Obs.	Diff.	FWHM	Count Rate c/m	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]		5.256	5.251	0.005				[illegible]	
2	Am241	0.082	5.276	5.315	-.039	0.39	1.71	9.6	[illegible]	[illegible]
	Pu240		5.144	5.315	-.171				13.4	[illegible]
3	Pu239	0.068	5.143	5.151	-.008	0.04	1.42	8.3	11.1	[illegible]
	Pu240		5.144	5.151	-.007				11.1	[illegible]
		---					---			
Totals:		0.977	<--valid peaks only-->				20.47			

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DETECTOR CALIBRATION
Energy(MEV) = 4.105 + (0.0046)*Channel
Energy range (MeV): 4.105 TO 6.460
Efficiency = 0.1280 CPM/DPM

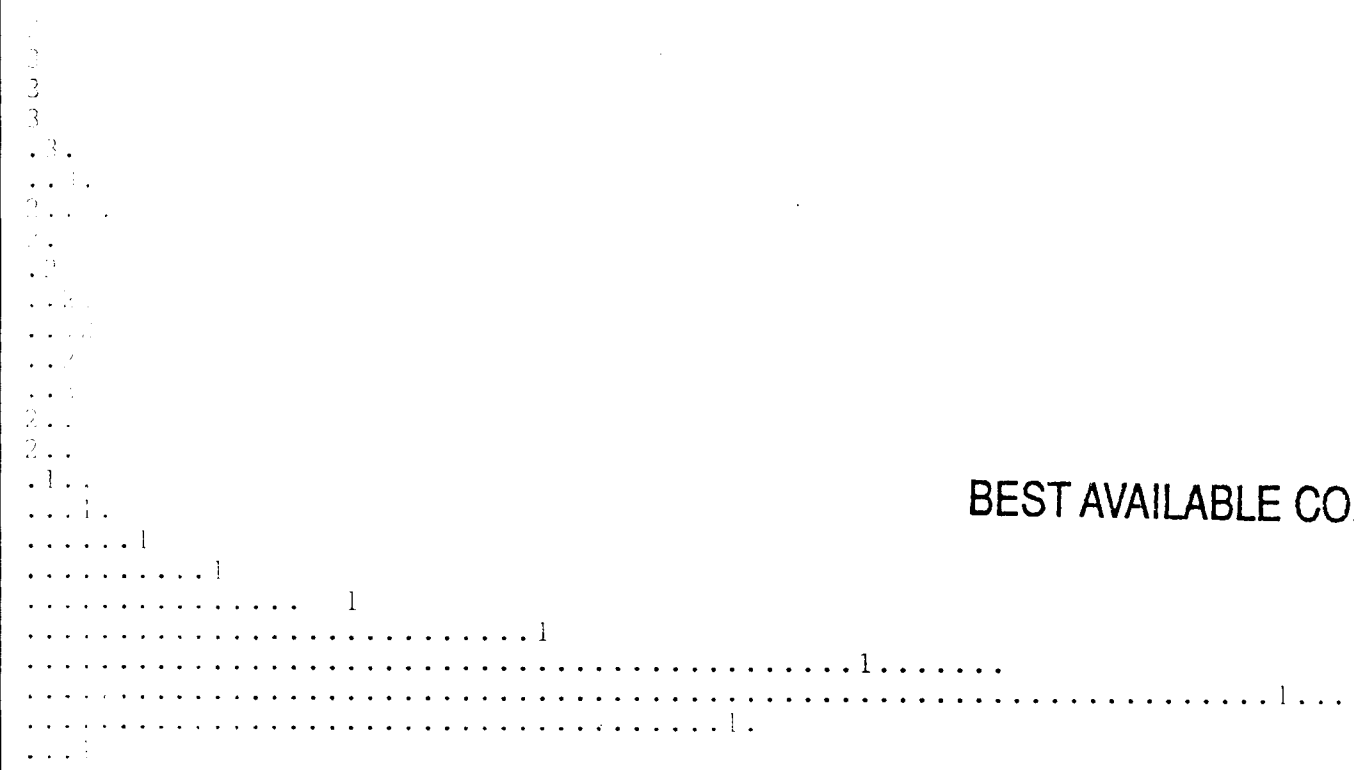
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	10059.0	100.000
Smoothed	10059.0	100.000
Composite fit	9824.7	97.671
Residuals	234.3	2.329

Analyzed by: [illegible]
[illegible]

Spectrum 10a2264.CNF

Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 2476.7



BEST AVAILABLE COPY

Raw Data Dump for AFA Spectrum: 10a2264.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	1.	0.	0.	2.	0.	0.	0.	1.	0.
21	1.	0.	0.	1.	1.	0.	0.	1.	0.	0.
31	0.	0.	1.	1.	0.	2.	2.	0.	1.	0.
[illegible]	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	1.	0.	1.	0.	0.	0.	0.	0.	1.
61	2.	1.	1.	0.	0.	0.	1.	0.	0.	0.
71	0.	2.	0.	2.	0.	0.	1.	2.	1.	2.
[illegible]	[illegible]	1.	1.	0.	0.	1.	1.	1.	0.	[illegible]
[illegible]	[illegible]	1.	1.	0.	[illegible]	0.	0.	2.	0.	[illegible]
[illegible]	[illegible]	1.	1.	1.	1.	0.	3.	1.	1.	[illegible]
111	1.	0.	0.	0.	1.	0.	1.	0.	0.	[illegible]
121	0.	1.	0.	1.	1.	2.	1.	0.	1.	[illegible]
131	1.	2.	2.	4.	1.	2.	3.	1.	3.	1.
141	2.	2.	3.	3.	1.	1.	2.	4.	0.	1.
151	0.	2.	0.	0.	2.	1.	1.	1.	1.	1.
161	2.	1.	2.	3.	2.	1.	1.	4.	3.	4.
171	4.	1.	1.	3.	2.	3.	3.	0.	3.	2.
181	2.	3.	4.	6.	7.	4.	6.	1.	4.	2.
191	1.	4.	7.	6.	3.	8.	8.	6.	6.	[illegible]
201	3.	3.	7.	8.	12.	8.	9.	5.	6.	11.
211	[illegible]	23.	13.	10.	[illegible]	9.	17.	21.	19.	[illegible]
[illegible]	[illegible]	26.	[illegible]	29.	21.	26.	24.	23.	21.	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	11.	[illegible]	17.	[illegible]	3.	9.	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	26.	16.	19.	[illegible]	19.	22.	19.	[illegible]	[illegible]
261	16.	16.	18.	15.	20.	16.	14.	14.	5.	12.
271	8.	14.	15.	12.	17.	10.	8.	14.	14.	8.
281	11.	15.	12.	12.	17.	15.	19.	19.	19.	18.
291	19.	12.	16.	17.	17.	22.	21.	16.	19.	18.
301	[illegible]	15.	26.	18.	[illegible]	23.	17.	17.	[illegible]	[illegible]
[illegible]	[illegible]	31.	28.	23.	[illegible]	32.	39.	37.	[illegible]	
[illegible]	[illegible]	49.	40.	43.	51.	52.	47.	58.	[illegible]	[illegible]
[illegible]	[illegible]	72.	[illegible]	84.	[illegible]	81.	104.	109.	103.	[illegible]
[illegible]	[illegible]	145.	143.	163.	190.	207.	224.	260.	[illegible]	[illegible]
[illegible]	295.	301.	292.	313.	315.	311.	334.	338.	[illegible]	[illegible]
[illegible]	[illegible]	281.	206.	163.	117.	69.	37.	15.	[illegible]	[illegible]
[illegible]	1.	0.	0.	0.	[illegible]	0.	0.	[illegible]	[illegible]	[illegible]
391	1.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.
421	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.
[illegible]	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
[illegible]	[illegible]	0.	0.	0.	0.	0.	0.	0.	1.	[illegible]
451	[illegible]	1.	0.	2.	0.	0.	1.	0.	0.	0.
461	1.	0.	0.	1.	2.	1.	0.	0.	0.	[illegible]
471	1.	2.	1.	1.	1.	1.	1.	0.	0.	1.
481	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
491	1.	0.	0.	0.	1.	0.	0.	0.	0.	0.
501	0.	0.								

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Raymond
11-12-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

SAMPLE
[illegible]-5781
File ID: 11a3242.CNF

Counted on: 11/11/93 @19:26
Detector: AEA11
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	[illegible] Initial	[illegible]
1	360.2	360.2	365.062	365.062	10.000	[illegible]	[illegible]	[illegible]
2	21.8	24.[illegible]	306.170	306.168	12.000	[illegible]	[illegible]	[illegible]
3	45.4	45.[illegible]	267.140	267.138	10.000	2.610	[illegible]	[illegible]
4	147.8	147.8	232.398	232.395	10.000	5.969	5.000	[illegible]

PEAK RESULTS
Peak Error Limit: .25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	[illegible]	[illegible]	[illegible]
1	[illegible]	0.592	5.796	5.801	-.01[illegible]	.01	7.81	[illegible]	92.[illegible]	[illegible]
	[illegible]		5.796	5.801	-.005				67.[illegible]	[illegible]
2	Pu239	0.047	5.499	5.530	-.0310	.02	0.62	11.[illegible]	[illegible]	[illegible]
3		0.077		5.352	0.01		1.01	8.9	8.[illegible]	[illegible]
4		0.242		5.191	0.02		3.19	5.0	27.[illegible]	[illegible]
Totals:		0.957	<--valid peaks only-->				12.64			

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DETECTOR CALIBRATION
Energy(MEV) = 4.122 + (0.0046)*Channel
Energy range (MeV): 4.122 TO 6.477
Efficiency = 0.1155 CPM/DPM

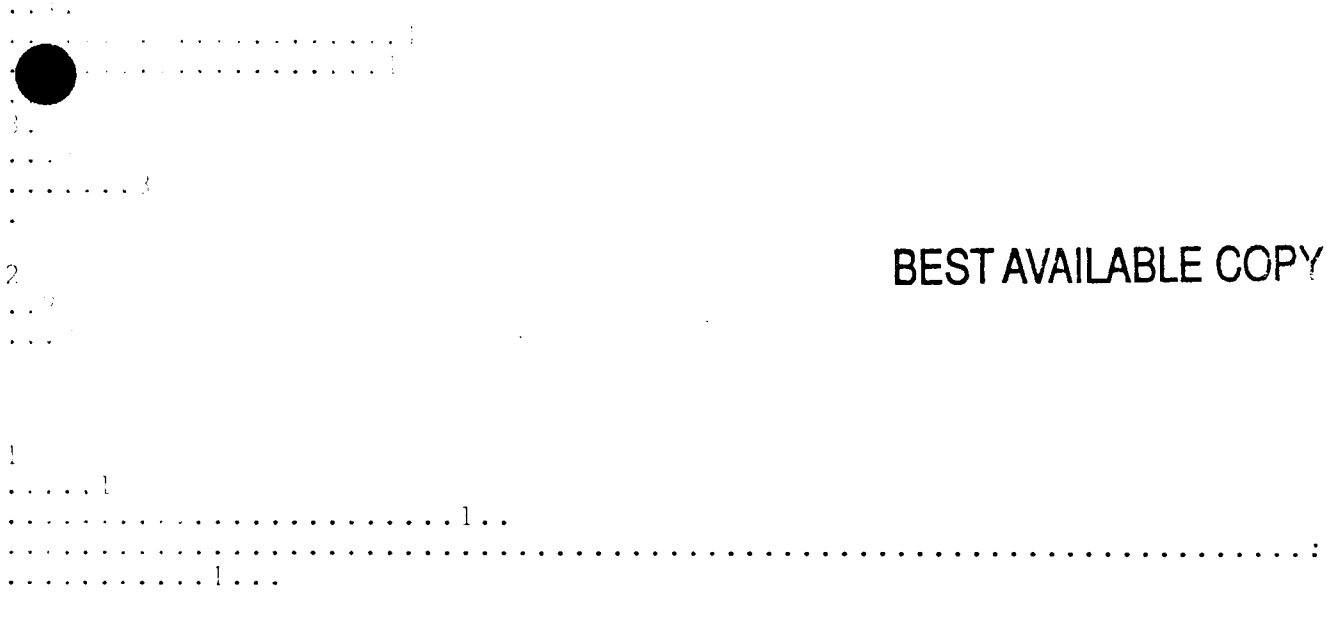
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	6338.0	100.000
Smoothed	6338.0	100.000
Composite fit	6068.3	95.744
Residuals	269.7	4.256

Analyzed by: [illegible]

Spectrum 11a3242.CNF

Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 2208.6



BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 11a3242.CNF

WHC-SD-WM-DP-057 REV O

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	1.	0.	1.	1.	1.	1.	0.	0.
21	0.	0.	2.	1.	0.	0.	3.	3.	2.	0.
31	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
91	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
111	0.	0.	0.	1.	2.	0.	0.	1.	0.	0.
121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
131	1.	0.	0.	0.	0.	1.	0.	1.	0.	1.
141	1.	0.	1.	0.	2.	2.	3.	2.	5.	2.
151	2.	2.	0.	0.	1.	1.	0.	0.	0.	0.
161	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
171	0.	0.	0.	1.	2.	0.	1.	1.	2.	1.
181	0.	2.	0.	0.	1.	2.	1.	0.	0.	0.
191	0.	0.	3.	1.	2.	0.	0.	0.	0.	1.
201	1.	2.	4.	1.	0.	0.	3.	1.	4.	1.
211	1.	2.	2.	4.	2.	6.	8.	6.	4.	1.
221	1.	19.	23.	29.	3.	31.	51.	41.	42.	[illegible]
231	1.	177.	172.	165.	1[illegible].	91.	62.	1[illegible].	[illegible]	[illegible]
241	1.	7.	1.	7.	1.	1.	1.	1.	1.	[illegible]
251	1.	10.	15.	18.	1[illegible].	23.	7.	1[illegible].	[illegible]	[illegible]
261	6.	9.	25.	28.	32.	49.	59.	59.	1[illegible].	[illegible]
271	12.	2.	6.	0.	2.	0.	0.	1.	0.	[illegible]
281	1.	0.	3.	0.	2.	2.	5.	3.	4.	1.
291	2.	4.	3.	6.	5.	7.	7.	11.	13.	1[illegible].
301	11.	8.	17.	22.	23.	31.	28.	20.	25.	1[illegible].
311	1.	0.	3.	0.	0.	3.	3.	0.	1.	1.
321	0.	3.	2.	3.	3.	1.	2.	1.	0.	2.
331	1.	3.	1.	4.	0.	4.	4.	5.	2.	1.
341	1.	7.	5.	6.	1.	5.	11.	8.	11.	1.
351	1.	55.	79.	121.	11[illegible].	133.	138.	105.	9[illegible].	1.
361	1[illegible].	230.	305.	421.	471.	425.	329.	177.	7[illegible].	[illegible]
371	1.	2.	2.	1.	1.	0.	0.	0.	[illegible]	[illegible]
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
441	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
461	0.	0.	0.	0.	0.	0.	0.	0.	1.	[illegible]
471	1.	0.	1.	0.	1.	0.	1.	0.	1.	[illegible]
481	2.	1.	1.	0.	1.	0.	0.	0.	0.	[illegible]
491	1.	0.	0.	0.	0.	0.	0.	0.	1.	[illegible]
501	1.	0.								

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D.H. Wilson
11-12-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV 0

SAMPLE
J1286-5781
File ID: 10a2265.CNF

Counted on: 11/12/93 @ 5:34
Detector: AEA10
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Fm Initial	Fm Final
1	531.4	531.4	364.483	364.483	12.000	2.918	6.000	1.766
2	35.1	35.1	306.433	306.431	10.000	3.079	5.000	1.711
3	35.6	35.6	267.575	267.569	10.000	3.347	5.000	1.535
4	201.1	201.1	233.130	233.125	12.000	3.740	6.000	2.576

PEAK RESULTS
Peak Error Limit: 25%

Peak	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Diff.	FWHM	Count Rate c/m	Sert @95	d/m	[illegible]
1	Cm243	0.638	5.786	5.817	-.031	0.01	12.03	2.6	136.6	0.[illegible]E-01
	Cm244		5.796	5.817	-.021				99.7	0.449E-01
2		0.044		5.544		0.01	0.84	9.8	6.9	0.313E-05
3		0.051		5.361		0.02	0.97	9.1	8.0	0.361E-05
4		0.247		5.199		0.02	4.66	4.2	38.6	0.174E-04
Totals:		0.980	<--valid peaks only-->				18.49			

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DETECTOR CALIBRATION
Energy(MEV) = 4.104 + (0.0047)*Channel
Energy range (MeV): 4.104 TO 6.510
Efficiency = 0.1206 CPM/DPM

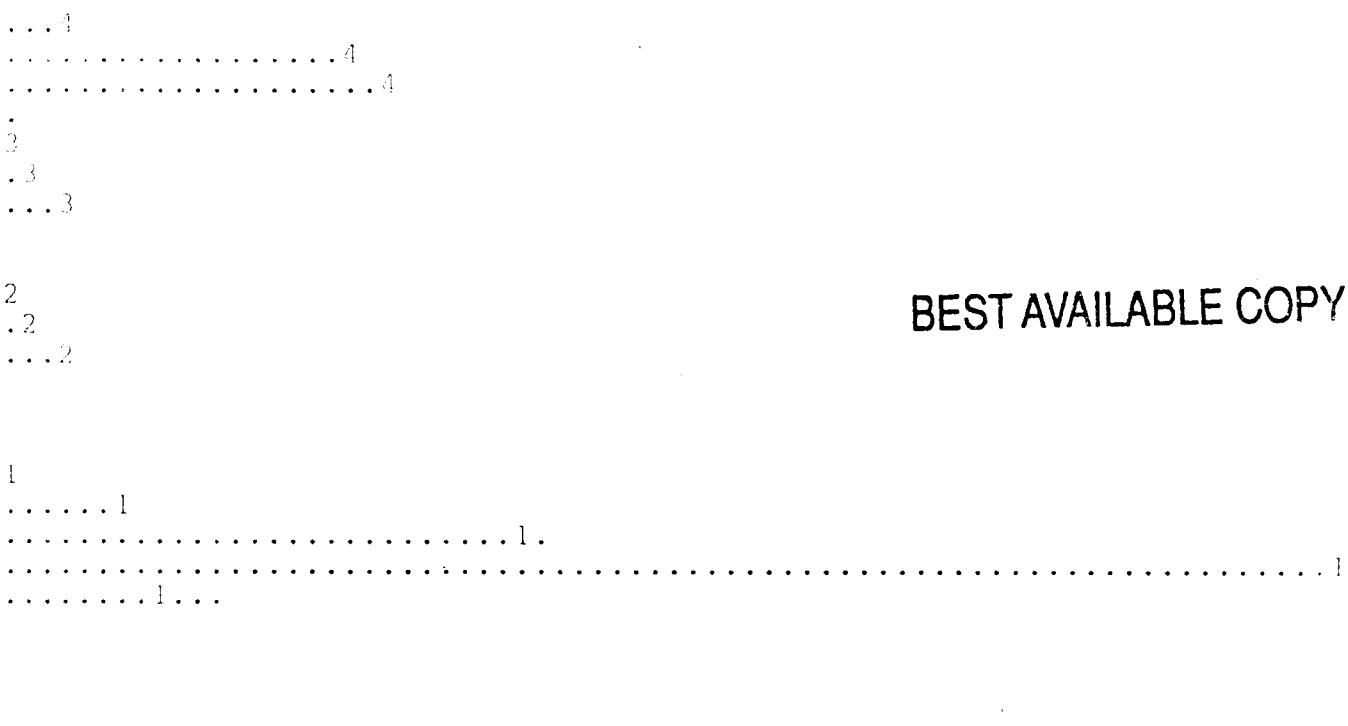
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	9054.0	100.000
Smoothed	9054.0	100.000
Composite fit	8874.7	98.020
Residuals	179.3	1.980

Analyzed by: _____
VR

Spectrum 10a2265.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 3366.7



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Raw Data Dump for AEA Spectrum: 10a2265.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	1.	0.	1.	0.	0.	2.	0.
[illegible]	2.	2.	1.	0.	0.	0.	0.	1.	0.	0.
[illegible]	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
51	0.	1.	0.	0.	0.	0.	0.	1.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	1.	1.	1.	1.	0.	0.	0.	0.	1.	[illegible]
81	[illegible]	1.	0.	0.	0.	1.	0.	0.	[illegible]	[illegible]
91	1.	0.	1.	0.	0.	0.	0.	0.	[illegible]	[illegible]
101	0.	0.	0.	0.	0.	1.	0.	0.	0.	[illegible]
111	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
121	0.	0.	1.	0.	0.	0.	0.	0.	1.	0.
131	0.	0.	0.	1.	1.	0.	0.	0.	2.	3.
141	1.	0.	0.	2.	0.	1.	1.	1.	1.	3.
151	3.	2.	1.	1.	0.	1.	1.	0.	0.	0.
161	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.
171	0.	0.	1.	0.	0.	1.	2.	0.	0.	1.
181	0.	0.	2.	0.	2.	1.	1.	0.	0.	1.
191	1.	0.	0.	0.	0.	1.	4.	2.	1.	[illegible]
201	1.	0.	2.	2.	4.	2.	0.	1.	[illegible]	[illegible]
211	[illegible]	3.	3.	6.	7.	12.	14.	8.	15.	[illegible]
221	[illegible]	42.	52.	42.	79.	78.	66.	86.	[illegible]	[illegible]
231	[illegible]	224.	256.	213.	209.	145.	95.	49.	[illegible]	[illegible]
241	2.	0.	1.	0.	1.	0.	2.	1.	4.	[illegible]
251	4.	8.	12.	9.	16.	18.	13.	9.	13.	9.
261	14.	17.	15.	16.	36.	42.	38.	41.	45.	27.
271	14.	12.	2.	2.	1.	0.	0.	0.	0.	0.
281	1.	1.	0.	1.	4.	1.	2.	3.	3.	4.
291	8.	2.	1.	7.	4.	10.	13.	16.	16.	11.
[illegible]	[illegible]	19.	29.	19.	41.	39.	47.	35.	21.	11.
[illegible]	4.	3.	1.	0.	0.	0.	3.	1.	[illegible]	[illegible]
[illegible]	0.	1	1.	0.	0.	3.	3.	2.	1.	[illegible]
331	[illegible]	4.	3.	5.	4.	3.	3.	1.	[illegible]	[illegible]
341	14.	9.	11.	15.	14.	16.	21.	21.	[illegible]	[illegible]
351	69.	103.	137.	181.	215.	197.	194.	204.	151.	[illegible]
361	270.	387.	561.	676.	684.	557.	375.	194.	77.	[illegible]
371	2.	1.	1.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
431	0.	0.	0.	0.	0.	0.	0.	1.	0.	[illegible]
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
471	0.	0.	1.	1.	1.	0.	0.	0.	0.	1.
481	0.	1.	2.	2.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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D.H. Milian
11-12-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

SAMPLE
J1286-5781
File ID: 11a3244.CNF

Counted on: 11/12/93 @ 5:35
Detector: AEA11
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	[illegible] Initial	[illegible] Final
1	277.2	277.2	364.716	364.716	10.000	2.852	5.000	1.6[illegible]
2	19.9	19.9	306.548	306.545	10.000	2.806	5.000	1.427
3	40.8	40.8	266.434	266.430	10.000	3.020	5.000	2.346
4	13.2	13.2	255.855	255.058	10.000	1.699	5.000	0.883
5	114.3	114.3	232.563	232.552	10.000	3.607	5.000	2.561

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	Err @95	d/m	[illegible]
1	Cm243	0.589	5.786	5.796	-.0100.01		6.43	3.5	68.6	[illegible]
	Cm244		5.796	5.796	0.000				50.1	0.225E-04
2	Pu238	0.045	5.499	5.529	-.0300.01		0.49	12.8	5.3	0.238E-05
3		0.073		5.344	0.01		0.79	10.1	6.2	0.278E-05
4	Am243	0.026	5.276	5.292	-.0160.01		0.29	22.1	2.3	0.102E-05
5		0.237		5.188	0.02		2.59	5.6	20.1	0.907E-05
Totals:		0.970	<--valid peaks only-->				10.59			

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DETECTOR CALIBRATION
Energy(MEV) = 4.119 + (0.0046)*Channel
Energy range (MeV): 4.119 TO 6.474
Efficiency = 0.1285 CPM/DPM

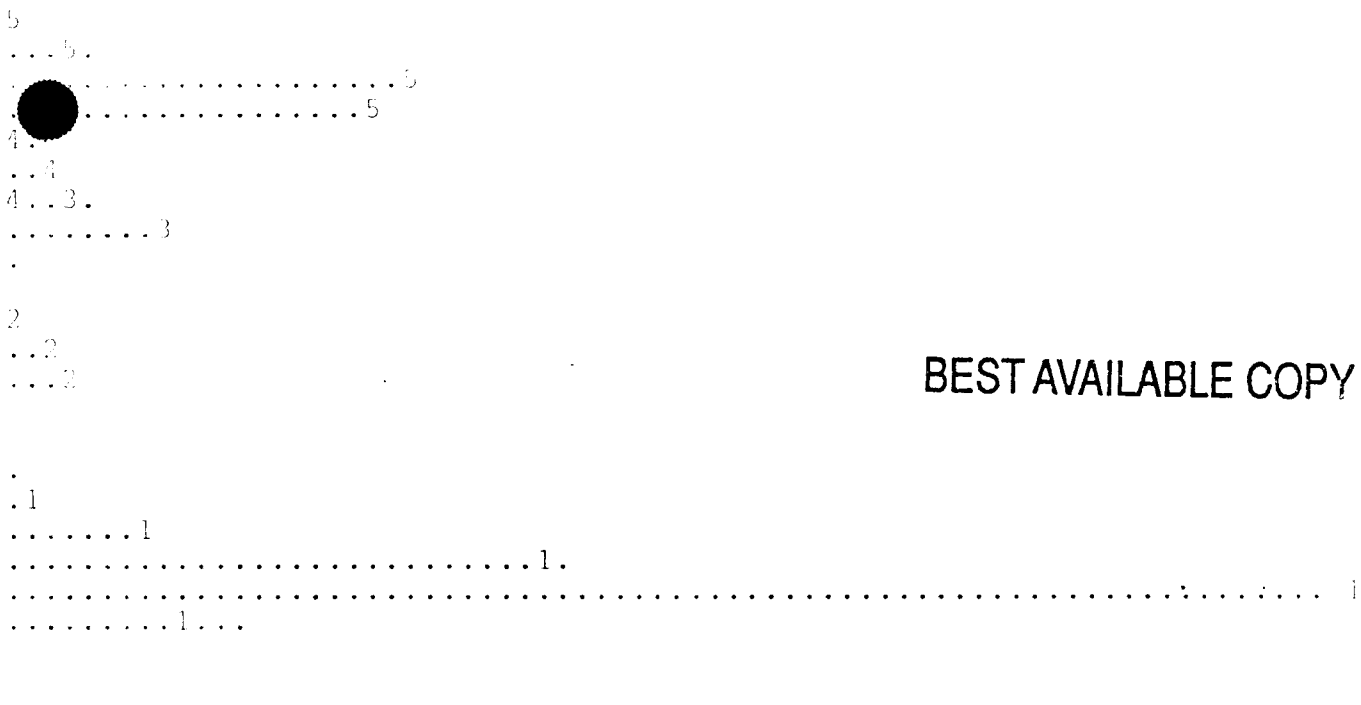
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	5238.0	100.000
Smoothed	5238.0	100.000
Composite fit	5082.9	97.039
Residuals	155.1	2.961

Analyzed by: _____
VR

Spectrum 11a3244.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 1735.6



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Raw Data Dump for AEA Spectrum: 11a3244.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	1.	0.	0.	0.	1.	1.	3.	1.	0.	1.
21	1.	1.	2.	1.	1.	3.	2.	1.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	1.	0.	0.	0.	1.	0.	1.	[illegible]
91	[illegible]	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
101	1.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
111	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
121	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
131	0.	0.	0.	0.	2.	1.	2.	1.	0.	0.
141	0.	1.	4.	2.	1.	3.	1.	3.	6.	1.
151	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.
161	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
171	0.	2.	0.	0.	0.	0.	0.	0.	1.	0.
181	0.	1.	0.	0.	2.	0.	0.	1.	0.	0.
191	2.	0.	0.	2.	0.	1.	2.	2.	1.	[illegible]
201	0.	0.	2.	2.	2.	0.	0.	6.	3.	[illegible]
211	2.	5.	2.	5.	[illegible]	5.	7.	[illegible]	11.	[illegible]
221	17.	24.	22.	39.	[illegible]	17.	41.	[illegible]	[illegible]	[illegible]
231	[illegible]	130.	111.	[illegible]	[illegible]	51.	35.	[illegible]	[illegible]	[illegible]
241	0.	4.	4.	3.	1.	3.	2.	2.	[illegible]	[illegible]
251	8.	11.	10.	12.	27.	15.	16.	11.	15.	[illegible]
261	10.	18.	15.	40.	50.	45.	52.	43.	33.	13.
271	3.	3.	0.	1.	1.	0.	2.	2.	0.	1.
281	1.	2.	2.	3.	1.	0.	2.	5.	4.	5.
291	5.	3.	5.	5.	1.	6.	9.	3.	7.	13.
301	[illegible]	11.	10.	13.	16.	25.	31.	15.	14.	[illegible]
311	[illegible]	0.	1.	2.	[illegible]	1.	2.	1.	[illegible]	[illegible]
321	[illegible]	1.	2.	2.	1.	4.	6.	2.	1.	[illegible]
331	[illegible]	3.	2.	4.	[illegible]	5.	[illegible]	[illegible]	[illegible]	[illegible]
341	[illegible]	7.	11.	6.	15.	11.	14.	13.	[illegible]	[illegible]
351	40.	35.	69.	112.	107.	112.	102.	110.	102.	[illegible]
361	147.	199.	263.	328.	367.	294.	229.	112.	49.	16.
371	2.	1.	1.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
471	0.	0.	0.	0.	0.	0.	2.	1.	0.	[illegible]
481	1.	0.	0.	1.	0.	0.	0.	0.	0.	[illegible]
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

D.H. Milburn
11-12-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

SAMPLE
J1286-5981
File ID: 9a1360.CNF

Counted on: 11/12/93 @ 5:33
Detector: AEA9
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	1328.2	1328.2	364.553	364.553	10.000	3.025	5.[illegible]	[illegible]
[illegible]	103.	103.[illegible]	306.21[illegible]	306.212	12.000	3.253	[illegible]	[illegible]
[illegible]	31.[illegible]	21.[illegible]	266.537	266.519	10.000	[illegible].678	[illegible]	[illegible]
4	1974.1	1974.1	231.755	231.755	10.000	3.609	[illegible]	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity [illegible]
1	Cm244	0.397	5.796	5.789	0.007	0.01	32.32	1.6	229.[illegible]	[illegible]
	Cm243		5.786	5.789	-.003				314.5	[illegible]
2	Pu238	0.032	5.499	5.521	-.022	0.01	2.57	5.6	25.[illegible]	[illegible]
3		0.011		5.338		0.02	0.88	9.7	6.[illegible]	[illegible]
4	Pu239	0.538	5.143	5.178	-.035	0.02	43.81	1.4	311.[illegible]	[illegible]
	Pu240		5.144	5.178	-.034				311.[illegible]	[illegible]
Totals:		0.978	<--valid peaks only-->				79.58			

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DETECTOR CALIBRATION
Energy(MEV) = 4.112 + (0.0046)*Channel
Energy range (MeV): 4.112 TO 6.468
Efficiency = 0.1408 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	39059.0	100.000
Smoothed	39059.0	100.000
Composite fit	38203.3	97.809
Residuals	855.7	2.191

Analyzed by: _____
VR

Spectrum 9a1360.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 10441.9

WHC-SD-WM-DP-057 REV O

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BEST AVAILABLE COPY

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.......................................................... 1
.......1..
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Raw Data Dump for AEA Spectrum: 9a1360.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	2.	1.
11	0.	0.	0.	1.	2.	0.	0.	2.	1.	0.
21	0.	0.	0.	0.	1.	2.	1.	3.	3.	4.
31	3.	1.	1.	0.	0.	1.	0.	0.	0.	0.
[illegible]	0.	0.	0.	1.	0.	1.	0.	1.	0.	1.
[illegible]	0.	0.	1.	0.	0.	0.	1.	1.	0.	1.
61	0.	0.	1.	0.	1.	1.	0.	0.	0.	0.
71	0.	3.	1.	0.	1.	0.	2.	1.	1.	1.
[illegible]	3.	0.	1.	0.	0.	2.	0.	0.	0.	[illegible]
[illegible]	0.	0.	1.	0.	0.	1.	0.	0.	0.	[illegible]
101	0.	0.	1.	1.	1.	4.	1.	0.	0.	0.
111	1.	0.	1.	0.	1.	2.	2.	0.	0.	0.
121	0.	2.	1.	1.	2.	1.	0.	2.	0.	0.
131	0.	2.	0.	0.	1.	3.	1.	1.	0.	1.
141	2.	1.	0.	0.	2.	4.	2.	5.	1.	4.
151	4.	2.	1.	1.	1.	1.	2.	2.	1.	1.
161	1.	2.	2.	4.	0.	1.	2.	4.	7.	1.
171	3.	4.	1.	1.	2.	4.	1.	6.	3.	3.
181	3.	3.	12.	10.	5.	2.	1.	7.	7.	8.
191	6.	5.	12.	14.	14.	8.	7.	11.	15.	13.
201	19.	18.	21.	29.	22.	37.	26.	32.	34.	40.
211	81.	55.	87.	85.	83.	121.	154.	152.	239.	317.
221	371.	425.	468.	580.	641.	761.	961.	1235.	1561.	[illegible]
231	2345.	2451.	2205.	1594.	1145.	633.	297.	130.	55.	[illegible]
241	2.	1.	1.	0.	0.	1.	1.	5.	1.	[illegible]
251	7.	5.	9.	11.	12.	7.	4.	11.	[illegible]	[illegible]
261	12.	16.	23.	20.	34.	40.	45.	28.	21.	[illegible]
271	12.	7.	1.	4.	2.	5.	1.	2.	1.	[illegible]
281	3.	2.	3.	5.	2.	3.	4.	8.	11.	[illegible]
291	13.	13.	12.	28.	20.	39.	45.	52.	15.	[illegible]
[illegible]	56.	48.	87.	89.	113.	124.	120.	114.	66.	[illegible]
[illegible]	4.	6.	2.	1.	2.	2.	1.	7.	1.	[illegible]
[illegible]	4.	5.	3.	6.	6.	7.	7.	14.	7.	17.
321	13.	18.	11.	19.	17.	17.	20.	20.	27.	21.
341	21.	38.	41.	40.	53.	51.	78.	95.	123.	156.
351	187.	296.	385.	497.	589.	589.	579.	555.	546.	631.
361	745.	1050.	1390.	1587.	1665.	1471.	978.	572.	191.	57.
371	10.	2.	0.	0.	0.	0.	0.	0.	0.	[illegible]
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
431	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
441	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
471	0.	0.	1.	0.	0.	0.	1.	1.	0.	2.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
511	0.	0.								

BEST AVAILABLE COPY

Eric Bauer
11-11-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV 0

SAMPLE
J-1286-5981
File ID: 4a4953.CHF

Counted on: 11/11/93 @10:52
Detector: AEA4
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	838.5	838.5	362.593	362.593	12.000	5.375	6.000	1.721
2	66.7	66.7	301.359	301.239	12.000	4.357	6.000	1.21
3	12.4	12.4	265.211	264.864	20.000	7.511	10.000	2.92
4	1209.6	1209.6	231.170	231.167	14.000	5.839	7.000	2.15

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	Err 095	d/m	Activity uCi/g
1	Cm244	0.421	5.796	5.784	0.012	0.03	30.77	1.6	349.2	[illegible]
	Cm243		5.786	5.784	0.002				478.4	0.215E-03
2	Pu238	0.034	5.499	5.510	-.011	0.02	2.46	6.1	38.7	0.174E-04
	Am241		5.480	5.510	-.030				29.7	0.134E-04
3	Am243	0.013	5.276	5.325	-.049	0.04	0.94	10.5	10.8	0.487E-05
4	Pu239	0.537	5.143	5.166	-.023	0.03	39.28	1.4	445.8	0.201E-03
	Pu240		5.144	5.166	-.022				445.8	0.201E-03
Totals:		1.004	<--valid peaks only-->				73.44			

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DETECTOR CALIBRATION
Energy(MEV) = 4.080 + (0.0047)*Channel
Energy range (MeV): 4.080 TO 6.486
Efficiency = 0.0881 CPM/DPM

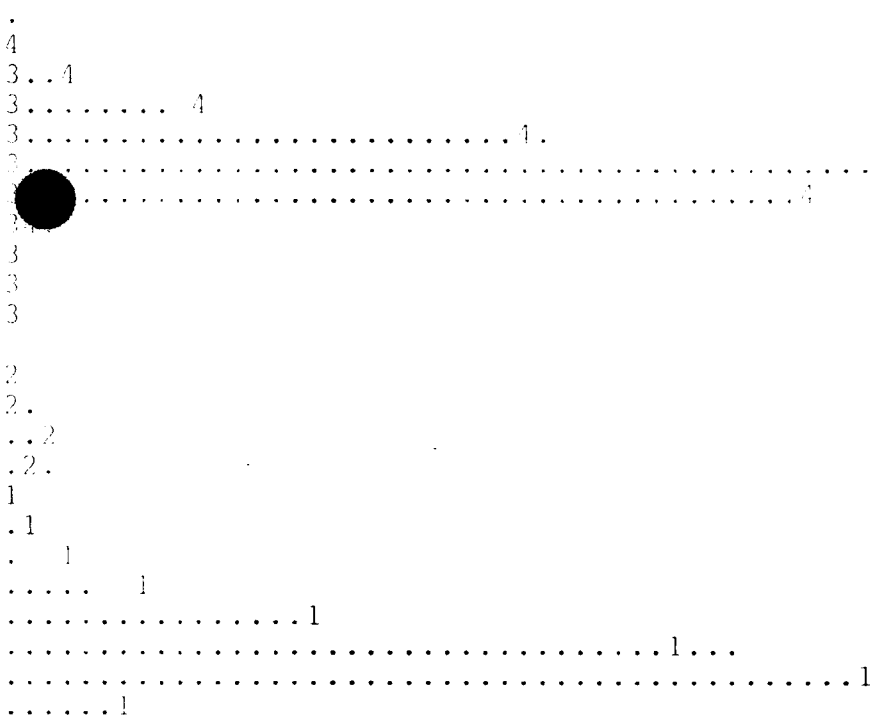
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	35102.0	100.000
Smoothed	35102.0	100.000
Composite fit	35256.6	100.440
Residuals	-154.6	-0.440

Analyzed by: _____
DM

Spectrum 4a4953.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 8233.4



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Raw Data Dump for AEA Spectrum: 4a4953.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
21	1.	0.	1.	1.	1.	0.	0.	1.	0.	0.
31	0.	0.	1.	0.	0.	1.	1.	0.	0.	1.
41	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
51	0.	1.	0.	1.	0.	0.	0.	1.	1.	0.
61	0.	0.	0.	1.	1.	2.	0.	2.	1.	0.
71	0.	1.	0.	0.	0.	0.	0.	0.	0.	3.
81	0.	0.	2.	0.	1.	1.	0.	0.	1.	0.
91	0.	0.	1.	3.	0.	0.	2.	2.	0.	1.
101	0.	1.	1.	1.	2.	2.	1.	1.	1.	2.
111	0.	0.	0.	3.	0.	1.	0.	1.	0.	2.
121	0.	2.	1.	1.	2.	2.	2.	2.	3.	3.
131	4.	5.	2.	0.	1.	2.	3.	4.	2.	1.
141	4.	4.	6.	1.	2.	3.	5.	1.	6.	1.
151	4.	6.	2.	4.	3.	2.	4.	3.	4.	3.
161	6.	1.	5.	6.	3.	9.	5.	7.	6.	6.
171	15.	9.	3.	9.	1.	12.	12.	6.	9.	9.
181	6.	9.	9.	16.	18.	10.	13.	18.	17.	23.
191	30.	23.	18.	15.	26.	25.	22.	21.	41.	39.
201	32.	44.	46.	55.	52.	55.	62.	70.	82.	89.
211	107.	119.	148.	171.	228.	239.	294.	315.	399.	433.
221	497.	568.	607.	701.	789.	927.	1066.	1119.	1123.	1256.
231	1336.	1354.	1220.	990.	768.	532.	335.	201.	90.	[illegible]
241	19.	10.	5.	3.	2.	3.	6.	3.	1.	7.
251	4.	6.	5.	6.	9.	13.	12.	7.	11.	7.
261	18.	9.	13.	18.	18.	15.	16.	12.	11.	12.
271	13.	13.	10.	7.	2.	4.	8.	10.	5.	5.
281	9.	6.	8.	13.	11.	14.	12.	17.	20.	26.
291	28.	39.	29.	42.	43.	39.	62.	55.	56.	59.
301	71.	56.	55.	93.	74.	70.	55.	41.	32.	[illegible]
311	17.	11.	6.	5.	9.	7.	4.	10.	4.	11.
321	10.	15.	21.	15.	15.	18.	27.	14.	21.	[illegible]
331	19.	31.	35.	16.	31.	36.	50.	49.	61.	[illegible]
341	98.	100.	101.	126.	150.	193.	230.	270.	269.	[illegible]
351	402.	445.	521.	564.	614.	563.	593.	643.	741.	[illegible]
361	833.	906.	934.	875.	782.	615.	398.	246.	120.	[illegible]
371	20.	2.	1.	0.	0.	1.	0.	0.	0.	[illegible]
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.
421	0.	0.	0.	1.	0.	0.	0.	0.	2.	1.
431	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
471	0.	1.	1.	1.	1.	1.	1.	1.	0.	0.
481	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

WHC-SD-WM-DP-057 REV 0

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

Batch 2094

ANALYTICAL BATCH

Lab Segment Serial No. U 1287.-	Customer ID: NE20D
Analysis: Pu 239/40	Sample Prep: DIRECT

Instrument: UB537237	Procedure/ Rev: LAB-3-156 D
Technologist: John VanSant	Date: 11-11-93
Starting Time: 10:00	Temperature 25°C
Ending Time: 15:30	Chemist: L Fritz

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	11305-5581	11		
2	Blank	11306-5681	12		
3	Sample	11287-5781	13		
4	Duplicate	11287-5781	14		
5	Triplicate	11287-5781	15		
6	Spike Sample	11287-5781	16		
7	Spike Duplicate	11287-5781	17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	63843 .100mL	10 - 100mL		
Spike	77843 .100mL			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

WHC-SD-WM-DP-057 REV O

METHOD: LA-503-156

DATE START: November 11, 1993

PREPARED BY: L.L. Fritts L.L. Fritts 11-18-93/12-6-93

DATE COMPLETE: November 18, 1993

	UNITS:	uCi/mL									
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	%REC	DET LIM	% CT ER
STD 63B43	J1305	Pu-239/40	1.30E+2						99.6	1.45E-2	1.6
BLANK	J1306	Pu-239/40	<1.73E-3						14.6	1.73E-3	100.0
KE20D	J1287	Pu-239/40	1.37E-2	1.41E-2	1.45E-2	1.41E-2	8.00E-4	5.7	12.1	2.58E-3	2.9
									9.7	2.77E-3	3.4
									8.0	2.80E-3	3.9
KE20D	J1287	239 Spike	104.1	108.0						5.53E-3	0.8
										5.68E-3	0.8
STD 63B43	J1305	Pu-238	<3.28E-2						N/A	3.28E-2	2.4
BLANK	J1306	Pu-238	<1.36E-2						14.6	1.36E-2	100.0
KE20D	J1287	Pu-238	<1.64E-2	<2.04E-2	<2.47E-2	N/A	N/A	N/A	12.1	1.64E-2	5.9
									9.7	2.04E-2	6.2
									8.0	2.47E-2	7.3

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

The results for the spike are in percent recovery.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#2 2386 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1305.-5581	BECHTOLD	11- 8-93	11:56	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	% RECOVERY	E14157	0

Sample Size	Customer ID
? .1mL - 10mL - .1mL + .1mL Spike	STD

Remarks Calculations Results

SPIKE #78843

77843

EDP R211 AR001

STD# 63843 RESULT 130

STD VAL. 130.5 %REC 99.61%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-11-93	1530	

54-680/061 (R-10 83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	STANDARD 0.494
J1305-5581	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0.127
Batch ID	Sample D.F. (DF)	101	Pu 239 AEA Frac. (C239)	0.446
2094	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	2751
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77843	Background in cpm (Bkg)	3
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	18.11
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	4.66
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	16.36
11/11/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * le to the power of ((-ln2 * Decay Time) / 1040.95))

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	1.30E+02

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.30E-01
Relative Counting Error	=	1.6%
Pu-238 µCi/mL	=	< 3.28E-02
Relative Counting Error	=	2.4%
Pu 236 Tracer Recovery	=	27.8%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	1.45E-02	Pu 238	=	3.28E-02

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	November 18, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

A3 11-11-93

J1305-5581

2751/30 -3

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#4 4960 WHC-SD-WM-DP-057 REV O

No.	Sample Point	Date	Time Issued	Priority
1306.-5681	BECHTOLD	11- 8-93	12: 2	18

Termination	Method Standard	Result Units	Charge Code	Reruns
u239/40	LA-503-156	uCi/ML	E14157	0

Sample Size 1-10-.05 11.11.93 ? ~~1mL~~ + .100mL Spike #77B43

Customer ID: BLK

Remarks, Calculations, Results

REAGENT BLANK

COUNT AS uCI/L

$<1.73 \times 10^{-3}$ uCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr.	
11-11-93	1530		

54-6800-061 (4-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	BLANK
J1306-5681	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0
2094	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	916
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	5
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	6.12
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	0
11/11/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted − Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * le to the power of {(−ln2 * Decay Time) / 1040.95 }

Pu 236 Tracer Recovery = (Total AT Counts / TC − Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) − Bkg * 2 * C238) − (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	< 1.73E+00

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	< 1.73E-03
Relative Counting Error	=	100.0%
Pu-238 µCi/mL	=	< 1.36E-02
Relative Counting Error	=	100.0%
Pu 236 Tracer Recovery	=	14.6%

NOTE: Pu 239/240 Reported result is a LESS THAN value using 0.05 for the Pu-239/240 peak height.

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	1.73E-03	Pu 238	=	1.36E-02

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	November 18, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#1 11-11-93

$\frac{916}{30}$ -5

J1306-5681

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#9 1366 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1287.-5781	BECHTOLD	11- 4-93	8:52	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
? 1mL-10mL- .05 mL + .1CC Spike	KE30D

Remarks, Calculations, Results

77B43

COUNT AS uCI/L

sample 1.37 x 10^{-2} uCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[signature]	[signature]	[signature]	[signature]	
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-17-93	1530	[signature] [signature]

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54-6800-06 (R-10-83)

Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

				SAMPLE
Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	0.607
J1287-5781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.049
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.266
2094	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	973
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	1
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	7.89
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0.64
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	3.46
11/11/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * ie to the power of ((-ln2 * Decay Time) / 1040.95))

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = (Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-236 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / (Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	1.37E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.37E-02
Relative Counting Error	=	2.9%
Pu-238 µCi/mL	=	< 1.64E-02
Relative Counting Error	=	5.9%
Pu 236 Tracer Recovery	=	12.1%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	2.58E-03	Pu 238	=	1.64E-02

Data Entry by:	[signature]	Date:	18-Nov-93
Approved by:	[signature]	Date:	November 18, 1993

Form 1 Rev. 1.4

#2 11-11-93

973/30 -1

J1287-5781

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#8 8543 WHC-SD-WM-DP-057 REV 0

Serial No.	Sample Point	Date	Time Issued	Priority
J 1287.-5781	BECHTOLD	11- 4-93	8:59	18

Determination	Method-Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
? 1mL - 10mL - .05mL + .100mL Sp	KE20D

Remarks. Calculations Results

COUNT AS uCI/L

77B43

duplicate 1.41 X 10^{-2} uCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-11-93	1530	

54-6800-061 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

				SAMPLE
Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	0.565
J1287-5781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.059
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.254
2094	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	964
Rerun No.	Digest. D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	5
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	5.69
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0.59
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	2.56
11/11/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * e to the power of {(-ln2 * Decay Time) / 1040.95 }

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	1.41E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.41E-02
Relative Counting Error	=	3.4%
Pu-238 µCi/mL	=	< 2.04E-02
Relative Counting Error	=	6.2%
Pu 236 Tracer Recovery	=	9.7%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	2.77E-03	Pu 238	=	2.04E-02

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	November 18, 1993

Form 1 Rev. 1.4

#1 11-11-93

964/30 -5

J 1287-5781

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#7 7329

WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1287.-5781	BECHTOLD	11- 4-93	8:59	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
?1mL-10mL-.05mL + .100mL Spike	KE20D

Remarks, Calculations, Results

COUNT AS uCI/L

77843

Triplicate

1.45×10^{-2} uCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
22-11-93	1530	

54-6800-061 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

				SAMPLE
Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	0.558
J1287-5781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.055
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.258
2094	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	772
Rerun No.	Digest. D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77843	Background in cpm (Bkg)	3
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	4.34
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0.43
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	2.01
11/11/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of {(-ln2 * Decay Time) / 1040.95 })

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * (236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 236 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	1.45E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.45E-02
Relative Counting Error	=	3.9%
Pu-238 µCi/mL	=	< 2.47E-02
Relative Counting Error	=	7.3%
Pu 236 Tracer Recovery	=	8.0%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	2.80E-03	Pu 238	=	2.47E-02

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	November 18, 1993

Form 1 Rev. 1.4

350

#3 11-11-93

J1287-5781

772/30 -3

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#5 5882 WHC-SD-WM-DP-057 REV 0

Serial No.	Sample Point	Date	Time Issued	Priority
J 1287.-5981	BECHTOLD	11- 4-93	8:59	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/24	LA-503-156	% RECOVERY	E14157	0

Sample Size: ?1mL-10mL - .05mL + .100mL Std. + .200mL Spike (63343) (77843) — Customer ID: KE20D

Remarks Calculations Results

SAMPLE SPIKED ID

SPIKE ID

SPIKE VOLUME

COUNT AS uCI/L

$$\frac{(43.3 - 13.7)\left[\left(\frac{101}{.1}\right)\left(\frac{11}{.05}\right)\right](100)}{130.5} = 104.1\%$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
		D.H. Milsic		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-17-93	1530	

54 (HNW-061 (R 10-83))

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	0.566
J1287-5981	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.033
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.392
2094	Tracer Volume in mL (SPKV)	0.2	Total AT Counts	9554
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	5
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	76.2
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	4.4
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	52.69
11/11/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

CHK EXT NO.

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of ((-ln2 * Decay Time) / 1040.95))

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = ((C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	4.33E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	4.33E-02
Relative Counting Error	=	0.8%
Pu-238 µCi/mL	=	< 3.53E-03
Relative Counting Error	=	2.2%
Pu 236 Tracer Recovery	=	56.2%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	5.53E-03	Pu 238	=	3.53E-03

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	November 18, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#1 11-11-93

J1287-5981

9554 -5
30

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#6 6792 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1287.-5981	BECHTOLD	11- 4-93	8:59	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/24	LA-503-156	% RECOVERY	E14157	0

Sample Size	Customer ID
63B43 ?mL-10mL-.05mL + .100mL Std + .200mL Spike	KE20D

Remarks, Calculations, Results

Spike Cup 77B43

SAMPLE SPIKED ID

SPIKE ID

SPIKE VOLUME

COUNT AS uCI/L

$$\frac{(44.8 - 14.1)\left(\frac{10}{.1} / \frac{11}{.05}\right)(100)}{130.5} = 108.0\%$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-11-93	1530	

SX-6800-001 (R-10-93)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

				CHK EXT NO.
Serial No.	Date Counted	11/13/93	Pu 236 AEA Frac. (C236)	0.551
J1287-5981	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.04
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.394
2094	Tracer Volume in mL (SPKV)	0.2	Total AT Counts	9663
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	1
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	82.26
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	5.96
Date	Pu-236 Decay Corr'd Value	3157.99	Pu 239 Counts	58.85
11/11/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * le to the power of {(-ln2 * Decay Time) / 1040.95 }

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	4.48E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	4.48E-02
Relative Counting Error	=	0.8%
Pu-238 µCi/mL	=	< 3.54E-03
Relative Counting Error	=	1.9%
Pu 236 Tracer Recovery	=	56.0%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	5.68E-03	Pu 238	=	3.54E-03

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	November 18, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-057 REV 0

#2 11-11-93

J1287-5981

9663/30 -1

BEST AVAILABLE COPY

Tim Bucher
11-13-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
J-1305-5581
File ID: 2a2386.CNF

WHC-SD-WM-DP-057 REV 0

Counted on: 11/13/93 @10:58
Detector: AEA2
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	416.9	416.9	360.566	360.566	20.000	15.398	10.000	6.674
2	13.0	13.0	265.810	265.804	22.000	23.022	11.000	9.317
3	422.7	422.7	230.498	230.493	16.000	11.286	8.000	1.996

PEAK RESULTS
Peak Error Limit: 25%

Peak	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
	Cm243	0.494	5.786	5.780	0.006	0.07	18.11	2.1	217.2	0.978E-04
	Cm244		5.796	5.780	0.016				158.6	0.714E-04
2	Th228	0.127	5.430	5.334	0.096	0.11	4.66	4.1	57.5	0.259E-04
	Am243		5.276	5.334	-.058				41.2	0.186E-04
3	Pu239	0.446	5.143	5.168	-.025	0.05	16.36	2.5	143.2	0.645E-04
	Pu240		5.144	5.168	-.024				143.2	0.645E-04
Totals:		1.067	<--valid peaks only-->				39.12			

BEST AVAILABLE COPY

DETECTOR CALIBRATION
Energy(MEV) = 4.085 + (0.0047)*Channel
Energy range (MeV): 4.085 TO 6.491
Efficiency = 0.1142 CPM/DPM

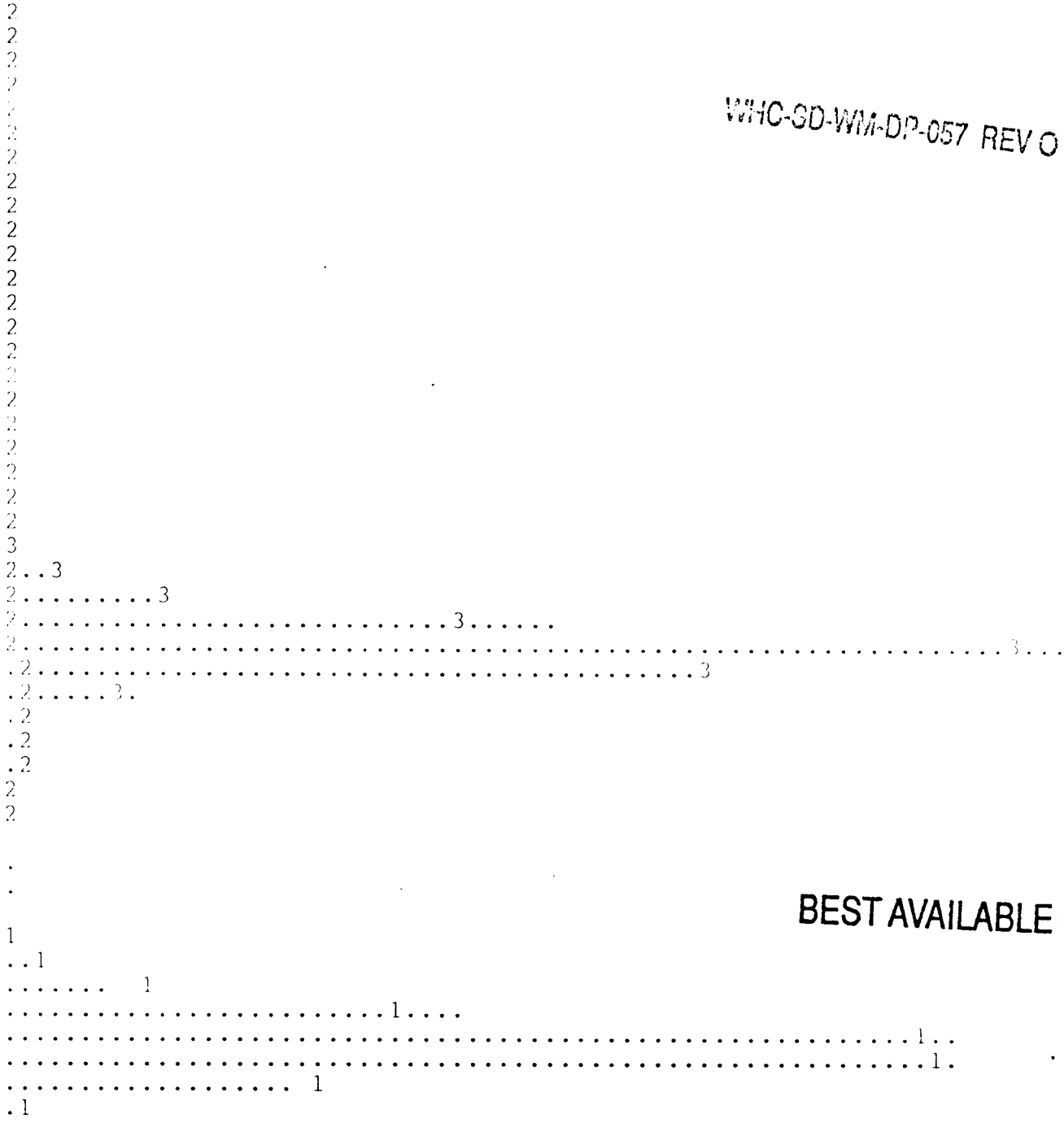
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	17609.0	100.000
Smoothed	17609.3	100.002
Composite fit	18781.2	106.657
Residuals	-1172.2	-6.657

Analyzed by: _____
DM

Spectrum 2a2386.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 3219.9



WHC-SD-WM-DP-057 REV 0

BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 2a2386.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
21	0.	0.	0.	1.	2.	0.	0.	0.	1.	0.
31	1.	0.	2.	0.	0.	1.	1.	2.	0.	1.
[illegible]	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.
51	0.	1.	0.	0.	1.	0.	1.	0.	0.	1.
61	0.	1.	2.	1.	0.	0.	0.	0.	0.	1.
71	0.	1.	0.	1.	1.	2.	1.	0.	0.	1.
81	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
91	1.	0.	0.	1.	1.	0.	0.	0.	2.	1.
101	0.	1.	0.	0.	0.	2.	0.	0.	0.	0.
111	1.	0.	0.	0.	1.	1.	1.	0.	2.	0.
121	0.	2.	0.	2.	1.	0.	1.	0.	0.	1.
131	0.	1.	0.	1.	0.	0.	2.	0.	0.	2.
141	1.	1.	2.	1.	2.	0.	0.	1.	2.	2.
151	2.	1.	5.	1.	1.	1.	0.	1.	1.	2.
161	2.	1.	3.	3.	2.	0.	0.	2.	3.	3.
171	6.	1.	3.	2.	2.	4.	6.	5.	3.	4.
181	3.	1.	0.	2.	2.	3.	6.	3.	7.	8.
191	8.	3.	8.	4.	4.	4.	9.	11.	9.	10.
201	12.	11.	10.	19.	25.	24.	26.	26.	45.	15.
211	43.	64.	69.	84.	105.	118.	128.	179.	181.	[illegible]
221	223.	274.	295.	325.	429.	396.	394.	430.	455.	[illegible]
231	444.	482.	379.	377.	295.	259.	210.	173.	115.	[illegible]
241	74.	52.	39.	29.	18.	14.	6.	7.	10.	[illegible]
251	7.	2.	8.	10.	7.	8.	13.	6.	10.	[illegible]
261	12.	13.	15.	12.	13.	13.	15.	12.	9.	[illegible]
271	11.	13.	6.	7.	6.	6.	4.	3.	1.	[illegible]
281	0.	3.	2.	4.	3.	3.	4.	1.	5.	[illegible]
291	2.	2.	7.	9.	5.	7.	2.	6.	9.	[illegible]
301	5.	9.	9.	3.	7.	8.	6.	1.	[illegible]	[illegible]
[illegible]	8.	9.	9.	6.	3.	3.	1.	8.	4.	[illegible]
[illegible]	3.	12.	8.	8.	16.	6.	9.	6.	10.	[illegible]
331	7.	13.	14.	18.	18.	27.	19.	27.	33.	36.
341	47.	57.	77.	81.	106.	139.	137.	167.	249.	211.
351	244.	277.	320.	296.	345.	401.	419.	407.	451.	[illegible]
361	429.	435.	393.	377.	357.	361.	272.	196.	175.	133.
371	93.	78.	42.	34.	22.	21.	10.	6.	2.	[illegible]
381	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	1.	0.	0.	0.	0.	[illegible]
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	1.	0.	0.	0.	2.	1.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	1.	0.	2.	0.	0.	0.
461	0.	0.	1.	0.	0.	0.	2.	0.	1.	0.
471	4.	1.	1.	1.	1.	3.	0.	2.	1.	1.
481	0.	0.	3.	1.	0.	2.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

Eric Barelo
11-13-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT **WHC-SD-WM-DP-057 REV 0**

SAMPLE
J-1306-5681
File ID: 4a4960.CNF

Counted on: 11/13/93 @10:59
Detector: AEA4
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tail Initial	Tail Final
1	227.2	227.2	364.254	364.254	12.000	3.551	6.000	1.693
2	15.6	15.6	267.520	267.520	14.000	4.970	7.000	1.959

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Counts	Peak Centroid Exp.	Peak Centroid Lib.	Peak Centroid Diff.	Count Rate CPM	Peak Area	Peak Height	Peak Fwhm
1	Pu239	5.894	5.266	5.259	-.0070.02	0.12	[illegible]	[illegible]	[illegible]
2	Am243	0.071	5.276	5.314	-.0380.02	0.50	12.6	7.3	0.327e-05
Totals:		0.978	<--valid peaks only-->			6.62			

BEST AVAILABLE COPY

DETECTOR CALIBRATION
Energy(MEV) = 4.084 + (0.0046)*Channel
Energy range (MeV): 4.084 TO 6.439
Efficiency = 0.0697 CPM/DPM

TOTAL COUNT DATA:

Item	Total	Recovery
Raw spectrum	3247.0	100.000
Smoothed	3247.0	100.000
Composite fit	3177.0	97.844
Residuals	70.0	2.156

Analyzed by: _____
DM

Spectrum 4a4960.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 1483.3

WHC-SD-WM-DP-057 REV O

2
..2
....2
2

BEST AVAILABLE COPY

1
.. 1
.....1
.....1
.....1
.....1..

Raw Data Dump for AEA Spectrum: 4a4960.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
21	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
51	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
91	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
101	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.
111	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
141	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.
151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
161	0.	0.	0.	0.	1.	0.	0.	1.	0.	0.
171	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
181	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.
191	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.
201	0.	0.	1.	1.	0.	1.	1.	0.	0.	[illegible]
211	2.	0.	0.	0.	0.	1.	0.	0.	0.	1.
221	1.	1.	1.	2.	0.	3.	3.	2.	3.	2.
231	0.	0.	4.	1.	3.	0.	2.	0.	0.	1.
241	0.	0.	1.	2.	0.	2.	1.	0.	4.	4.
251	3.	2.	4.	4.	6.	9.	6.	10.	14.	3.
261	6.	8.	10.	8.	10.	21.	20.	15.	20.	10.
271	12.	7.	1.	5.	1.	0.	0.	0.	1.	1.
281	1.	2.	0.	5.	0.	1.	0.	3.	1.	3.
291	1.	2.	6.	2.	0.	1.	0.	2.	1.	[illegible]
301	0.	0.	0.	0.	1.	1.	0.	[illegible]	[illegible]	[illegible]
311	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]	[illegible]
321	1.	0.	0.	1.	0.	0.	0.	[illegible]	[illegible]	[illegible]
331	2.	2.	1.	2.	1.	1.	1.	[illegible]	[illegible]	[illegible]
341	6.	7.	10.	10.	10.	20.	23.	39.	51.	[illegible]
351	55.	69.	93.	112.	123.	111.	91.	96.	92.	116.
361	139.	208.	253.	275.	288.	207.	164.	100.	54.	14.
371	4.	1.	1.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
431	0.	0.	1.	0.	0.	0.	0.	0.	0.	[illegible]
441	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
471	0.	1.	0.	1.	0.	1.	0.	1.	0.	1.
481	0.	0.	3.	0.	1.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

Em Barnes
11-13-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

SAMPLE
J-1287-5781
File ID: 9a1366.CNF

Counted on: 11/13/93 @11: 2
Detector: AEA9
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	256.8	256.8	365.330	365.330	10.000	2.583	[illegible]	[illegible]
2	32.0	32.0	307.101	307.102	10.000	3.377	[illegible]	[illegible]
3	21.9	21.9	269.604	269.602	9.000	[illegible]	[illegible]	[illegible]
4	8.5	8.5	256.356	256.404	8.000	1.363	[illegible]	[illegible]
5	163.9	163.9	233.027	233.021	12.000	3.541	[illegible]	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err 095	d/m	Activity Curies
1	Pu236	0.607	5.756	5.772	-.0160	0.01	7.89	3.2	[illegible]	[illegible]
	Cm243		5.786	5.772	0.014				75.2	[illegible]
2	Pu238	0.049	5.499	5.504	-.0050	0.01	0.64	11.2	6.2	[illegible]
	Am241		5.480	5.504	-.021				1.9	[illegible]
3		0.031		5.327		0.01	0.40	14.2	[illegible]	[illegible]
4	Am243	0.016	5.276	5.271	0.0050	0.01	0.20	23.8	1.1	[illegible]
5	Pu239	0.266	5.143	5.163	-.0200	0.02	3.46	4.8	24.3	0.109E-[illegible]
	Pu240		5.144	5.163	-.019				24.3	0.109E-04
Totals:		0.969	<--valid peaks only-->				12.59			

BEST AVAILABLE COPY

DETECTOR CALIBRATION
Energy(MEV) = 4.091 + (0.0046)*Channel
Energy range (MeV): 4.091 TO 6.417
Efficiency = 0.1426 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	6235.0	100.000
Smoothed	6235.0	100.000
Composite fit	6043.7	96.932
Residuals	191.3	3.068

Analyzed by: _____
DM

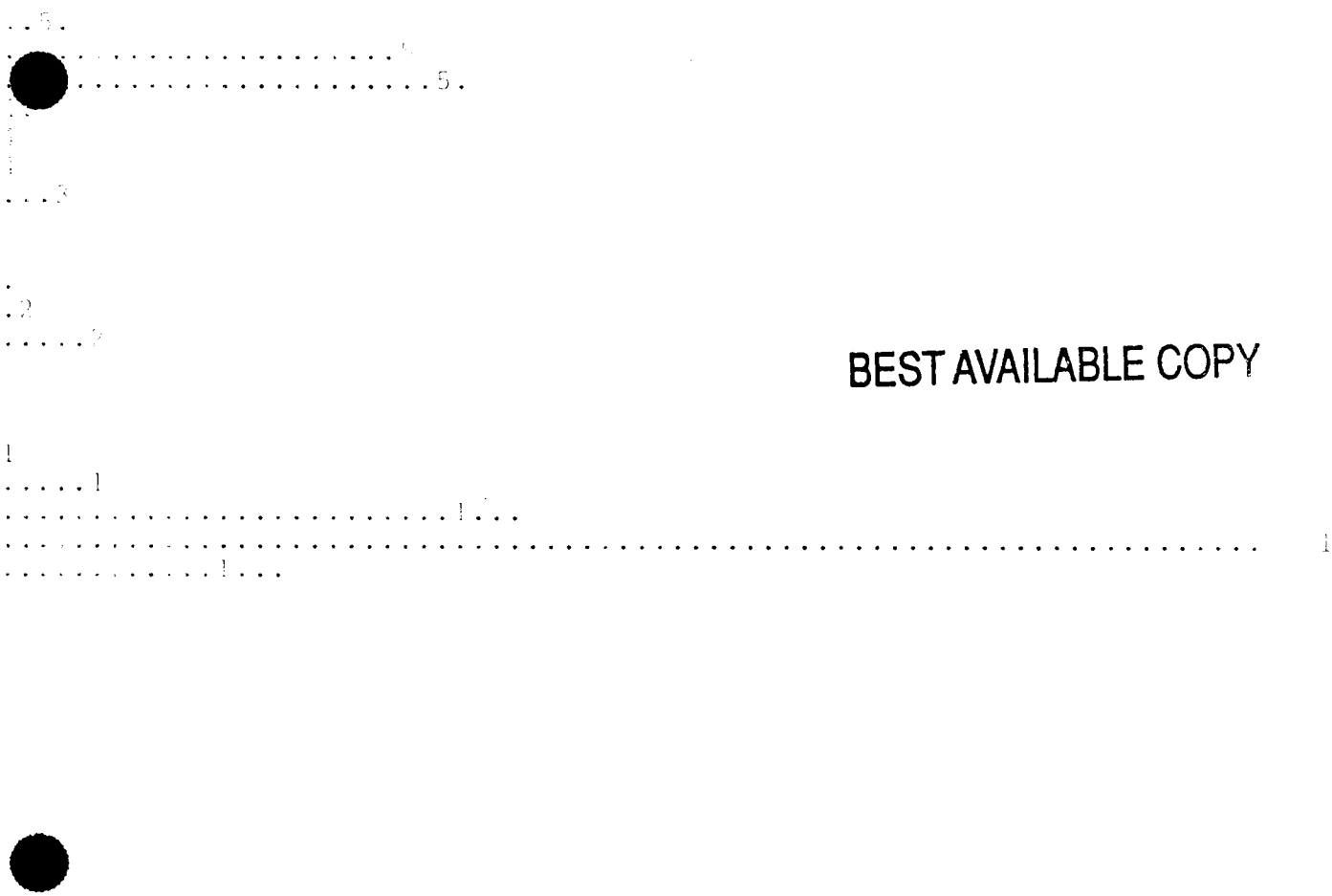
WHC-SD-WM-DP-057 REV O

BEST AVAILABLE COPY

Spectrum 9a1366.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 2156.7

WHC-SD-WM-DP-057 REV O



BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 9a1366.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	1.	1.	1.	1.	0.	1.	1.
21	2.	1.	0.	0.	0.	0.	1.	1.	2.	1.
31	4.	1.	0.	1.	0.	0.	0.	0.	0.	0.
41	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
71	0.	2.	1.	0.	0.	0.	0.	0.	0.	[illegible]
81	[illegible]	0.	0.	1.	[illegible]	0.	1.	0.	[illegible]	[illegible]
91	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
101	[illegible]	0.	[illegible]	0.	[illegible]	0.	0.	1.	[illegible]	[illegible]
111	0.	0.	0.	0.	0.	0.	1.	0.	[illegible]	[illegible]
121	0.	0.	1.	0.	0.	0.	1.	0.	0.	0.
131	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.
141	0.	0.	1.	1.	0.	0.	1.	2.	2.	2.
151	1.	3.	2.	1.	1.	0.	0.	2.	0.	1.
161	0.	0.	0.	0.	0.	0.	0.	1.	1.	2.
171	2.	0.	0.	1.	0.	1.	0.	0.	0.	1.
181	1.	0.	1.	0.	0.	0.	1.	1.	0.	0.
191	0.	0.	1.	1.	0.	1.	0.	1.	[illegible]	[illegible]
201	1.	1.	0.	0.	2.	3.	0.	3.	[illegible]	[illegible]
211	[illegible]	[illegible]	[illegible]	0.	[illegible]	[illegible]	1.	10.	[illegible]	[illegible]
221	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
231	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
241	1.	0.	[illegible]	1.	[illegible]	0.	0.	0.	[illegible]	0.
251	1.	3.	8.	7.	7.	10.	17.	8.	8.	3.
261	5.	3.	5.	13.	10.	17.	17.	26.	32.	23.
271	12.	6.	1.	1.	0.	0.	1.	0.	0.	0.
281	1.	2.	0.	0.	1.	0.	7.	3.	2.	5.
291	1.	4.	1.	5.	7.	4.	13.	4.	[illegible]	[illegible]
301	[illegible]	12.	[illegible]	13.	[illegible]	31.	10.	[illegible]	[illegible]	[illegible]
311	[illegible]	3.	[illegible]	1.	1.	0.	0.	1.	[illegible]	[illegible]
321	0.	0.	[illegible]	2.	[illegible]	0.	[illegible]	[illegible]	[illegible]	[illegible]
331	0.	1.	[illegible]	1.	7.	[illegible]	1.	[illegible]	[illegible]	[illegible]
341	[illegible]	2.	13.	5.	19.	12.	[illegible]	21.	[illegible]	[illegible]
351	37.	47.	88.	96.	157.	161.	159.	123.	[illegible]	[illegible]
361	125.	205.	281.	361.	471.	460.	356.	197.	[illegible]	[illegible]
371	10.	1.	1.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	1.	0.	0.	0.	[illegible]
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
451	0.	0.	0.	0.	1.	0.	0.	0.	0.	[illegible]
461	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
471	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.
481	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

Eric Douglas
11-13-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV 0

SAMPLE
[illegible]
File [illegible]: [illegible]

Counted on: 11/13/93 @11: 2
Detector: AEA8
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Final	Peak center Initial	Final	FWHM Initial	Final	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
3	16.1	16.1	[illegible]	[illegible]	[illegible]	[illegible]		
3	31.9	31.9	266.117	266.112	14.000	5.355	[illegible]	[illegible]
4	89.7	89.7	231.836	231.824	14.000	5.756	7.000	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

	Nuclide	MeV	Peak Centroid Exp.	Lib.	Diff.	Count FWHM	Rate	Err %	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Cm242		5.786	5.780	[illegible]					
2	Pu238	0.059	5.199	5.517	-.0180.02		0.59	11.4	[illegible]	[illegible]
	Am241		5.120	5.517	-.037				[illegible]	[illegible]
3		0.091		5.333	0.02		0.91	9.6	8.1	0.360E-[illegible]
4	Pu239	0.254	5.143	5.175	-.0320.03		2.56	5.6	22.8	0.103E-0[illegible]
	Pu240		5.144	5.175	-.031				22.8	0.103E-0[illegible]
		---					---			
Totals:		0.968	<--valid peaks only-->				9.75			

BEST AVAILABLE COPY

DET-STOP CALIBRATION
Energy(MeV) = 1.109 + (0.0046)*Channel
Energy range (MeV): 1.109 TO 6.164
Efficiency = 0.1123 CPM/DPM

TOTAL COUNT DATA:

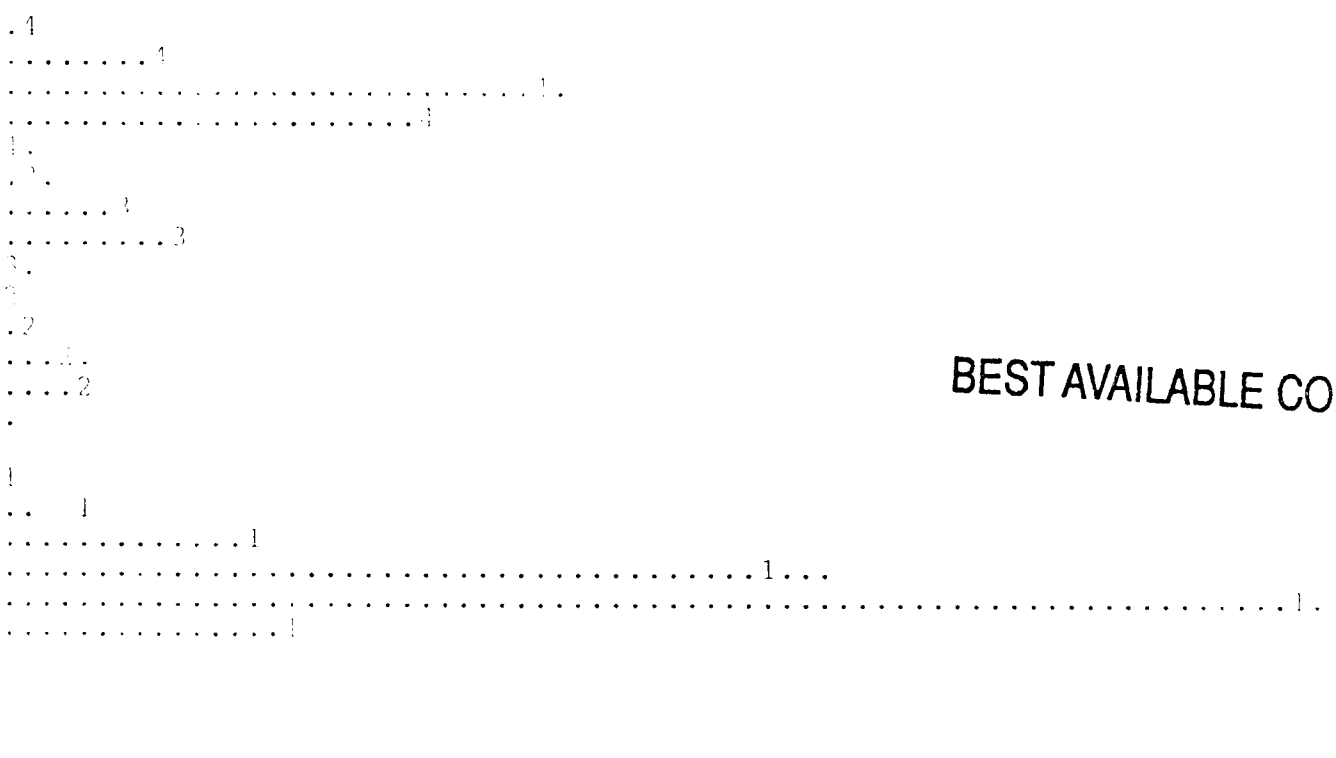
Item	Total	% Recovery
Raw spectrum	4833.0	100.000
Smoothed	4833.0	100.000
Composite fit	4679.8	96.829
Residuals	153.2	3.171

Analyzed by:
[illegible]

Spectrum 8a8543.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 1275.5

WHC-SD-WM-DP-057 REV O



BEST AVAILABLE COPY

Raw Data Dump for ASA Spectrum: Sa8543.CNF

1	[illegible]	0.	[illegible]	0.	[illegible]	0.	0.	0.	[illegible]	[illegible]
11	[illegible]	0.	0.	0.	[illegible]	0.	1.	1.	[illegible]	[illegible]
21	1.	1.	0.	3.	2.	3.	1.	2.	1.	[illegible]
31	2.	1.	1.	0.	0.	0.	1.	1.	0.	[illegible]
[illegible]	1.	1.	0.	1.	0.	1.	0.	0.	0.	0.
51	2.	2.	0.	0.	0.	1.	0.	0.	0.	1.
61	0.	0.	0.	0.	1.	0.	1.	0.	0.	1.
71	0.	0.	1.	0.	2.	1.	1.	0.	2.	0.
81	1.	[illegible]	[illegible]	1.	1.	0.	1.	0.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	2.	0.	0.	[illegible]	1.	[illegible]	1.
101	[illegible]	[illegible]	0.	2.	[illegible]	2.	0.	0.	[illegible]	[illegible]
111	1.	0.	1.	2.	1.	[illegible]	[illegible]	1.	[illegible]	[illegible]
121	1.	1.	0.	0.	0.	3.	2.	1.	[illegible]	[illegible]
131	0.	0.	3.	5.	1.	0.	2.	2.	[illegible]	
141	1.	1.	2.	0.	1.	1.	3.	4.	2.	[illegible]
151	4.	2.	1.	1.	1.	0.	2.	0.	0.	0.
161	0.	1.	4.	0.	0.	1.	1.	3.	2.	1.
171	2.	1.	1.	1.	4.	2.	2.	3.	0.	1.
181	1.	2.	0.	1.	2.	2.	0.	2.	1.	0.
191	6.	2.	1.	0.	2.	0.	2.	0.	2.	1.
201	3.	2.	0.	2.	3.	7.	1.	2.	2.	1.
211	2.	5.	1.	8.	11.	9.	14.	12.	19.	13.
[illegible]	[illegible]	[illegible]	[illegible]	11.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	11.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
261	12.	13.	29.	33.	31.	37.	38.	25.	[illegible]	[illegible]
271	12.	12.	9.	1.	2.	2.	0.	1.	1.	0.
281	0.	1.	1.	2.	2.	2.	2.	2.	3.	3.
291	3.	7.	7.	6.	3.	14.	10.	8.	12.	17.
301	11.	[illegible]	15.	10.	19.	16.	23.	10.	16.	[illegible]
[illegible]	7.	2.	0.	2.	4.	3.	1.	0.	[illegible]	[illegible]
[illegible]	1.	0.	0.	0.	1.	2.	1.	2.	[illegible]	[illegible]
331	2.	1.	1.	0.	2.	3.	4.	1.	[illegible]	[illegible]
341	[illegible]	9.	3.	10.	11.	21.	11.	31.	[illegible]	[illegible]
[illegible]	56.	64.	[illegible]	86.	[illegible]	97.	115.	109.	[illegible]	[illegible]
[illegible]	267.	131.	211.	167.	[illegible]	139.	115.	[illegible]		
[illegible]	13.	[illegible]	[illegible]	1.	[illegible]	1.	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	0.	[illegible]	0.	[illegible]	0.	[illegible]	0.	[illegible]	[illegible]
391	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.
421	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
431	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	1.	1.	0.	1.	[illegible]
481	1.	0.	0.	0.	[illegible]	1.	1.	0.	[illegible]	[illegible]
491	0.	0.	0.	1.	1.	0.	0.	1.	[illegible]	[illegible]
501	0.	0.								

BEST AVAILABLE COPY

Eric Barclay
11-13-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

[illegible]
[illegible] - 7[illegible] TEIP
File ID: 7a7329.CNF

Counted on: 11/13/93 @11: 1
Detector: AEA7
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	[illegible]	[illegible]
1	[illegible]	137.7	363.313	363.343	16.000	7.016	8.000	[illegible]
[illegible]	[illegible]	19.3	305.943	305.922	10.000	5.321	5.000	[illegible]
3	25.0	25.0	266.933	266.933	16.000	5.990	8.000	[illegible]
4	70.0	70.0	231.748	231.722	14.000	7.023	7.000	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AOA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	[illegible]	[illegible]	[illegible]
1	Cm243	[illegible]	5.796	5.804	-.008	0.03	4.34	[illegible]	[illegible]	[illegible]
	Cm242		5.786	5.804	-.018				50.7	0.223E-[illegible]
2	Pu238	0.055	5.499	5.534	-.035	0.03	0.43	13.8	5.1	0.228E-05
3		0.107		5.351		0.03	0.83	10.1	7.1	0.319E-05
4	Pu239	0.258	5.143	5.185	-.042	0.03	2.01	6.4	17.1	0.772E-05
	Pu240		5.144	5.185	-.041				17.1	0.773E-05
Totals:		0.977	<--valid peaks only-->				7.61			

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DETECTOR CALIBRATION
Energy(MEV) = 4.096 + (0.0017)*Channel
Energy range (MeV): 4.096 TO 6.503
Efficiency = 0.1173 CPM/DPM

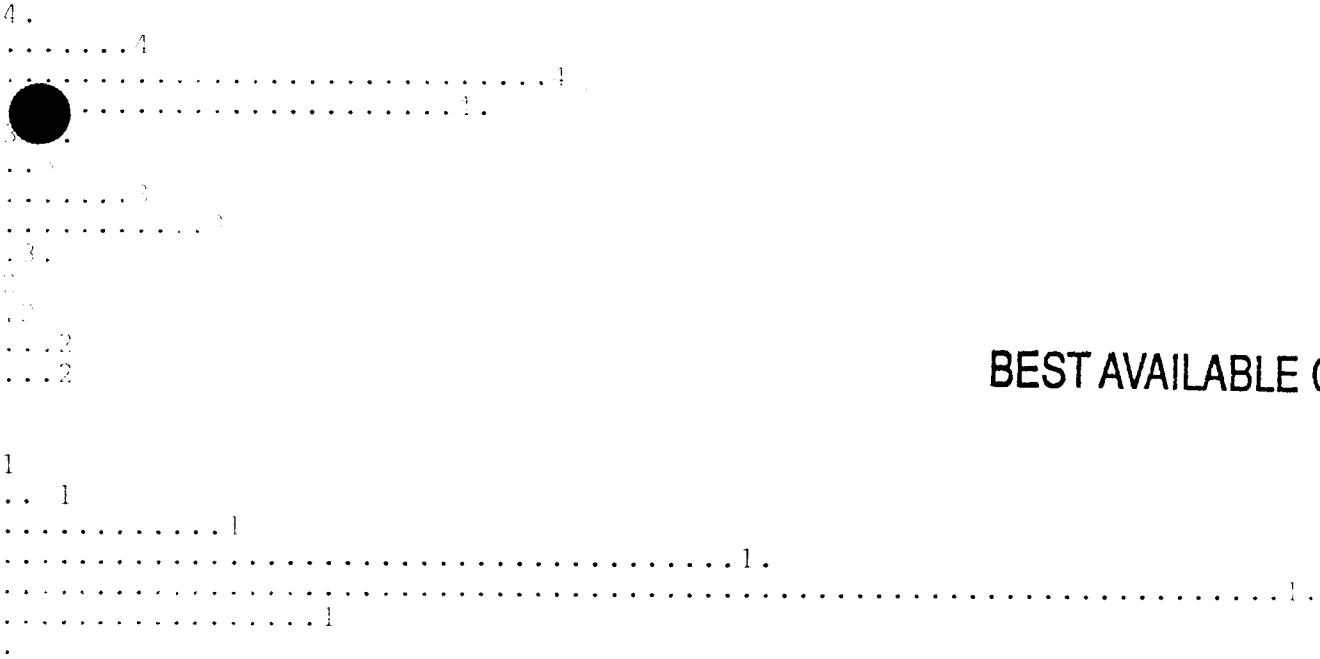
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	3739.0	100.000
Smoothed	3739.0	100.000
Composite fit	3653.2	97.705
Residuals	85.8	2.295

Analyzed by: _____
DM

Spectrum 7a7329.CNF

! Legend. - Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 981.3



BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 7a7329.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
21	1.	2.	0.	1.	1.	3.	0.	1.	1.	1.
31	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
61	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.
71	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
81	0.	1.	0.	2.	1.	0.	1.	0.	0.	
91	0.	1.	1.	0.	0.	0.	1.	0.	0.	
101	0.	0.	1.	0.	1.	1.	1.	0.	1.	
111	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.
121	2.	0.	0.	1.	0.	0.	0.	0.	0.	1.
131	1.	0.	1.	1.	0.	1.	2.	1.	0.	1.
141	0.	0.	1.	1.	1.	2.	0.	1.	3.	3.
151	1.	0.	3.	1.	4.	0.	0.	0.	2.	1.
161	0.	0.	0.	0.	1.	0.	1.	0.	0.	1.
171	0.	2.	1.	1.	0.	1.	0.	0.	1.	1.
181	0.	1.	0.	0.	0.	0.	0.	1.	0.	1.
191	0.	0.	1.	2.	1.	4.	1.	1.	1.	0.
201	0.	1.	1.	4.	0.	2.	2.	4.	0.	0.
211	0.	0.	0.	3.	0.	0.	5.	7.	0.	0.
221	14.	19.	22.	20.	25.	19.	17.	19.		
231	5.	45.	5.	44.	61.	19.	41.	25.		
241	11.	4.	2.	4.	0.	0.	0.	1.		
251	1.	2.	15.	13.	10.	4.	13.	8.	13.	16.
261	14.	20.	25.	21.	20.	34.	27.	23.	27.	20.
271	15.	13.	6.	7.	5.	1.	1.	2.	2.	2.
281	0.	0.	3.	3.	2.	1.	2.	5.	3.	4.
291	0.	8.	6.	6.	5.	6.	5.	6.	5.	7.
301	0.	0.	10.	10.	11.	8.	15.	6.	11.	5.
311	0.	0.	0.	1.	0.	0.	0.	2.	0.	0.
321	1.	0.	0.	2.	1.	1.	1.	0.	0.	
331	2.	0.	2.	1.	0.	1.	2.	0.		
341	6.	3.	5.	5.	10.	9.	11.	17.	0.	0.
351	19.	49.	50.	59.	71.	72.	87.	73.	92.	110.
361	129.	163.	158.	156.	129.	117.	112.	95.	50.	21.
371	24.	12.	8.	3.	1.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.
481	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	7.	0.								

BEST AVAILABLE COPY

Gal Barker
11-13-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

[illegible]

File ID: 5a5882.CHF

Counted on: 11/13/93 @11: 0
Detector: AEA5
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	[illegible]	[illegible]
1	1475.5	1174.8	356.506	356.566	22.000	18.675	11.000	[illegible]
[illegible]	68.0	[illegible]	297.543	297.001	22.000	13.967	13.000	[illegible]
3	1052.1	1052.1	225.004	224.995	22.000	18.016	11.000	5.856

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	Frac	Exp.	Obs.	Diff.	FWHM	Rate (cpm)	[illegible]	[illegible]	[illegible]
	Cm243	0.566	5.786	5.756	0.030	0.29	1.20	[illegible]	[illegible]	[illegible]
	Pu236		5.756	5.750	0.006				[illegible]	
2	Am241	0.033	5.480	5.476	0.004	0.06	1.40	[illegible]	[illegible]	[illegible]
	Pu238		5.499	5.476	0.023				44.9	0.202E-03
3	Pu239	0.392	5.143	5.145	-.002	0.08	52.69	1.2	386.9	0.174E-03
	Pu240		5.144	5.145	-.001				386.9	0.174E-03
		---					---			
Totals:		0.990	<--valid peaks only-->				133.29			

BEST AVAILABLE COPY

DETECTOR CALIBRATION
Energy(MEV) = 4.110 + (0.0046)*Channel
Energy Range (MeV): 1.110 TO 6.1[illegible]
Efficiency = 0.1365 CPM/DPM

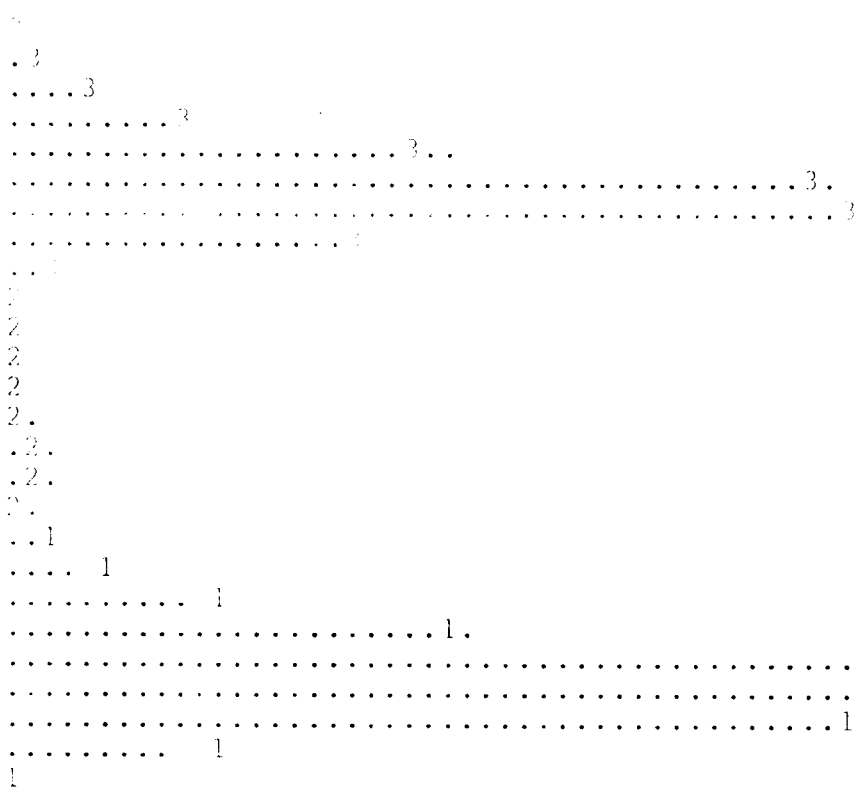
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	64606.0	100.000
Smoothed	64606.0	100.000
Composite fit	63988.3	99.044
Residuals	617.7	0.956

Analyzed by:
[illegible]

Spectrum 5a5882.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 11379.8



BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 5a5882.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	1.	3.	2.
21	4.	3.	0.	5.	2.	2.	3.	0.	3.	2.
31	3.	4.	1.	5.	2.	4.	4.	4.	2.	2.
[illegible]	1.	0.	3.	0.	2.	5.	2.	1.	2.	1.
[illegible]	1.	3.	2.	2.	3.	2.	3.	4.	3.	0.
61	4.	2.	1.	1.	7.	4.	1.	6.	1.	3.
71	2.	4.	2.	1.	4.	3.	3.	3.	1.	0.
[illegible]	[illegible]	[illegible]	[illegible]	2.	1.	2.	3.	3.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
101	1.	[illegible]	2.	[illegible]	1.	4.	[illegible]	[illegible]	[illegible]	[illegible]
111	4.	0.	3.	2.	[illegible]	4.	6.	[illegible]	[illegible]	[illegible]
121	3.	9.	7.	3.	2.	2.	1.	3.	[illegible]	[illegible]
131	7.	6.	6.	6.	7.	3.	3.	7.	5.	5.
141	8.	7.	4.	8.	7.	9.	4.	7.	12.	3.
151	6.	10.	6.	7.	7.	7.	13.	8.	7.	10.
161	9.	8.	12.	9.	12.	15.	10.	16.	16.	15.
171	15.	25.	18.	19.	23.	17.	20.	26.	26.	34.
181	32.	22.	20.	26.	23.	31.	43.	40.	42.	[illegible]
191	[illegible]	65.	[illegible]	74.	81.	95.	105.	118.	117.	[illegible]
201	157.	164.	172.	235.	234.	216.	272.	281.	277.	[illegible]
211	[illegible]	[illegible]	[illegible]	606.	[illegible]	[illegible]	787.	[illegible]	[illegible]	[illegible]
221	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1086.	[illegible]	[illegible]	[illegible]	[illegible]
231	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
241	75.	63.	[illegible]	36.	[illegible]	32.	37.	[illegible]	[illegible]	[illegible]
251	25.	38.	34.	27.	35.	31.	26.	30.	26.	[illegible]
261	25.	19.	23.	17.	24.	18.	22.	25.	16.	18.
271	25.	14.	26.	31.	22.	19.	30.	30.	26.	35.
281	35.	45.	36.	49.	41.	44.	50.	65.	67.	61.
291	59.	50.	69.	62.	72.	91.	92.	79.	80.	75.
[illegible]	[illegible]	78.	61.	71.	50.	55.	55.	45.	27.	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	42.	54.	56.	39.	64.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	71.	85.	88.	99.	118.	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	262.	[illegible]	289.	327.	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	751.	[illegible]	[illegible]	1113.	[illegible]	[illegible]	[illegible]
351	1365.	1368.	1448.	1427.	[illegible]	1583.	[illegible]	[illegible]	[illegible]	[illegible]
361	1245.	1190.	1033.	899.	778.	594.	491.	[illegible]	301.	[illegible]
371	137.	104.	72.	53.	28.	24.	18.	10.	2.	2.
381	0.	1.	0.	0.	1.	0.	0.	0.	0.	0.
391	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.
401	1.	0.	0.	0.	0.	0.	0.	0.	1.	0.
411	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
421	0.	1.	0.	0.	1.	0.	1.	1.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	1.	0.	0.	0.	0.	0.	[illegible]	[illegible]
451	0.	0.	0.	0.	1.	1.	1.	1.	[illegible]	[illegible]
461	0.	0.	2.	2.	2.	3.	1.	2.	[illegible]	[illegible]
471	2.	[illegible]	4.	2.	1.	3.	4.	0.	[illegible]	[illegible]
481	2.	1.	2.	1.	3.	2.	1.	0.	[illegible]	[illegible]
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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Eric Burrell
11-13-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

SAMPLE
[illegible] SPIK
File ID: [illegible].CEL

Counted on: 11/13/93 @11: 0
Detector: AEA6
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4?	23.9	23.9	263.633	263.633	20.000	0.623	[illegible]	[illegible]
5	1195.1	1195.1	225.837	225.831	22.000	19.373	11.000	7.20[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Fmc	Peak Centroid Exp.	Peak Centroid Obs.	Diff.	FWHM	Count Rate c/m	%err		Activity
1		????		5.432			0.19	52.4		
2	Cm243	0.551	5.796	5.791	-.0050	0.13	92.26	1.5	[illegible]	[illegible]
	Cm244		5.796	5.791	0.005				641.2	[illegible]
3	Am241	0.040	5.400	5.500	-.0200	0.13	5.96	4.1	19.4	0.[illegible]E-0[illegible]
	Pu238		5.499	5.500	-.001				64.5	0.291E-01
4		????		5.341			0.19	52.4		
5	Pu239	0.394	5.143	5.163	-.0200	0.09	58.85	1.2	458.7	0.207E-03
	Pu240		5.144	5.163	-.019				458.7	0.207E-03
Totals:		0.985	<--valid peaks only-->				147.07			

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DETECTOR CALIBRATION
Energy(MEV) = 4.102 + (0.0047)*Channel
Energy range (MeV): 1.102 TO 6.508
Efficiency = 0.1283 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	71637.0	100.000
Smoothed	71641.0	100.006
Composite fit	70758.7	98.774
Residuals	878.3	1.226

Analyzed by: _____
DM

WHC-SD-WM-DP-057 REV O

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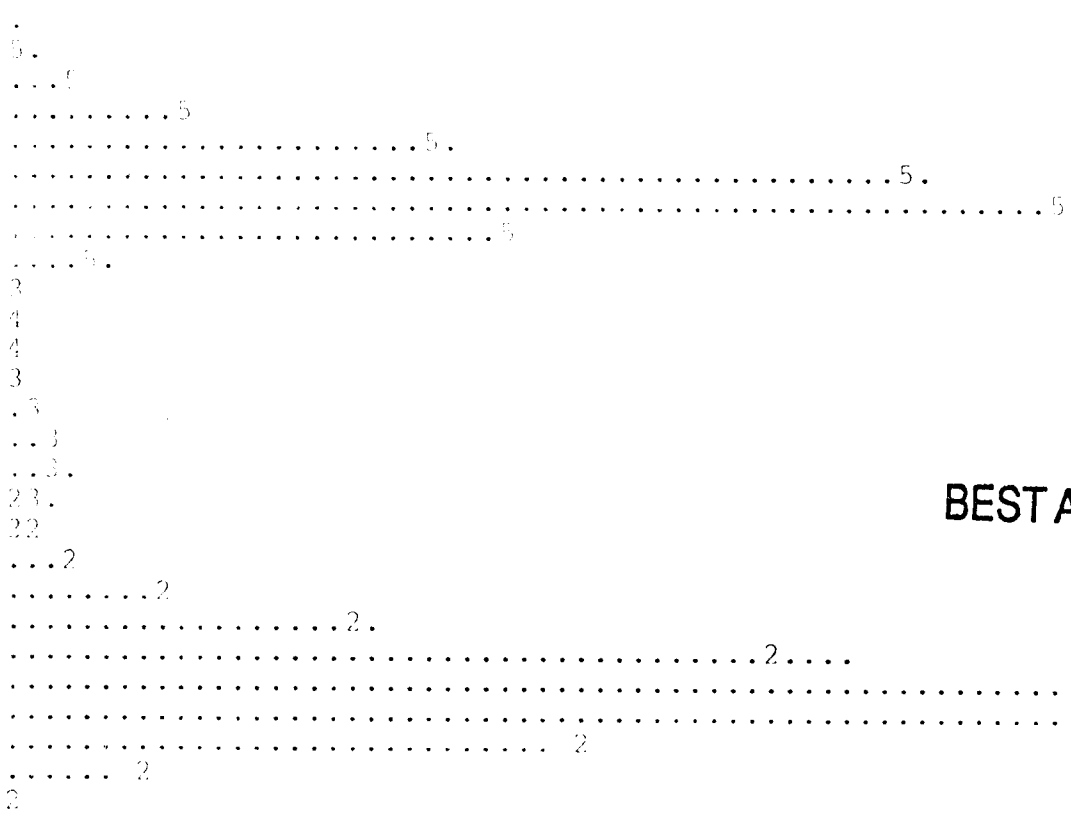
Spectrum 6a6792.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 10932.7

WHC-SD-WM-DP-057 REV O



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Raw Data Dump for AEA Spectrum: 6a6792.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	3.	3.	1.
21	0.	1.	0.	2.	3.	1.	0.	2.	3.	0.
31	1.	2.	4.	0.	2.	4.	0.	4.	2.	1.
[illegible]	3.	3.	0.	0.	5.	3.	2.	0.	3.	2.
[illegible]	0.	2.	1.	4.	1.	1.	2.	1.	5.	2.
61	2.	1.	2.	4.	4.	0.	0.	2.	1.	2.
[illegible]	[illegible]	1.	0.	1.	3.	6.	2.	1.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	2	1.	2.	3.	1.	[illegible]	[illegible]
[illegible]	[illegible]	1.	1.	1.	1.	0.	[illegible]	1.	[illegible]	
101	3.	1.	2.	3.	5.	2.	1.	[illegible]	[illegible]	[illegible]
111	6.	6.	6.	3.	8.	4.	2.	5.	6.	5.
121	1.	6.	6.	5.	8.	9.	3.	3.	8.	9.
131	2.	8.	8.	4.	4.	9.	6.	9.	7.	7.
141	5.	10.	9.	10.	10.	7.	9.	3.	6.	3.
151	10.	8.	7.	13.	11.	10.	13.	14.	13.	15.
161	16.	18.	10.	18.	21.	17.	10.	20.	11.	21.
171	22.	17.	22.	16.	19.	15.	23.	17.	27.	33.
181	25.	27.	25.	36.	43.	36.	38.	39.	36.	32.
[illegible]	[illegible]	[illegible]	[illegible]	53.	[illegible]	69.	85.	[illegible]	[illegible]	[illegible]
201	[illegible]	150.	162.	165.	195.	206.	254.	[illegible]	[illegible]	[illegible]
211	[illegible]	195.	549.	593.	653.	734.	813.	862.	[illegible]	[illegible]
221	1116.	1128.	1152.	1209.	1263.	1290.	1203.	1186.	[illegible]	[illegible]
231	919.	877.	750.	682.	563.	489.	371.	341.	[illegible]	[illegible]
241	[illegible]	132.	96.	73.	48.	38.	59.	36.	[illegible]	[illegible]
251	25.	33.	25.	40.	27.	29.	40.	34.	27.	27.
261	27.	27.	31.	26.	33.	27.	29.	24.	32.	28.
271	21.	25.	38.	32.	25.	26.	29.	45.	45.	43.
281	44.	42.	47.	51.	55.	66.	67.	67.	56.	61.
291	77.	81.	77.	75.	80.	84.	97.	94.	87.	[illegible]
[illegible]	[illegible]	62.	[illegible]	77.	71.	[illegible]	56.	81.	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	14.	[illegible]		
[illegible]	67.	[illegible]	72.	[illegible]	82.	87.	[illegible]	[illegible]		
321	[illegible]	189.	[illegible]	189.	211.	252.	287.	[illegible]	[illegible]	
331	433.	496.	550.	635.	632.	731.	843.	954.	1005.	[illegible]
351	1172.	1210.	1304.	1356.	1366.	1516.	1415.	1522.	1489.	1410.
361	1466.	1364.	1432.	1275.	1204.	1124.	1034.	880.	802.	695.
371	586.	510.	400.	367.	275.	211.	190.	154.	85.	84.
381	59.	32.	26.	18.	13.	3.	8.	5.	1.	1.
391	3.	1.	0.	1.	0.	0.	0.	2.	1.	1.
401	0.	0.	0.	0.	0.	0.	0.	0.	1.	[illegible]
411	0.	0.	1.	0.	1.	0.	1.	1.	2.	[illegible]
421	0.	0.	1.	1.	2.	1.	1.	1.	[illegible]	[illegible]
431	1.	2.	0.	0.	1.	2.	1.	1.	[illegible]	[illegible]
441	1.	2.	0.	0.	1.	3.	0.	0.	[illegible]	[illegible]
451	0.	1.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
461	1.	1.	4.	2.	0.	1.	4.	2.	0.	5.
471	7.	3.	7.	7.	4.	0.	3.	1.	0.	0.
481	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.
491	0.	3.	3.	6.	16.	28.	16.	4.	0.	0.
511	0.	0.								

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WHC-SD-WM-DP-057 REV 0

WESTINGHOUSE HANFORD COMPANY Batch 2097

222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No. J1289 - 5781	Customer ID: KE24A
Analysis: Pu239/40	Sample Prep: DIRECT

Instrument: WB537237	Procedure/ Rev: LA-503-156 D-0
Technologist: JOEL M VAN SANT	Date: 11-11-93
Starting Time: 1330	Temperature 25°C
Ending Time: 2020	Chemist: L Fritts

Comments: BLK LEAKER 1 1/2 hr into electroplating

	Description	Lab ID		Description	Lab ID
1	LMCS	J1303.-5581	11		
2	BLANK	J1304.-5681	12		
3	Sample	J1289.-5781	13		
4	Duplicate Sample	J1289.-5781	14		
5	Triplicate Sample	J1289.-5781	15		
6	Spike	J1289.-5981	16		
7	Spike Duplicate	J1289.-5981	17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	63843 .100mL-10	-.100mL		
Spike	77843 .100mL			

A-6000-881 (03/92)

CA

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-503-156

DATE START: November 11, 1993

PREPARED BY: L.L. Fritts LLFritts 11-18-93

DATE COMPLETE: November 18, 1993

	UNITS:	uCi/mL									
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	%REC	DET LIM	% CT ER
STD 63B43	J1303	Pu-239/40	1.37E+2						105.0	1.46E-2	1.0
BLANK	J1304	Pu-239/40	<2.04E-3						3.4	2.04E-3	100.0
KE24A	J1289	Pu-239/40	3.13E-2	3.18E-2	2.80E-2	3.04E-2	4.13E-3	13.6	11.0	3.83E-3	2.4
									18.9	3.66E-3	1.8
									5.0	4.11E-3	3.7
KE24A	J1289	239 Spike	101.0	87.9						4.94E-3	1.4
										4.91E-3	1.2
STD 63B43	J1303	Pu-238	<1.48E-2						N/A	1.48E-2	5.0
BLANK	J1304	Pu-238	<5.80E-2						3.4	5.80E-2	100.0
KE24A	J1289	Pu-238	<1.80E-2	<1.05E-2	<3.97E-2	N/A	N/A	N/A	11.0	1.80E-2	4.2
									18.9	1.05E-2	3.4
									5.0	3.97E-2	5.9

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

The results for the spike are in percent recovery.

Results for the spike and the spike duplicate were recalculated using a tracer volume of 0.1 mL.
J. Van Sant has confirmed this to be the amount added.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#11 3245 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1303.-5581	BECHTOLD	11- 8-93	11:47	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	% RECOVERY	E14157	0

Sample Size	Customer ID
~~25 ml~~ vs .100mL -10-.1mL +.100m Spike	STD

Remarks Calculations Results 77B43

EDP R211 AR001

STD# 63B43 RESULT 137.0

STD VAL. 130.5 %REC 105.0%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-11-93	2020	

54-6800-061 (R 10 83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/12/93	Pu 236 AEA Frac. (C236)	STANDARD 0.491
J1303-5581	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0.011
Batch ID	Sample D.F. (DF)	101	Pu 239 AEA Frac. (C239)	0.467
2097	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	6073
Rerun No.	Digest. D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	5
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	39.68
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0.85
Date	Pu-236 Decay Corr'd Value	3160.09	Pu 239 Counts	37.77
11/11/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * le to the power of {(-ln2 * Decay Time) / 1040.95 }

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / ((C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = {(Total AT Counts / TC) - Bkg * 2 * C238} - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / {(Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS}

Relative Counting Error = Square Root of {(1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)} * 100

Pu-239/240 µCi/L	=	1.37E+02

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	1.37E-01
Relative Counting Error	=	1.0%
Pu-238 µCi/mL	=	< 1.48E-02
Relative Counting Error	=	5.0%
Pu 236 Tracer Recovery	=	61.4%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	1.46E-02	Pu 238	=	1.48E-02

Data Entry by:	C.A. Clark	Date:	16-Nov-93
Approved by:		Date:	November 18, 1993

Form 1 Rev. 1.4

#1 11-11-93

J1303-5581

6073 -5
30

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#12 4232

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1304.-5681	BECHTOLD	11- 8-93	11:48	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
? ~~1mL~~ 1-10-.05 11-18-93 + .100 ml Spike	BLK

Remarks, Calculations, Results

77B43

REAGENT BLANK

COUNT AS uCI/L $<2.04 \times 10^{-3}$ uCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11-11-93			

54-6800-063 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

				BLANK
Serial No.	Date Counted	11/12/93	Pu 236 AEA Frac. (C236)	0.768
J1304-5681	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0
2097	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	301
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	3
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	1.48
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0
Date	Pu-236 Decay Corr'd Value	3160.09	Pu 239 Counts	0
11/11/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * le to the power of {(-ln2 * Decay Time) / 1040.95 }

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = {(Total AT Counts / TC) - Bkg * 2 * C238} - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / {(Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS}

Relative Counting Error = Square Root of {(1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)} * 100

Pu-239/240 µCi/L	=	< 2.04E+00

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	< 2.04E-03
Relative Counting Error	=	100.0%
Pu-238 µCi/mL	=	< 5.80E-02
Relative Counting Error	=	100.0%
Pu 236 Tracer Recovery	=	3.4%

NOTE: Pu 239/240 Reported result is a LESS THAN value using 0.05 for the Pu-239/240 peak height.

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	2.04E-03	Pu 238	=	5.80E-02

Data Entry by:	CA Clark	Date:	16-Nov-93
Approved by:		Date:	November 18, 1993

#3 11-11-93

J1304-5681

301/30 -3

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#9 1361 ~~WHC-SD-WM-DP-057 REV 0~~

Serial No	Sample Point	Date	Time Issued	Priority
J 1289.-5781	BECHTOLD	11- 4-93	8:53	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
? 1mL-10-.05mL + .100mL Spike	KE24A

Remarks, Calculations, Results

COUNT AS uCI/L Sample 77B43

3.13×10^{-2} uCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit No.	
12-12-93	2020		

54-6800-061 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

				SAMPLE
Serial No.	Date Counted	11/12/93	Pu 236 AEA Frac. (C236)	0.409
J1289-5781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.079
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.409
2097	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	1306
Rerun No.	Digest. D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	1
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	7.3
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	1.4
Date	Pu-236 Decay Corr'd Value	3160.09	Pu 239 Counts	7.29
11/11/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of {(-ln2 * Decay Time) / 1040.95 })

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	3.13E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	3.13E-02
Relative Counting Error	=	2.4%
Pu-238 µCi/mL	=	< 1.80E-02
Relative Counting Error	=	4.2%
Pu 236 Tracer Recovery	=	11.0%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	3.83E-03	Pu 238	=	1.80E-02

Data Entry by:	C.A. Clark	Date:	16-Nov-93
Approved by:		Date:	November 18, 1993

Form 1 Rev. 1.4

#2 11-11-93

J1289-5781

1306
30 -1

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#10 2266 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1289.-5781	BECHTOLD	11- 4-93	9: 2	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
1mL-10-.05mL + .100mL Spike	KE24A

Remarks, Calculations, Results

COUNT AS uCI/L duplicate 77B43

3.18×10^{-2} uCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-12-93	2020	

54-6800-061 (R 10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

				SAMPLE
Serial No	Date Counted	11/12/93	Pu 236 AEA Frac. (C236)	0.428
J1289-5781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.07
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.435
2097	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	2188
Rerun No	Digest. D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	3
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	12.87
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	2.1
Date	Pu-236 Decay Corr'd Value	3160.09	Pu 239 Counts	13.1
11/11/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of {(-ln2 * Decay Time) / 1040.95 })

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	3.18E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	3.18E-02
Relative Counting Error	=	1.8%
Pu-238 µCi/mL	=	< 1.05E-02
Relative Counting Error	=	3.4%
Pu 236 Tracer Recovery	=	18.9%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	3.66E-03	Pu 238	=	1.05E-02

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	November 18, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#3 11-11-93

J1289-5781

2188/30 -3

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#2 2382

WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1289.-5781	BECHTOLD	11- 4-93	9: 2	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
1mL-10 - .05mL + .100mL Spike	KE24A

Remarks, Calculations, Results triplicate 77B43

COUNT AS uCI/L

2.80×10^{-2} uCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-11-93	2020	

54-6800-061 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

				SAMPLE
Serial No.	Date Counted	11/12/93	Pu 236 AEA Frac. (C236)	0.381
J1289-5781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.089
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.341
2097	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	771
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	5
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	3.14
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	0.73
Date	Pu-236 Decay Corr'd Value	3160.09	Pu 239 Counts	2.81
11/11/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * (e to the power of {(-ln2 * Decay Time) / 1040.95 })

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	2.80E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	2.80E-02
Relative Counting Error	=	3.7%
Pu-238 µCi/mL	=	< 3.97E-02
Relative Counting Error	=	5.9%
Pu 236 Tracer Recovery	=	5.0%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	4.11E-03	Pu 238	=	3.97E-02

Data Entry by:	P.A. Clark	Date:	16-Nov-93
Approved by:		Date:	November 18, 1993

Form 1 Rev. 1.4

PLUTONIUM 239\240 ANALYSIS - UNDIGESTED SAMPLE

#1 11-11-93

$\frac{771}{30}$ - 5 J1289-5781

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#3 3725 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1289.-5981	BECHTOLD	11- 4-93	9: 2	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/24	LA-503-156	% RECOVERY	E14157	0

Sample Size: 1mL-10-.05mL + .100 mL std + .200mL spike (.100mL Spike VS 11-19-93) — Customer ID: KE24A

Remarks, Calculations Results

63843 77843

SAMPLE SPIKED ID

SPIKE ID

SPIKE VOLUME

COUNT AS uCI/L

$\frac{(60.0-31.3)(\frac{101}{.1}/\frac{11}{.05})(100)}{130.5} = 101.0\%$ ~~100~~

$\frac{(120-31.3)(\frac{101}{.1}/\frac{11}{.05})(100)}{130.5} = 312\%$

11-19-93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs 11-12-93	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-11-93	2020	

54-6800-061 (R 10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/12/93	Pu 236 AEA Frac. (C236)	0.317	CHK EXT NO.
J1289-5981	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.058	
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.607	
2097	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	4535	
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30	
0	Tracer Book No.	77843	Background in cpm (Bkg)	1	
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	22.09	
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	4.06	
Date	Pu-236 Decay Corr'd Value	3160.09	Pu 239 Counts	42.31	
11/11/93	Pu-236 Tracer Value	133	AEA Count Time in min	480	

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * ie to the power of ((-ln2 * Decay Time) / 1040.95))

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-236 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	6.00E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	6.00E-02
Relative Counting Error	=	1.2%
Pu-238 µCi/mL	=	< 6.58E-03
Relative Counting Error	=	2.5%
Pu 236 Tracer Recovery	=	30.1%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	4.94E-03	Pu 238	=	6.58E-03

Data Entry by:		Date:	18-Nov-93
Approved by:		Date:	November 18, 1993

Form 1 Rev. 1.4

II 2 11-11-93

J1289-5981

4535
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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#4 4956 WHC-SD-WM-DP-057 REV O

Serial No.	Sample Point	Date	Time Issued	Priority
J 1289.-5981	BECHTOLD	11- 4-93	9: 2	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/24	LA-503-156	% RECOVERY	E14157	0

Sample Size: 63B43 .100mL Sp2 — 1mL-10-.05mL + .100ml std + .200mL Sp

Customer ID: 11-17-93 KE24A

Remarks, Calculations, Results: Spike Cup 77B43

SAMPLE SPIKED ID

SPIKE ID

SPIKE VOLUME

COUNT AS uCI/L

$$\frac{(56.8-31.8)\left(\frac{10.1}{.1}\right)/\frac{11}{.05})(100)}{130.5} = 87.9\%$$

$$\frac{(114-31.8)\left(\frac{10.1}{.1}\right)/\frac{11}{.05})(100)}{130.5} = \cancel{289\%}$$

11.18.93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
		11.12.93		

Date	Time Completed	Lab Unit Mgr
11-11-93	2020	

54-6800-061 (R-10-83)

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Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	11/12/93	Pu 236 AEA Frac. (C236)	CHK EXT NO.
J1289-5981	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.056
Batch ID	Sample D.F. (DF)	11	Pu 239 AEA Frac. (C239)	0.579
2097	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	5841
Rerun No.	Digest D.F. (DDF)	1	Time Counted in min (TC)	30
0	Tracer Book No.	77B43	Background in cpm (Bkg)	3
Analyst	Tracer Preparation Date	10/12/93	Pu 236 Counts	16.55
J VAN SANT	Pu-236 Preparation Value	3226	Pu 238 Counts	2.89
Date	Pu-236 Decay Corr'd Value	3160.09	Pu 239 Counts	30.06
11/11/93	Pu-238 Tracer Value	133	AEA Count Time in min	480

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value * ie to the power of ((-ln2 * Decay Time) / 1040.95))

Pu 236 Tracer Recovery = (Total AT Counts / TC - Bkg) * 2 * C236 * 100 / Pu-236 Decay Corr'd Value * SS

Pu-239/240 µCi/L = (C239 * Pu-236 Decay Corr'd Value * SPKV * DF * DDF * (1000mL/L)) / (C236 * SS * (2220000dpm/µCi))

Pu 238 dpm = ((Total AT Counts / TC) - Bkg * 2 * C238) - (Pu-238 Tracer Value * SPKV * Pu 236 Tracer Recovery / 100)

Pu-238 µCi/mL = (Pu238 dpm * DF * DDF) / ((Pu 236 Tracer Recovery / 100) * (2220000dpm/µCi) * SS)

Relative Counting Error = Square Root of ((1/Pu 236 Counts) + (1 / Pu 238 or 239/240 Counts)) * 100

Pu-239/240 µCi/L	=	5.68E+01

NOTE: Tracer values are in dpm/mL.

Pu-239/240 µCi/mL	=	5.68E-02
Relative Counting Error	=	1.4%
Pu-238 µCi/mL	=	< 5.12E-03
Relative Counting Error	=	2.9%
Pu 236 Tracer Recovery	=	38.7%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

DETECTION LEVELS in µCi/mL					
Pu 239/240	=	4.91E-03	Pu 238	=	5.12E-03

Data Entry by:		Date:	18-Nov-93
Approved by:		Date:	November 18, 1993

II 3 11-11-93

5841 -3
30

J1289-5981

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Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

SAMPLE
J-1303-5581
File ID: 11a3245.CNF

Counted on: 11/12/93 @15:31
Detector: AEA11
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	1681.6	1681.6	364.576	364.576	10.000	2.997	[illegible]	[illegible]
2	27.2	27.2	305.748	305.732	10.000	[illegible]	[illegible]	[illegible]
22	4.9	4.9	299.232	299.533	6.000	0.563	[illegible]	[illegible]
4	46.6	46.6	266.956	266.940	10.000	3.059	5.000	[illegible]
5?	23.2	23.2	256.138	254.812	8.000	1.670	4.000	1.5[illegible]
6	1794.4	1794.4	231.534	231.534	10.000	3.394	5.000	2.81[illegible]

PEAK RESULTS
Peak Error Limit: 25%

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Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err 095	d/m	activity
1	Cm244	0.491	5.796	5.796	0.000	0.01	39.68	1.4	303.8	[illegible]
	Cm243		5.786	5.796	-.010				423.1	[illegible]
2	Pu238	0.011	5.499	5.525	-.026	0.02	0.85	9.8	9.2	0.415E-05
3		????		5.451			0.04	104.		
4		0.012		5.347		0.01	1.00	9.1	7.8	0.251E-07
5		????		5.291			0.37	19.9		
6	Pu240	0.467	5.144	5.184	-.040	0.02	37.77	1.5	293.9	[illegible]
		---					---			
Totals:		0.981	<--valid peaks only-->				79.31			

DETECTOR CALIBRATION
Energy(MEV) = 4.119 + (0.0046)*Channel
Energy range (MeV): 4.119 TO 6.474
Efficiency = 0.1285 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	38804.0	100.000
Smoothed	38804.0	100.000
Composite fit	38274.5	98.635
Residuals	529.5	1.365

Analyzed by: _____
DM

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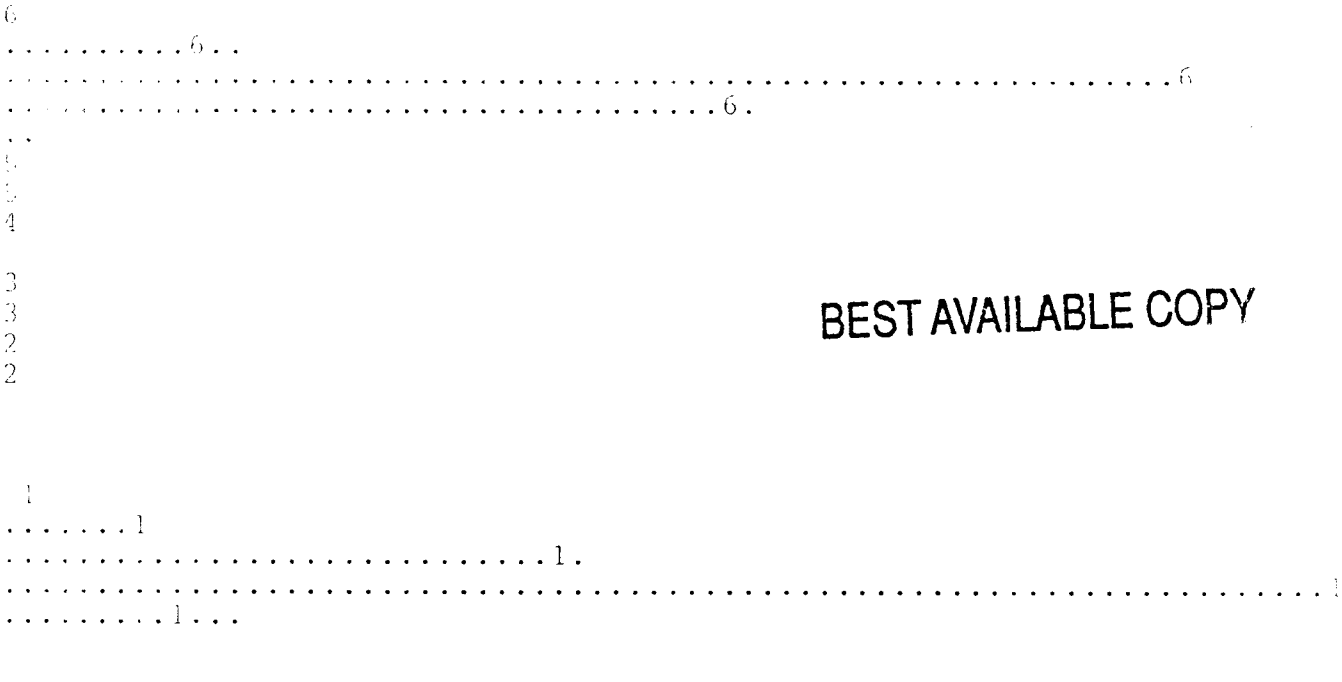
Spectrum 11a3245.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 10754.8



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Raw Data Dump for AEA Spectrum: 11a3245.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	1.	0.	0.	0.	0.	1.	0.	1.	0.	0.
21	0.	0.	0.	1.	0.	1.	0.	1.	0.	1.
[illegible]	0.	1.	1.	0.	0.	0.	0.	0.	0.	1.
[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	0.	0.	0.	1.	0.	1.	0.	1.	0.	0.
[illegible]	1.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
[illegible]	[illegible]	0.	0.	1.	0.	0.	0.	0.	[illegible]	[illegible]
[illegible]		0.	[illegible]	0.	[illegible]	0.	0.	1.	[illegible]	
[illegible]		0.	[illegible]	0.	[illegible]	[illegible]	[illegible]	1.	[illegible]	
[illegible]	[illegible]	1.	0.	0.	[illegible]	0.	0.	0.	0.	[illegible]
111	1.	1.	1.	0.	1.	0.	0.	0.	1.	[illegible]
121	0.	2.	0.	1.	0.	0.	0.	0.	0.	0.
131	0.	0.	0.	2.	1.	0.	1.	0.	0.	0.
141	0.	0.	1.	0.	0.	0.	1.	1.	0.	0.
151	2.	1.	0.	0.	0.	3.	1.	0.	0.	3.
161	2.	0.	1.	2.	0.	0.	0.	1.	0.	0.
171	0.	1.	3.	2.	1.	1.	3.	1.	1.	0.
181	1.	0.	1.	2.	6.	3.	2.	1.	2.	
[illegible]		1.	[illegible]	1.	[illegible]	1.	[illegible]	1.	[illegible]	
[illegible]	[illegible]	9.	12.	6.	[illegible]	11.	21.	12.	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	76.	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	25.	[illegible]	[illegible]	[illegible]	661.	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	2191.	[illegible]	1409.	[illegible]	[illegible]	157.	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	2.	[illegible]	1.	4.	7.	2.	7.	[illegible]	[illegible]
251	9.	10.	21.	25.	27.	30.	17.	29.	17.	[illegible]
261	14.	19.	26.	29.	45.	50.	61.	58.	37.	26.
271	13.	6.	3.	3.	3.	1.	4.	0.	1.	4.
281	0.	1.	2.	2.	5.	5.	9.	7.	10.	17.
291	12.	8.	6.	7.	8.	10.	13.	13.	10.	12.
[illegible]	[illegible]	12.	[illegible]	30.	[illegible]	31.	[illegible]	29.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	2.	2.	[illegible]	[illegible]	
[illegible]	[illegible]	3.	[illegible]	1.	[illegible]	[illegible]	6.	[illegible]	[illegible]	
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11.	[illegible]	
[illegible]	[illegible]	31.	26.	33.	17.	56.	58.	92.	[illegible]	[illegible]
[illegible]	[illegible]	362.	183.	625.	678.	636.	670.	624.	694.	[illegible]
361	[illegible]	1348.	1722.	2069.	2072.	1896.	1300.	619.	279.	63.
371	[illegible]	5.	2.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	1.	0.	2.	2.	0.	[illegible]
[illegible]	[illegible]	0.	0.	0.	1.	0.	0.	0.	[illegible]	[illegible]
441	[illegible]	0.	0.	0.	0.	0.	0.	0.	[illegible]	
451	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
471	0.	0.	0.	1.	1.	0.	0.	3.	1.	[illegible]
481	1.	1.	1.	1.	1.	0.	1.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

11-22-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT WHC-SD-WM-DP-057 REV O

SAMPLE
J-1304-5681
File ID: 12a4232.CNF

Counted on: 11/12/93 @15:23
Detector: AEA12
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak	Peak height		Peak center		FWHM		Fwm	
#	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	15.6	15.6	357.380	359.942	12.000	6.631	6.000	[illegible]
[illegible]	6.1	6.1	259.541	260.374	12.000	5.679	6.000	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak	AEA	Peak Centroid				Count	%err		Activity	
[illegible]	Freq	Exp.	Obs.	Diff.	FWHM	Rate c/m	2σ%	d/m	[illegible]	[illegible]
1	[illegible]	0.763	5.756	5.747	0.0090	0.03	1.18	7.3	13.	9. [illegible]
2	Am241	0.277	5.276	5.289	-.0130	0.03	0.53	13.8	4.7	0.[illegible]
Totals:		1.045	<--valid peaks only-->				2.02			

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DETECTOR CALIBRATION
Energy(MEV) = 4.091 + (0.0046)*Channel
Energy range (MeV): 4.091 TO 6.447
Efficiency = 0.1138 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	927.0	100.000
Smoothed	927.0	100.000
Composite fit	969.1	104.541
Residuals	-42.1	-4.541

Analyzed by: _____
DM

Spectrum 12a4232.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 106.9

BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 12a4232.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
41	0.	0.	0.	0.	0.	1.	1.	0.	0.	1.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	1.	0.	0.	0.	0.	0.	0.	0.	1.	1.
91	1.	0.	0.	1.	0.	0.	0.	0.	1.	1.
101	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
111	0.	0.	0.	2.	0.	1.	0.	1.	0.	0.
121	0.	2.	0.	0.	0.	1.	1.	0.	1.	0.
131	0.	0.	0.	0.	0.	0.	2.	0.	1.	1.
141	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
151	0.	0.	1.	1.	1.	1.	0.	0.	0.	1.
161	0.	1.	0.	0.	0.	1.	0.	1.	0.	1.
171	0.	0.	0.	1.	1.	1.	0.	0.	0.	1.
181	2.	0.	1.	2.	0.	0.	1.	0.	0.	1.
191	2.	1.	0.	2.	0.	1.	4.	1.	1.	1.
201	0.	2.	0.	0.	0.	3.	0.	3.	1.	1.
211	5.	3.	3.	3.	1.	1.	3.	4.	1.	1.
221	5.	2.	1.	0.	2.	4.	2.	3.	4.	1.
231	1.	4.	2.	5.	6.	1.	5.	2.	1.	1.
241	1.	6.	1.	1.	1.	5.	7.	1.	1.	1.
251	4.	4.	8.	5.	7.	8.	7.	5.	1.	1.
261	2.	6.	6.	12.	4.	3.	0.	1.	2.	0.
271	1.	0.	1.	1.	1.	1.	4.	3.	0.	1.
281	2.	3.	2.	3.	1.	2.	6.	0.	1.	5.
291	3.	4.	1.	3.	3.	0.	3.	0.	1.	6.
301	1.	2.	2.	2.	1.	4.	5.	3.	2.	4.
311	2.	5.	7.	3.	5.	3.	3.	2.	1.	1.
321	3.	5.	6.	7.	5.	7.	1.	4.	1.	1.
331	7.	6.	2.	7.	13.	8.	4.	10.	1.	1.
341	11.	13.	11.	4.	12.	16.	15.	13.	1.	1.
351	16.	11.	16.	13.	10.	4.	12.	17.	1.	1.
361	21.	11.	15.	13.	13.	3.	1.	0.	0.	1.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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11-22-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
J-1289-5781
File ID: 9a1361.CNF

WHC-SD-WM-DP-057 REV 0

Counted on: 11/12/93 @15:22
Detector: AEA9
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	[illegible] Initial	[illegible] Final
1	349.6	349.6	364.799	364.799	10.000	2.571	5.000	1.7[illegible]
2	59.5	59.5	306.015	306.015	10.000	3.051	5.000	1.75[illegible]
3	52.0	52.0	267.338	267.334	10.000	2.451	5.000	1.57[illegible]
4	333.5	333.5	232.562	232.561	10.000	3.737	5.000	3.056

PEAK RESULTS
Peak Error Limit: 25%

[illegible] ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	Err 095	d/m	Activity [illegible]
1	Cm244	0.409	5.796	5.790	0.006	0.01	7.30	3.3	51.8	0.233E-0[illegible]
	Cm243		5.786	5.790	-.004				71.0	0.320E-0[illegible]
2	Pu238	0.079	5.499	5.520	-.021	0.01	1.40	7.6	13.9	0.624E-05
3		0.062		5.342		0.01	1.10	8.6	7.8	0.351E-05
4	Pu239	0.409	5.143	5.182	-.039	0.02	7.29	3.3	51.8	0.233E-0[illegible]
	Pu240		5.144	5.182	-.038				51.8	0.233E-0[illegible]
Totals:		0.958	<--valid peaks only-->				17.09			

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DETECTOR CALIBRATION
Energy(MEV) = 4.112 + (0.0046)*Channel
Energy range (MeV): 4.112 TO 6.468
Efficiency = 0.1408 CPM/DPM

TOTAL COUNT DATA:

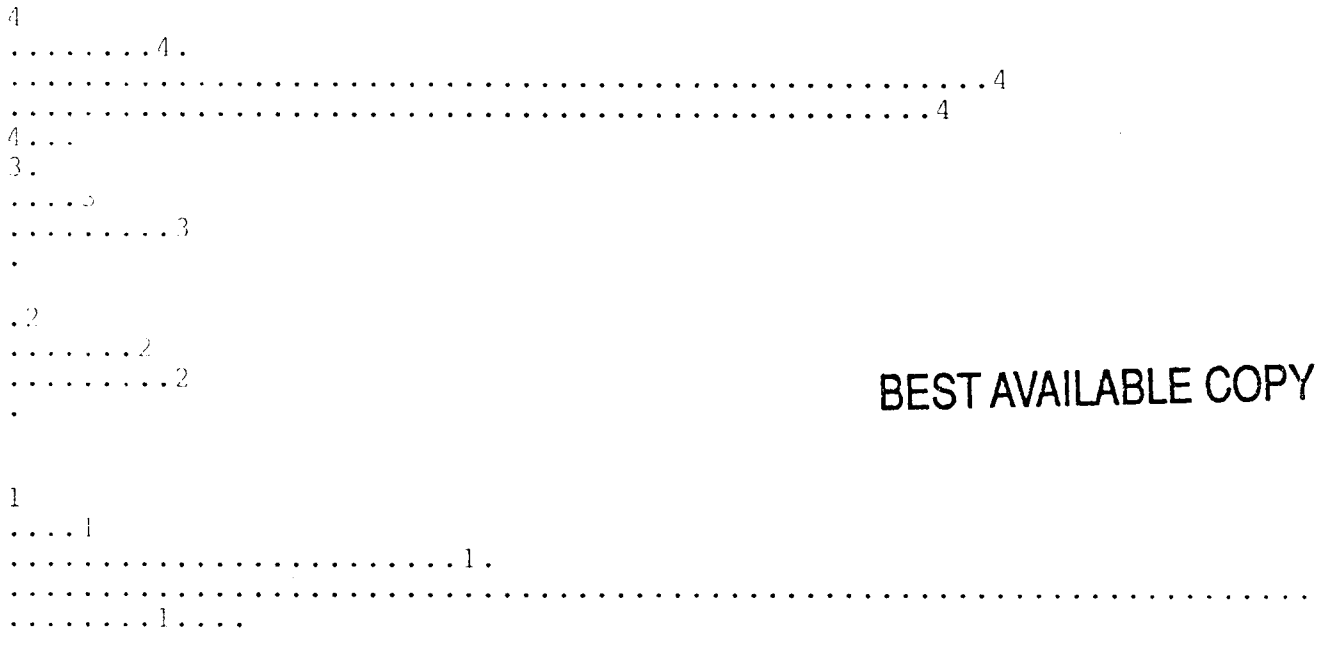
Item	Total	% Recovery
Raw spectrum	8559.0	100.000
Smoothed	8559.0	100.000
Composite fit	8203.7	95.848
Residuals	355.3	4.152

Analyzed by: _____
DM

Spectrum 9a1361.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 2104.7

WHC-SD-WM-DP-057 REV 0



BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 9a1361.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	2.	2.	0.	1.	0.	0.	0.	2.
21	1.	2.	2.	1.	0.	0.	0.	2.	9.	4.
31	4.	2.	0.	0.	1.	0.	1.	0.	0.	0.
[illegible]	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.
[illegible]	0.	0.	2.	0.	2.	0.	0.	1.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
71	0.	0.	1.	1.	0.	0.	0.	2.	0.	[illegible]
81	0.	0.	2.	0.	0.	0.	0.	0.	1.	[illegible]
91	1.	0.	0.	0.	0.	0.	0.	0.	[illegible]	
101	0.	2.	0.	0.	2.	0.	0.	0.	0.	
111	0.	1.	0.	0.	0.	0.	2.	0.	1.	[illegible]
121	0.	2.	2.	1.	0.	0.	1.	1.	2.	0.
131	0.	1.	0.	1.	0.	2.	1.	2.	3.	3.
141	0.	1.	1.	3.	1.	1.	4.	6.	3.	10.
151	2.	3.	2.	1.	0.	1.	1.	1.	0.	1.
161	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
171	0.	0.	0.	0.	0.	1.	2.	0.	0.	0.
181	0.	2.	1.	1.	1.	0.	1.	1.	0.	0.
191	0.	1.	1.	3.	0.	2.	3.	3.	2.	1.
201	2.	3.	3.	0.	5.	0.	1.	4.	[illegible]	[illegible]
211	6.	7.	8.	7.	7.	7.	15.	16.	[illegible]	[illegible]
221	19.	59.	67.	76.	88.	113.	135.	171.	[illegible]	[illegible]
231	271.	399.	419.	332.	276.	199.	100.	33.	[illegible]	[illegible]
241	2.	2.	0.	2.	3.	2.	3.	2.	2.	[illegible]
251	3.	8.	6.	14.	18.	20.	9.	14.	13.	[illegible]
261	12.	17.	25.	33.	40.	45.	71.	70.	49.	26.
271	10.	6.	3.	2.	4.	4.	2.	1.	0.	3.
281	0.	1.	0.	5.	3.	1.	3.	8.	9.	8.
291	12.	13.	5.	9.	11.	18.	30.	23.	27.	29.
301	22.	26.	36.	58.	69.	76.	70.	56.	29.	15.
[illegible]	0.	4.	4.	2.	0.	2.	0.	3.	[illegible]	[illegible]
[illegible]	1.	2.	0.	0.	5.	0.	1.	2.	[illegible]	[illegible]
331	3.	4.	1.	0.	2.	1.	2.	2.	[illegible]	
341	5.	3.	3.	3.	5.	13.	15.	19.	19.	[illegible]
351	12.	63.	90.	105.	137.	124.	111.	98.	90.	[illegible]
361	146.	207.	326.	429.	478.	389.	268.	141.	57.	31.
371	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
431	2.	0.	0.	0.	0.	0.	0.	0.	0.	1.
441	1.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
451	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
471	1.	0.	0.	0.	0.	1.	0.	1.	0.	0.
481	1.	1.	0.	1.	0.	0.	1.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV 0

SAMPLE
J-1296-5781 DUP.
File ID: 10a2266.CNF

Counted on: 11/12/93 @15:24
Detector: AEA10
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Fan Initial	Fan Final
1	595.5	595.5	364.558	364.558	10.000	2.738	5.000	[illegible]
2	93.0	93.0	306.177	306.176	12.000	3.314	6.000	[illegible]
3	54.8	54.8	267.757	267.754	10.000	2.598	5.000	[illegible]
4	607.1	607.1	232.989	232.988	12.000	3.601	6.000	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%Err @95	d/m	Activity µCi/cm²
1	Cm243	0.428	5.786	5.817	-.031	0.01	12.87	2.5	146.2	[illegible]
	Cm241		5.796	5.817	-.021				106.7	[illegible]
2	Pu238	0.070		5.543		0.02	2.10	6.2	17.4	0.7836E-05
3		0.040		5.362		0.01	1.19	8.2	9.9	0.4468E-05
4	Pu239	0.435		5.199		0.02	13.10	2.5	108.6	0.4898E-04
Totals:		0.972	<--valid peaks only-->				29.26			

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DETECTOR CALIBRATION
Energy(MEV) = 4.104 + (0.0047)*Channel
Energy range (MeV): 4.104 TO 6.510
Efficiency = 0.1206 CPM/DPM

TOTAL COUNT DATA:

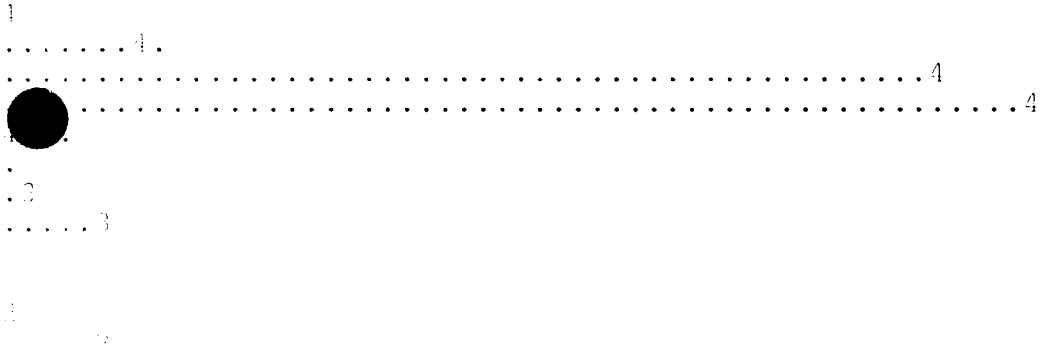
Item	Total	% Recovery
Raw spectrum	14455.0	100.000
Smoothed	14455.0	100.000
Composite fit	14048.6	97.188
Residuals	406.4	2.812

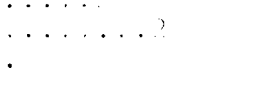
Analyzed by: _____
DM

Spectrum 10a2266.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 3711.2

WHC-SD-WM-DP-057 REV 0





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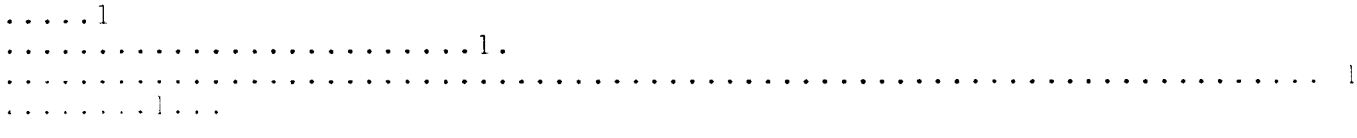

Raw Data Dump for AEA Spectrum: 10a2266.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	1.	0.	0.	0.	0.	0.	0.	1.	1.
21	0.	3.	1.	2.	1.	5.	0.	1.	2.	3.
31	7.	7.	7.	2.	3.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	1.	0.	0.	1.	2.	0.	0.	0.	0.	1.
91	2.	0.	2.	1.	2.	0.	0.	0.	0.	1.
101	0.	0.	0.	0.	1.	0.	1.	0.	1.	1.
111	1.	0.	0.	1.	0.	1.	0.	1.	0.	1.
121	0.	0.	0.	0.	1.	0.	0.	0.	0.	1.
131	0.	0.	0.	1.	0.	3.	1.	0.	0.	2.
141	3.	1.	4.	1.	1.	2.	0.	4.	6.	6.
151	4.	7.	7.	4.	1.	0.	0.	0.	2.	1.
161	0.	0.	1.	0.	0.	0.	0.	0.	5.	0.
171	2.	1.	1.	1.	0.	1.	0.	0.	1.	1.
181	1.	2.	0.	1.	1.	1.	1.	0.	1.	0.
191	1.	2.	3.	1.	2.	3.	4.	2.	1.	2.
201	3.	5.	4.	7.	3.	2.	2.	4.	3.	4.
211	5.	8.	8.	11.	11.	16.	32.	22.	36.	61.
221	72.	99.	127.	121.	169.	166.	225.	262.	276.	[illegible]
231	[illegible]	720.	751.	[illegible]	[illegible]	367.	236.	112.	[illegible]	[illegible]
241	[illegible]	3.	1.	0.	2.	0.	1.	1.	[illegible]	[illegible]
251	[illegible]	1.	10.	18.	22.	10.	15.	18.	11.	[illegible]
261	8.	16.	16.	35.	40.	44.	75.	71.	63.	13.
271	12.	8.	3.	4.	0.	1.	1.	2.	1.	0.
281	1.	1.	2.	3.	2.	2.	7.	3.	5.	8.
291	2.	8.	10.	15.	14.	27.	19.	48.	32.	32.
301	[illegible]	49.	62.	79.	113.	119.	105.	90.	61.	31.
311	4.	2.	2.	1.	0.	3.	1.	0.	[illegible]	[illegible]
321	2.	4.	1.	2.	2.	2.	2.	1.	1.	[illegible]
331	3.	3.	6.	4.	1.	1.	3.	6.	4.	[illegible]
341	1.	11.	5.	12.	18.	10.	18.	10.	33.	[illegible]
351	74.	86.	153.	183.	205.	234.	193.	182.	221.	[illegible]
361	228.	466.	621.	729.	774.	645.	435.	213.	58.	[illegible]
371	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
431	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	1.	0.	0.	0.	0.	2.	0.	2.	0.	1.
481	1.	0.	2.	0.	0.	1.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

D.H. Wilson
11-12-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

SAMPLE
J1289-5781
File ID: 2a2382.CNF

Counted on: 11/12/93 @ 5:30
Detector: AEA2
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	71.9	71.9	361.416	361.416	18.000	12.322	9.000	4.238
2	16.0	16.0	299.227	299.159	28.000	19.537	14.000	10.772
3	24.3	24.3	265.327	265.279	18.000	13.411	9.000	2.736
4	72.2	72.2	231.482	231.361	16.000	9.210	8.000	3.420

PEAK RESULTS
Peak Error Limit: 25%

Peak	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Cm243	0.381	5.786	5.780	0.006	0.06	3.14	5.0	33.1	0.149E-04
	Cm244		5.796	5.780	0.016				24.2	0.109E-04
2	Am241	0.089	5.480	5.487	-.007	0.09	0.73	10.9	6.0	0.270E-05
	Pu238		5.499	5.487	0.012				7.8	0.352E-05
3	Am243	0.170	5.276	5.328	-.052	0.06	1.40	7.8	10.9	0.490E-05
4	Pu239	0.341	5.143	5.169	-.026	0.04	2.81	5.7	21.6	0.974E-05
	Pu240		5.144	5.169	-.025				21.6	0.974E-05
Totals:		0.980	<--valid peaks only-->				8.07			

BEST AVAILABLE COPY

DETECTOR CALIBRATION
Energy(MEV) = 4.081 + (0.0047)*Channel
Energy range (MeV): 4.081 TO 6.488
Efficiency = 0.1298 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	3954.0	100.000
Smoothed	3954.0	100.000
Composite fit	3876.1	98.029
Residuals	77.9	1.971

Analyzed by: _____
VR

Spectrum 2a2382.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 554.4


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BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 2a2382.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.
21	0.	2.	1.	2.	3.	0.	0.	0.	2.	1.
31	1.	0.	0.	0.	0.	0.	0.	1.	0.	0.
[illegible]	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	2.	0.	0.	0.	0.	0.	0.	1.	2.	0.
61	0.	0.	0.	0.	0.	0.	1.	2.	1.	1.
71	0.	0.	0.	0.	0.	1.	0.	2.	1.	1.
81	0.	0.	0.	0.	0.	1.	0.	0.	1.	
[illegible]	[illegible]	1.	0.	1.	0.	1.	0.	1.	0.	
101	1.	1.	0.	0.	0.	1.	0.	0.	1.	[illegible]
111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
121	1.	1.	1.	0.	1.	0.	1.	0.	0.	1.
131	1.	0.	2.	0.	2.	1.	0.	3.	3.	2.
141	4.	2.	2.	2.	6.	4.	3.	2.	4.	2.
151	1.	1.	1.	2.	3.	0.	1.	2.	0.	1.
161	1.	0.	0.	0.	0.	1.	1.	0.	1.	0.
171	1.	2.	1.	0.	1.	0.	0.	1.	1.	0.
181	1.	0.	1.	1.	0.	0.	1.	3.	0.	1.
191	2.	1.	0.	4.	1.	2.	2.	2.	[illegible]	[illegible]
201	4.	2.	3.	4.	4.	5.	7.	5.	7.	[illegible]
211	7.	9.	10.	15.	17.	28.	27.	26.	29.	[illegible]
221	30.	45.	55.	47.	57.	78.	73.	80.	69.	[illegible]
231	82.	74.	81.	77.	60.	49.	39.	33.	23.	[illegible]
241	16.	9.	9.	6.	6.	8.	7.	7.	5.	10.
251	16.	9.	13.	18.	19.	21.	15.	18.	24.	20.
261	19.	20.	24.	29.	23.	26.	29.	15.	26.	21.
271	17.	14.	10.	8.	8.	7.	3.	8.	7.	1.
281	3.	2.	4.	2.	3.	7.	4.	6.	5.	5.
291	8.	11.	7.	11.	12.	15.	17.	20.	18.	[illegible]
301	15.	20.	6.	15.	16.	10.	12.	11.	[illegible]	
[illegible]	6.	6.	2.	7.	6.	3.	2.	0.	[illegible]	[illegible]
[illegible]	1.	1.	2.	2.	1.	2.	1.	0.	1.	1.
331	0.	0.	3.	1.	4.	0.	5.	4.	10.	6.
341	7.	9.	16.	15.	25.	31.	36.	32.	36.	39.
351	43.	54.	49.	40.	57.	49.	79.	72.	67.	72.
361	76.	82.	66.	65.	68.	58.	34.	26.	37.	29.
371	17.	12.	9.	5.	4.	1.	1.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
411	1.	0.	2.	0.	0.	1.	0.	0.	0.	[illegible]
421	0.	0.	0.	0.	0.	0.	1.	0.	0.	[illegible]
431	0.	0.	0.	2.	0.	1.	0.	0.	0.	[illegible]
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
451	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.
471	0.	1.	1.	1.	2.	3.	3.	1.	1.	1.
481	1.	0.	1.	0.	0.	0.	1.	0.	0.	0.
491	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

D.H. Wilson
11-12-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
31289-5981
File ID: 3a3725.CNF

WHC-SD-WM-DP-057 REV 0

Counted on: 11/12/93 @ 5:31
Detector: AEA3
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	734.5	734.5	365.481	365.481	12.000	5.927	[illegible]	[illegible]
2	134.3	134.3	307.233	307.226	14.000	6.417	[illegible]	[illegible]
3	42.9	42.9	268.318	268.302	12.000	4.581	[illegible]	[illegible]
4	1507.6	1507.6	233.644	233.640	12.000	6.207	6.000	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/cm²
1	Pu239	0.317	5.756	5.761	-.005	0.03	22.09	1.9	199.2	[illegible]
	Cm242		5.786	5.761	0.025				202.2	[illegible]
2	Pu238	0.058	5.499	5.493	0.006	0.03	4.06	4.5	37.7	[illegible]
	Am241		5.480	5.493	-.013				28.9	0.1305-03
3	Am243	0.022	5.276	5.313	-.037	0.02	1.55	7.3	10.5	[illegible]
4	Pu239	0.607	5.143	5.154	-.011	0.03	42.31	1.4	282.8	0.127E-03
	Pu240		5.144	5.154	-.010				282.8	0.127E-03
Totals:		1.004	<--valid peaks only-->				70.02			

BEST AVAILABLE COPY

DETECTOR CALIBRATION
Energy(MEV) = 4.079 + (0.0046)*Channel
Energy range (MeV): 4.079 TO 6.435
Efficiency = 0.1496 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	33475.0	100.000
Smoothed	33475.0	100.000
Composite fit	33610.0	100.403
Residuals	-135.0	-0.403

Analyzed by: _____
VR

Spectrum 3a3725.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 9193.6


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BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 3a3725.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	2.	0.	2.
21	4.	3.	6.	2.	1.	0.	2.	3.	1.	1.
31	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.
71	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.
81	1.	0.	0.	0.	0.	1.	1.	1.	1.	1.
91	2.	0.	2.	1.	0.	0.	0.	0.	0.	1.
101	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
111	0.	1.	0.	0.	0.	1.	1.	1.	0.	0.
121	0.	2.	0.	0.	1.	0.	0.	0.	0.	0.
131	1.	0.	0.	3.	0.	1.	3.	1.	0.	1.
141	1.	1.	3.	2.	2.	3.	4.	6.	1.	1.
151	3.	4.	2.	2.	4.	2.	0.	2.	1.	0.
161	1.	2.	1.	1.	4.	0.	0.	2.	3.	0.
171	4.	1.	3.	1.	3.	1.	1.	2.	5.	3.
181	1.	5.	3.	2.	3.	4.	2.	0.	5.	1.
191	1.	5.	4.	1.	2.	3.	2.	4.	5.	9.
201	6.	9.	5.	9.	11.	5.	12.	19.	16.	17.
211	17.	25.	30.	41.	64.	67.	92.	106.	157.	176.
221	265.	291.	351.	441.	554.	643.	782.	940.	1170.	[illegible]
231	1532.	1563.	1665.	1691.	1591.	1113.	1051.	816.	542.	[illegible]
241	212.	137.	41.	21.	15.	5.	5.	2.	[illegible]	[illegible]
251	1.	11.	9.	14.	15.	16.	14.	13.	19.	[illegible]
261	16.	24.	26.	39.	41.	37.	45.	53.	46.	[illegible]
271	40.	32.	15.	7.	6.	4.	3.	0.	2.	[illegible]
281	2.	1.	4.	0.	4.	1.	7.	5.	8.	[illegible]
291	15.	19.	17.	17.	40.	50.	38.	55.	62.	79.
301	79.	96.	104.	116.	125.	159.	156.	139.	131.	139.
311	86.	70.	47.	35.	10.	3.	3.	1.	3.	2.
321	1.	3.	4.	1.	2.	6.	3.	2.	2.	3.
331	2.	5.	3.	5.	7.	9.	8.	8.	7.	12.
341	6.	10.	20.	18.	20.	23.	38.	40.	72.	[illegible]
351	107.	161.	185.	254.	257.	318.	327.	376.	426.	[illegible]
361	574.	596.	703.	803.	789.	835.	778.	622.	506.	[illegible]
371	251.	146.	72.	26.	12.	9.	1.	0.	0.	[illegible]
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	1.	0.	0.	2.	0.	0.	0.
481	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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D.H. Wilcox
11-12-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

SAMPLE
J1289-5981
File ID: 4a4956.CNF

Counted on: 11/12/93 @ 5:32
Detector: AEA4
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	680.5	680.5	364.374	364.374	10.000	3.224	5.000	1.722
2	106.9	106.9	306.612	306.609	14.000	4.136	7.000	2.119
3?	22.9	22.9	267.572	267.515	14.000	4.191	7.000	7.158
4	35.9	35.9	256.580	256.080	6.000	0.085	3.000	0.007
5	1381.6	1381.6	233.178	233.173	12.000	3.912	6.000	3.146

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Pu236	0.319	5.756	5.754	0.002	0.01	16.55	2.2	212.5	0.[illegible]E-01
2	Pu238	0.056	5.499	5.489	0.010	0.02	2.89	5.3	50.4	0.227E-01
	Am241		5.480	5.489	-.009				38.6	0.174E-01
3		????		5.309			0.47	13.7		
4	Am243	0.062	5.276	5.256	0.020	0.00	3.23	5.0	41.0	0.185E-01
5	Pu239	0.579	5.143	5.151	-.008	0.02	30.06	1.7	378.1	0.17[illegible]E-0[illegible]
	Pu240		5.144	5.151	-.007				378.1	0.17[illegible]E-0[illegible]
Totals:		1.016	<--valid peaks only-->				52.72			

BEST AVAILABLE COPY

DETECTOR CALIBRATION
Energy(MEV) = 4.078 + (0.0046)*Channel
Energy range (MeV): 4.078 TO 6.433
Efficiency = 0.0795 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	24904.0	100.000
Smoothed	24904.0	100.000
Composite fit	25534.7	102.533
Residuals	-630.7	-2.533

Analyzed by: _____

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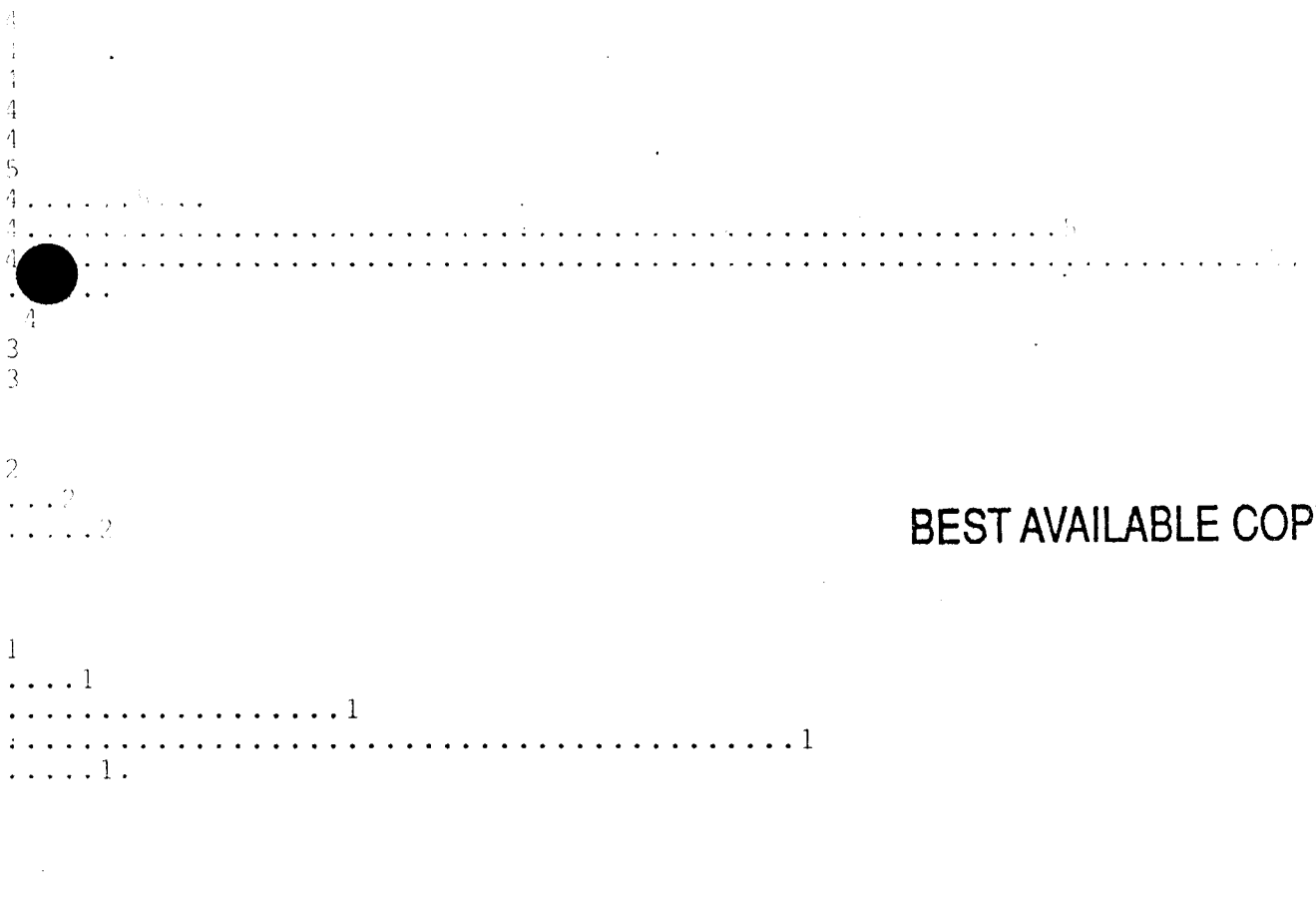
Spectrum 4a4956.CNF

Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 7255.2

WHC-SD-WM-DP-057 REV O



BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: 4a4956.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	2.	3.
21	0.	0.	2.	1.	0.	2.	3.	1.	1.	1.
31	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
71	1.	0.	0.	0.	0.	0.	0.	0.	1.	0.
81	0.	0.	0.	1.	1.	0.	0.	1.	1.	0.
91	1.	0.	1.	0.	0.	1.	0.	0.	0.	1.
101	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.
111	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
121	0.	0.	1.	0.	0.	0.	0.	1.	3.	1.
131	2.	0.	2.	1.	0.	1.	1.	0.	2.	2.
141	1.	1.	0.	3.	2.	3.	1.	1.	1.	3.
151	2.	2.	2.	0.	0.	1.	0.	2.	1.	0.
161	1.	0.	0.	0.	3.	0.	0.	2.	1.	0.
171	0.	2.	1.	0.	5.	2.	2.	1.	2.	1.
181	0.	2.	1.	2.	1.	2.	3.	3.	1.	2.
191	1.	4.	3.	3.	2.	2.	0.	3.	1.	6.
201	2.	5.	7.	3.	4.	12.	6.	6.	7.	6.
211	14.	8.	15.	16.	31.	33.	53.	48.	108.	140.
221	197.	225.	234.	291.	321.	374.	474.	595.	825.	1129.
231	1377.	1628.	1720.	1580.	1373.	1022.	652.	374.	195.	[illegible]
241	29.	15.	0.	0.	2.	0.	2.	1.	1.	[illegible]
251	2.	2.	4.	7.	9.	17.	9.	11.	[illegible]	[illegible]
261	5.	4.	10.	13.	21.	34.	32.	17.	29.	[illegible]
271	19.	7.	4.	2.	2.	3.	2.	2.	1.	[illegible]
281	2.	2.	2.	2.	2.	0.	3.	2.	2.	[illegible]
291	5.	11.	15.	19.	42.	46.	49.	57.	56.	52.
301	13.	46.	77.	101.	114.	133.	118.	115.	98.	55.
311	39.	15.	5.	1.	2.	1.	0.	0.	0.	0.
321	0.	0.	2.	0.	5.	2.	1.	1.	2.	2.
331	3.	4.	3.	0.	2.	5.	3.	5.	1.	[illegible]
341	4.	3.	6.	3.	4.	10.	11.	18.	57.	81.
351	128.	196.	231.	317.	309.	258.	270.	231.	245.	[illegible]
361	457.	558.	780.	794.	861.	725.	452.	250.	113.	[illegible]
371	15.	7.	3.	0.	0.	1.	0.	0.	[illegible]	[illegible]
381	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	
391	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	1.	0.	0.	0.	0.	2.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	3.	0.	0.
481	1.	0.	1.	0.	0.	0.	0.	0.	0.	1.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
511	0.	0.								

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WESTINGHOUSE HANFORD COMPANY

WHC-SD-WM-DP-057 REV 0 222-S LABORATORY

ANALYTICAL BATCH 2276

Lab Segment Serial No. 1285	Customer ID: KE13A
Analysis: Am 241	Sample Prep: DIRECT

Instrument: WB5372357	Procedure/ Rev: LA 503-156-D0
Technologist: Joel M VanSant	Date: 12-2-93
Starting Time: 0900	Temperature 28°C
Ending Time: 2100	Chemist: L Fitts

Comments: Slow cook

	Description	Lab ID
1	INITIAL LMCS CHECK STD	01284-5582
2	REAGENT BLANK	01300-5682
3	Sample	01285-5782
4	Sample Dup	01285-5782
5	Sample Trip	01285-5782
6	Spike	01285-5982
7	Spike Dup	01285-5982
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	63843 .100 ml	1 ml		
Spike	78843 .100 ml			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: **LA-503-156**

DATE START: **December 2, 1993**

PREPARED BY: **L.L. Fritts** LL Fritts 12-8-93

DATE COMPLETE: **December 8, 1993**

	UNITS:	uCi/mL									
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	%REC	DET LIM	% CT ER
STD 63B43	J1284	Am-241	3.11E+1						116.1	1.71E-3	4.8
BLANK	J1300	Am-241	<7.47E-4						5.7	7.47E-4	36.2
KE13A	J1285	Am-241	3.41E-2	4.08E-2	3.75E-2	3.75E-2	6.70E-3	17.9	6.1	7.47E-4	9.8
									2.7	7.47E-4	11.9
									47.2	7.47E-4	3.3
KE13A	J1285	241 Spike	205.6	182.5					1.5	1.49E-3	12.8
									4.0	1.49E-3	6.4

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

The results for the spike are in percent recovery.

No rerun requested: The spike recoveries are outside of control limits, however this is the third run and values for all three runs are fairly consistent.

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#8 8593 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1284.-5582	BECHTOLD	11- 4-93	8:47	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	% RECOVERY	E14157	2

Sample Size	Customer ID
100mL - 1R - 1mL 7.100mL SS	

Remarks Calculations Results

78B43

63B43 31.1

26.746 116.1%

1mL 8mHNO3

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
		12-4-93		
Date	Time Completed	Lab Unit		
12-2-93				

54-0800-061 (R 10-83)

AM-241: LA-503-156 (D-0) LIQUIDS

			STANDARD
Serial No.	Spike (Tracer) Book Number		78B43
J1284-5582	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
2276	Volume of Sample in mL	(SS)	1
Rerun No.	Dilution Factor	(DF)	101
2	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	828
J VANSANT	Am-243 Area Peak Height from AEA	(C243)	912
Date	Total AT Count	(ATOT)	7105
12/02/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	7

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	3.11E+01
Am-241 µCi/mL	=	3.11E-02
Relative counting error	=	4.8%
Am-243 Tracer Recovery	=	32.0%

Data Entry by:		Date:	06-Dec-93
Approved by:		Date:	December 8, 1993

Form 3 Rev. 1.2

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#1 12-3-93

7105 - 7
30

51284-5582

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#2 2443

WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1300.-5682	BECHTOLD	11- 4-93	15:22	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/ML	E14157	2

Sample Size .25ml
? ~~1ml~~ ~~dil~~ 12.1.93 .100mL Spike 78B43

Customer ID: BLK

Remarks Calculations Results

REAGENT BLANK

COUNT AS uCi/L

"AEA" - ARGONNE
ATTACH PRINTOUT

$< 7.47 \times 10^{-4}$ µCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Eric Bauer	Raymond	Eric Bauer	
Hrs	Hrs	Hrs	Hrs	Hrs
		12.4.93	E. Cabrera	
Date	Time Completed	Lab Unit Mgr		
12-2-93			E. Cabrera	

54-6800-061 (R-10-83)

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AM-241: LA-503-156 (D-0) LIQUIDS

			BLANK
Serial No.	Spike (Tracer) Book Number		78B43
J1300-5682	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
2276	Volume of Sample in mL	(SS)	0.25
Rerun No.	Dilution Factor	(DF)	11
2	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	8
J VANSANT	Am-243 Area Peak Height from AEA	(C243)	168
Date	Total AT Count	(ATOT)	792
12/02/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	4

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd − BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

NOTE: Reported result is a LESS THAN value using 5% of the Am-243 peak as the Am-241 peak.

Am-241 µCi/L	=	< 7.47E-01
Am-241 µCi/mL	=	< 7.47E-04
Relative counting error	=	36.2%
Am-243 Tracer Recovery	=	5.7%

Data Entry by:	Date: 06-Dec-93
Approved by:	Date: December 9, 1993

Form 3 Rev. 1.2

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#3 12-3-93

$\frac{792}{30}$ -4

J1300-5682

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV 0

#6 6847

Serial No	Sample Point	Date Issued	Time Issued	Priority
J 1285.-5782	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/ML	E14157	4

Sample Size	Customer ID
1mL-10-.25mL + .100mL spike	

Remarks, Calculations, Results: sample 78B43

3.41 x 10^-2 µCi/ml

1mL 8mHNO3

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Em Barela	Raymond	Em Barela	
Hrs	Hrs	Hrs	Hrs	Hrs
		12.4.93	E C Jones	
Date	Time Completed			
12-2-93				

54-6800-061 (R 10-83)

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AM-241: LA-503-156 (D-0) LIQUIDS

			SAMPLE
Serial No.	Spike (Tracer) Book Number		78B43
J1285-5782	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
2276	Volume of Sample in mL	(SS)	0.25
Rerun No.	Dilution Factor	(DF)	11
4	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	345
J VANSANT	Am-243 Area Peak Height from AEA	(C243)	151
Date	Total AT Count	(ATOT)	2278
12/02/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	1

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	3.41E+01
Am-241 µCi/mL	=	3.41E-02
Relative counting error	=	9.8%
Am-243 Tracer Recovery	=	6.1%

Data Entry by:		Date:	06-Dec-93
Approved by:		Date:	December 8, 1993

Form 3 Rev. 1.2

A2 12-3-93

J1285-5782

2275/30 -1

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV O

#7 7379

RERUN

Serial No	Sample Point		Time Issued	Priority
J 1285.-5782	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/ML	E14157	5

Sample Size	Customer ID
1mL-10-.25mL + .100 Spike	HE13A

Remarks Calculations Results Sample Dup 78B43

COUNT AS uCI/L

4.08×10^{-2} uCi/ml

1mL 8mHNO3

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Eric Barela	Raymond	Eric Barela	
Hrs	Hrs	Hrs 12.4.93	Hrs E. Castreras	Hrs
Date 12-2-93	Time Completed	Lab Unit Mgr.		

54-6800-061 (R-10-83)

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AM-241: LA-503-156 (D-0) LIQUIDS

			SAMPLE
Serial No.	Spike (Tracer) Book Number		78B43
J1285-5782	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
2276	Volume of Sample in mL	(SS)	0.25
Rerun No.	Dilution Factor	(DF)	11
5	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	262
J VANSANT	Am-243 Area Peak Height from AEA	(C243)	96
Date	Total AT Count	(ATOT)	1357
12/02/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	7

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	4.08E+01
Am-241 µCi/mL	=	4.08E-02
Relative counting error	=	11.9%
Am-243 Tracer Recovery	=	2.7%

Data Entry by:		Date:	06-Dec-93
Approved by:		Date:	December 8, 1993

Form 3 Rev. 1.2

#1 12-3-93

J1285-5782

$\frac{1357}{30}$ -7

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#6 5939

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point		Time Issued	Priority
J 1285.-5782	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/ML	F14157	6

Sample Size	Customer ID
1mL-78-.25ml + .100 mL Spike	

Remarks Customer Result Sample Prep 78B43

3.75×10^{-2} µCi/ml

1mL 8mHNO3

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Em Bueler	Raymond	Em Bueler	
Hrs	Hrs	Hrs 12.4.93	Hrs E. Contreras	Hrs
Date 12-2-93	Time Completed		E. Contreras	

54-6800-061 (R-10-83)

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AM-241: LA-503-156 (D-0) LIQUIDS

			SAMPLE
Serial No.	Spike (Tracer) Book Number		78B43
J1285-5782	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
2276	Volume of Sample in mL	(SS)	0.25
Rerun No.	Dilution Factor	(DF)	11
6	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	3242
J VANSANT	Am-243 Area Peak Height from AEA	(C243)	1293
Date	Total AT Count	(ATOT)	18837
12/02/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	4

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	3.75E+01
Am-241 µCi/mL	=	3.75E-02
Relative counting error	=	3.3%
Am-243 Tracer Recovery	=	47.2%

Data Entry by:		Date:	06-Dec-93
Approved by:		Date:	December 8, 1993

Form 3 Rev. 1.2

#3 12-3-93

18837 -4
30

J1285-5782

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

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#4 4016 WHC-SD-WM-DP-057 REV O

RERUN

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5982	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	% RECOVERY	E14157	3

Sample Size	Customer ID
2mL-10-.25mL +1mL Std 63B93	RE13A

Remarks Calculations Results Spike + .200 mL Spike 78B43

SAMPLE SPIKED IN 63B43

SPIKE ID 78B93

SPIKE VOLUME .200mL

COUNT AS uCi/L

ATTACH PRINTOUT

205.6 % Rec.

Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Eric Barela	Raymond	Eric Barela	
Hrs	Hrs	Hrs	Hrs
	12-4-93	E. Contreras	
Date	Time Completed	Lab Analyst	
12-2-93			E. Contreras

54-6800-061 (R 10 83)

AM-241: LA-503-156 (D-0) LIQUIDS

			CHK EXT NO.
Serial No.	Spike (Tracer) Book Number		78B43
J1285-5982	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.2
2276	Volume of Sample in mL	(SS)	0.25
Rerun No.	Dilution Factor	(DF)	11
2	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	181
J VAN SANT	Am-243 Area Peak Height from AEA	(C243)	93
Date	Total AT Count	(ATOT)	1191
12/02/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	7

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

$$\frac{(58.1 - 34.1)\left(\frac{101}{1} / \frac{11}{.25}\right)(100)}{26.794} = 205.6\ \%$$

Am-241 µCi/L	=	5.81E+01
Am-241 µCi/mL	=	5.81E-02
Relative counting error	=	12.8%
Am-243 Tracer Recovery	=	1.5%

Data Entry by:	C A Clark	Date:	06-Dec-93
Approved by:		Date:	December 8, 1993

Form 3 Rev. 1.2

#1 12-3-93

1191/30 -7

J1285-5982

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#3 3507 WHC-SD-WM-DP-057-REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285-5982	BECHTOL	11-4-93		

Determination	Method/Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	RECOVERY		

Sample Size	Customer ID
1mL-10-.25mL + .100-10 1mL std 63B43	

Remarks Calculations Results Spike Dup + .200 ml Spike

SAMPLE SPIKED ID 63B43 78B43

SPIKE ID 78B43

SPIKE VOLUME
COUNT AS uCI/L .200ml

182.5% Rec.

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
J VANSANT	Em Bueler	[illegible]	Em Bueler	
Hrs	Hrs	Hrs 12-2-93	Hrs E. Contreras	Hrs
Date 12-2-93	Time Completed	Lab Dir. [illegible]	E. Contreras	

54-6800-061 (9-10-93)

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AM-241: LA-503-156 (D-0) LIQUIDS

Serial No.			CHK EXT NO.
J1285-5982	Spike (Tracer) Book Number		78B43
	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.2
2276	Volume of Sample in mL	(SS)	0.25
Rerun No.	Dilution Factor	(DF)	11
2	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	761
J VAN SANT	Am-243 Area Peak Height from AEA	(C243)	366
Date	Total AT Count	(ATOT)	2788
12/02/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	1

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))
µCi/mL = µCi/L / (1000mL/L)
Tracer % Rec = ((ATOT / MIN CTd − BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100
Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

$$\frac{(62.1 - 40.5)\left[(101)\left(\frac{11}{.25}\right)\right](100)}{26.794} = 182.5\%$$

Am-241 µCi/L	=	6.21E+01
Am-241 µCi/mL	=	6.21E-02
Relative counting error	=	6.4%
Am-243 Tracer Recovery	=	4.0%

Data Entry by:	PA Clark	Date:	06-Dec-93
Approved by:	LL Fitts	Date:	December 8, 1993

Form 3 Rev. 1.2 432 Page 1 of 1

#2 12-3-93

2788/30 -1

J1285-5982

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Em Barela
12-4-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
J1284-5582/AM
File ID: 8a8593.CNF

WHC-SD-WM-DP-057 REV O

Counted on: 12/ 4/93 @ 0:57
Detector: AEA8
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	745.9	745.9	298.909	298.909	22.000	15.787	11.000	8.711
2	778.1	778.1	254.033	253.497	16.000	10.914	8.000	1.825
3?	0.0	0.1	176.624	176.624	0.000	0.100	0.000	0.100

PEAK RESULTS
Peak Error Limit: 25%

Peak	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity [illegible]
1	Th228	0.509	5.430	5.461	-.031	0.07	49.60	1.3	601.2	0.271E-02
	Am241		5.480	5.461	0.019				454.1	0.295E-02
2	Am243	0.507	5.276	5.252	0.024	0.05	49.37	1.4	429.2	0.193E-02
3		????		4.898			0.00	*****		
Totals:		1.015	<--valid peaks only-->				98.97			

DETECTOR CALIBRATION
Energy(MEV) = 4.086 + (0.0046)*Channel
Energy range (MeV): 4.086 TO 6.441
Efficiency = 0.1162 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	46783.0	100.000
Smoothed	46783.0	100.000
Composite fit	47507.1	101.548
Residuals	-724.1	-1.548

Analyzed by: _____
VR

Spectrum 8a8593.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 6740.9


```
2
3
.2
..2
.. 2
....  2
1......  2
1........... 2
.1..................2
..1.........................2.....
....1.......................................2.........
......1.............................................................2..........
.........1.......................2..........
...2..........1.....
....................1
..............................1
.........................................1..
.......................................................1
.........................1
...1.
```

Raw Data Dump for AEA Spectrum: 8a8593.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
21	1.	1.	2.	1.	3.	1.	2.	4.	0.	4.
[illegible]	3.	3.	0.	0.	1.	1.	3.	4.	2.	1.
[illegible]	0.	2.	3.	2.	1.	3.	2.	2.	3.	1.
51	3.	5.	1.	3.	2.	4.	3.	2.	1.	1.
61	4.	3.	3.	3.	3.	2.	3.	0.	0.	2.
71	4.	3.	3.	3.	0.	6.	1.	2.	4.	1.
81	2.	3.	3.	5.	4.	3.	1.	1.	2.	3.
91	5.	1.	2.	2.	2.	3.	2.	5.	2.	[illegible]
101	4.	7.	4.	4.	5.	5.	4.	6.	5.	1.
111	7.	3.	5.	1.	5.	6.	3.	5.	3.	8.
121	4.	3.	4.	5.	8.	7.	4.	7.	6.	6.
131	8.	5.	6.	9.	6.	7.	7.	10.	13.	8.
141	3.	6.	3.	6.	7.	11.	8.	9.	8.	5.
151	6.	8.	7.	8.	10.	11.	14.	10.	10.	3.
161	10.	11.	13.	12.	10.	18.	10.	5.	23.	17.
171	13.	13.	23.	18.	16.	21.	19.	20.	14.	19.
181	17.	19.	12.	28.	19.	29.	25.	19.	30.	26.
191	29.	29.	39.	29.	31.	34.	31.	37.	39.	58.
201	55.	56.	46.	57.	59.	53.	69.	62.	70.	75.
211	87.	96.	84.	114.	117.	114.	108.	120.	161.	147.
221	148.	163.	196.	180.	216.	225.	236.	265.	268.	311.
231	340.	306.	359.	360.	393.	453.	462.	505.	567.	511.
241	550.	590.	657.	657.	686.	743.	739.	787.	759.	844.
251	903.	907.	874.	882.	912.	895.	811.	716.	634.	483.
261	444.	356.	275.	242.	217.	221.	214.	219.	201.	217.
271	222.	223.	233.	220.	228.	254.	277.	303.	319.	286.
281	309.	389.	395.	433.	417.	431.	494.	566.	528.	580.
291	633.	637.	673.	723.	720.	716.	734.	828.	715.	768.
301	726.	733.	690.	541.	526.	441.	351.	276.	208.	165.
[illegible]	151.	93.	81.	66.	40.	42.	16.	9.	7.	1.
321	4.	1.	1.	0.	0.	1.	0.	0.	0.	0.
331	0.	1.	0.	0.	0.	0.	0.	0.	0.	[illegible]
341	0.	0.	0.	1.	0.	1.	1.	1.	0.	1.
351	1.	0.	0.	1.	1.	0.	0.	0.	0.	2.
361	1.	0.	0.	1.	0.	2.	1.	1.	1.	0.
371	1.	0.	0.	1.	0.	0.	0.	0.	1.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	1.	0.	1.	0.	0.	0.	0.	1.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

Em Davis
12-4-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV 0

SAMPLE
J1300-5682/AM
File ID: 2a2443.CNF

Counted on: 12/ 4/93 @ 0:48
Detector: AEA2
Geometry number: 1
Count time: 28805. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	153.2	153.2	253.817	253.817	20.000	16.393	10.000	3.830

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am243	0.897	5.276	5.273	0.003	0.08	8.63	3.0	74.5	0.336E-04
	Pu240		5.144	5.273	-.129				73.8	0.332E-04
Totals:		0.897	<--valid peaks only-->				8.63			

DETECTOR CALIBRATION
Energy(MEV) = 4.080 + (0.0047)*Channel
Energy range (MeV): 4.080 TO 6.487
Efficiency = 0.1169 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	4619.0	100.000
Smoothed	4619.0	100.000
Composite fit	4141.9	89.671
Residuals	477.1	10.329

Analyzed by: _____
VR

Spectrum 2a2443.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 1159.0


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Raw Data Dump for AEA Spectrum: 2a2443.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	1.	1.	0.
21	3.	0.	0.	0.	0.	1.	0.	0.	0.	1.
31	1.	1.	1.	0.	1.	0.	1.	1.	1.	1.
41	0.	0.	1.	1.	2.	0.	1.	0.	1.	0.
51	0.	1.	0.	0.	2.	2.	2.	1.	2.	1.
61	0.	2.	1.	0.	0.	3.	1.	3.	2.	2.
71	1.	0.	1.	2.	1.	0.	1.	2.	1.	1.
81	1.	2.	4.	1.	1.	0.	2.	1.	1.	1.
91	0.	2.	0.	4.	0.	1.	3.	0.	2.	0.
101	1.	0.	2.	5.	2.	0.	0.	1.	0.	2.
111	2.	1.	1.	0.	0.	2.	2.	1.	3.	1.
121	0.	0.	0.	1.	3.	0.	1.	1.	2.	2.
131	1.	3.	2.	1.	4.	2.	1.	2.	3.	4.
141	6.	1.	2.	4.	1.	4.	0.	1.	2.	1.
151	0.	1.	1.	3.	3.	3.	1.	1.	2.	4.
161	1.	0.	2.	2.	3.	2.	5.	0.	6.	7.
171	0.	1.	5.	2.	3.	2.	4.	0.	3.	3.
181	1.	6.	2.	4.	5.	3.	3.	6.	6.	3.
191	3.	7.	10.	5.	5.	4.	5.	7.	7.	4.
201	8.	11.	10.	10.	9.	13.	9.	7.	7.	11.
211	12.	15.	20.	9.	17.	16.	14.	19.	13.	17.
221	11.	19.	16.	29.	24.	19.	18.	40.	40.	35.
231	37.	43.	44.	58.	62.	62.	65.	60.	72.	90.
241	90.	81.	105.	117.	105.	98.	119.	127.	153.	146.
251	136.	153.	168.	159.	161.	153.	127.	122.	96.	94.
261	92.	80.	65.	43.	37.	27.	28.	20.	20.	14.
271	10.	15.	6.	4.	8.	7.	0.	5.	7.	1.
281	2.	3.	1.	6.	4.	3.	2.	5.	2.	5.
291	5.	5.	7.	6.	5.	8.	2.	4.	6.	3.
301	4.	1.	1.	5.	3.	2.	4.	2.	4.	0.
311	1.	1.	2.	0.	0.	2.	0.	1.	0.	0.
321	0.	1.	1.	0.	2.	0.	0.	0.	2.	1.
331	1.	1.	1.	1.	2.	3.	1.	3.	2.	3.
341	0.	2.	1.	2.	1.	0.	1.	2.	3.	1.
351	2.	2.	2.	0.	1.	1.	0.	0.	0.	1.
361	1.	0.	0.	1.	0.	1.	1.	0.	0.	0.
371	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	1.	1.	0.	0.	0.	0.	0.	1.	0.	1.
431	1.	1.	0.	0.	0.	0.	1.	1.	2.	0.
441	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	1.	0.	0.	0.	0.	1.
471	0.	4.	2.	1.	2.	0.	2.	1.	0.	2.
481	1.	0.	0.	0.	0.	0.	0.	0.	1.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

Em Bauer
12-4-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
J1285-5782/AM
File ID: 6a.CNF

WHC-SD-WM-DP-057 REV 0

Counted on: 12/ 4/93 @ 0:55
Detector: AEA6
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	318.5	318.5	299.028	299.028	28.000	28.742	14.000	6.868
2	112.2	112.2	253.822	253.366	20.000	18.303	10.000	3.519
3	8.3	8.3	179.380	179.161	54.000	408.696	27.000	92.755

PEAK RESULTS
Peak Error Limit: 25%

Peak	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am241	0.702	5.480	5.492	-.012	0.14	20.74	2.0	155.1	0.699E-04
	Pu238		5.499	5.492	0.007				202.5	0.912E-04
2	Am243	0.244	5.276	5.277	-.001	0.09	7.20	4.1	51.1	0.230E-04
	Pu240		5.144	5.277	-.133				50.6	0.228E-04
3	Np237	0.056	4.781	4.928	-.147	1.92	1.67	23.7	13.5	0.607E-05
		---					---			
Totals:		1.002	<--valid peaks only-->				29.61			

DETECTOR CALIBRATION
Energy(MEV) = 4.086 + (0.0047)*Channel
Energy range (MeV): 4.086 TO 6.493
Efficiency = 0.1423 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	14179.0	100.000
Smoothed	14180.2	100.009
Composite fit	14212.4	100.236
Residuals	-33.4	-0.236

Analyzed by: _____
VR

Spectrum 6a.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 2466.6


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31...............2...
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Raw Data Dump for AEA Spectrum: 6a.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	0.	4.	3.
21	2.	1.	1.	2.	4.	3.	1.	0.	0.	1.
31	0.	0.	3.	1.	0.	1.	2.	3.	2.	2.
[illegible]	1.	0.	1.	0.	4.	0.	3.	4.	4.	1.
[illegible]	1.	1.	2.	1.	3.	0.	1.	2.	0.	2.
61	1.	1.	3.	5.	0.	2.	4.	3.	0.	1.
71	1.	2.	7.	1.	4.	4.	1.	2.	3.	1.
81	2.	7.	3.	4.	1.	1.	5.	3.	2.	[illegible]
91	2.	6.	4.	3.	2.	2.	3.	2.	2.	[illegible]
101	1[illegible]	2.	1.	1.	4.	5.	3.	3.	4.	4.
111	5.	3.	4.	5.	3.	7.	5.	8.	3.	3.
121	8.	5.	6.	10.	5.	6.	7.	4.	6.	6.
131	8.	3.	5.	4.	1.	3.	5.	2.	11.	5.
141	2.	3.	3.	5.	7.	6.	9.	6.	2.	7.
151	5.	5.	6.	4.	11.	14.	6.	8.	3.	2.
161	8.	10.	10.	7.	4.	12.	3.	9.	6.	11.
171	8.	9.	9.	6.	9.	8.	9.	7.	15.	10.
181	13.	4.	7.	11.	8.	12.	5.	16.	10.	14.
191	12.	10.	19.	12.	8.	16.	19.	14.	15.	[illegible]
201	15.	16.	15.	15.	12.	11.	18.	18.	22.	[illegible]
211	22.	13.	19.	15.	18.	24.	36.	19.	21.	[illegible]
221	17.	28.	27.	32.	40.	43.	43.	28.	44.	[illegible]
231	40.	43.	35.	59.	51.	51.	55.	49.	52.	[illegible]
241	69.	82.	91.	107.	106.	105.	106.	107.	114.	121.
251	131.	119.	135.	151.	133.	124.	102.	116.	99.	108.
261	100.	88.	90.	82.	82.	87.	71.	71.	82.	66.
271	71.	72.	79.	78.	73.	106.	80.	109.	119.	118.
281	107.	132.	148.	162.	168.	172.	183.	205.	209.	184.
291	254.	249.	277.	311.	291.	292.	319.	340.	345.	320.
301	294.	312.	326.	270.	287.	214.	247.	218.	186.	[illegible]
[illegible]	155.	127.	92.	79.	75.	69.	41.	41.	30.	[illegible]
[illegible]	8.	14.	3.	8.	10.	3.	1.	2.	3.	[illegible]
331	1.	2.	0.	0.	0.	0.	2.	0.	1.	[illegible]
341	1.	0.	1.	3.	3.	1.	1.	1.	0.	1.
351	1.	3.	0.	2.	5.	1.	0.	1.	2.	1.
361	1.	0.	0.	0.	0.	0.	4.	0.	1.	1.
371	1.	1.	1.	2.	0.	1.	1.	0.	0.	1.
381	0.	1.	0.	2.	0.	0.	0.	0.	0.	0.
391	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	1.	0.	0.	0.	0.	1.	0.
421	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	1.	1.	0.	0.	[illegible]
441	0.	0.	0.	1.	0.	0.	0.	0.	1.	[illegible]
451	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
461	0.	0.	1.	0.	1.	1.	0.	1.	0.	0.
471	1.	1.	2.	2.	0.	3.	1.	1.	1.	0.
481	1.	0.	0.	0.	0.	1.	0.	0.	0.	0.
491	0.	0.	0.	1.	1.	3.	10.	1.	1.	0.
511	0.	0.								

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%PSM-E-OPENIN, error opening _DKA300:[USER]6A6847.REP;1 as input
-RMS-E-FNF, file not found
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Sm Barlow
12-4-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV 0

SAMPLE
J1285-5782/AM
File ID: 7a7379.CNF

Counted on: 12/ 4/93 @ 0:56
Detector: AEA7
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	237.3	237.3	302.240	302.240	16.000	10.462	8.000	1.192
2	79.4	79.4	257.077	257.001	16.000	11.274	8.000	1.512
3	10.5	10.5	208.988	208.789	12.000	19.624	6.000	1.323

PEAK RESULTS
Peak Error Limit: 25%

Peak	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am241	0.661	5.480	5.472	0.008	0.05	9.12	3.0	81.6	0.368E-04
	Pu238		5.499	5.472	0.027				106.6	0.480E-01
2	Am243	0.255	5.276	5.264	0.012	0.05	3.52	5.0	29.9	0.135E-01
3		0.046		5.042		0.09	0.63	14.0	5.3	0.241E-05
Totals:		0.962	<--valid peaks only-->				13.27			

DETECTOR CALIBRATION
Energy(MEV) = 4.081 + (0.0046)*Channel
Energy range (MeV): 4.081 TO 6.437
Efficiency = 0.1188 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	6622.0	100.000
Smoothed	6622.0	100.000
Composite fit	6370.5	96.202
Residuals	251.5	3.798

Analyzed by: _____
VR

Spectrum 7a7379.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 1716.8


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Raw Data Dump for AEA Spectrum: 7a7379.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
21	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.
31	0.	0.	1.	0.	0.	1.	0.	0.	0.	1.
[illegible]	1.	0.	0.	0.	1.	0.	1.	0.	1.	0.
51	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	1.	0.	0.	1.	3.	0.
71	1.	2.	0.	0.	0.	0.	0.	0.	1.	1.
81	1.	1.	1.	0.	0.	1.	1.	0.	1.	1.
91	1.	0.	2.	2.	0.	2.	2.	1.	0.	1.
101	1.	2.	1.	0.	1.	0.	1.	1.	0.	1.
111	2.	2.	2.	1.	1.	1.	0.	1.	1.	3.
121	2.	1.	1.	0.	2.	4.	3.	1.	3.	0.
131	1.	0.	1.	1.	3.	3.	2.	4.	2.	4.
141	2.	0.	2.	2.	3.	0.	5.	0.	1.	4.
151	4.	0.	2.	3.	4.	3.	4.	3.	3.	1.
161	2.	1.	4.	1.	1.	6.	2.	6.	4.	0.
171	1.	5.	3.	3.	0.	0.	2.	2.	1.	2.
181	4.	2.	3.	3.	7.	4.	2.	5.	9.	6.
191	6.	3.	6.	4.	9.	6.	3.	3.	4.	[illegible]
201	6.	6.	5.	7.	7.	11.	6.	17.	14.	11.
211	10.	10.	2.	8.	5.	9.	8.	12.	14.	15.
221	7.	10.	9.	12.	16.	9.	15.	11.	15.	15.
231	14.	17.	17.	12.	16.	16.	14.	21.	17.	[illegible]
241	30.	24.	23.	27.	31.	36.	43.	39.	48.	61.
251	49.	67.	89.	73.	78.	84.	96.	71.	87.	71.
261	59.	43.	36.	25.	32.	26.	15.	23.	27.	31.
271	22.	21.	25.	21.	32.	20.	22.	25.	28.	37.
281	24.	37.	29.	25.	33.	60.	52.	54.	72.	82.
291	87.	101.	112.	120.	146.	150.	188.	193.	242.	250.
301	256.	244.	262.	233.	223.	172.	165.	122.	103.	[illegible]
[illegible]	60.	48.	37.	38.	27.	13.	13.	4.	6.	2.
321	1.	1.	0.	1.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
341	0.	1.	0.	0.	0.	0.	0.	0.	0.	1.
351	1.	2.	3.	1.	0.	2.	0.	0.	0.	0.
361	1.	0.	1.	2.	1.	0.	2.	3.	0.	3.
371	0.	1.	1.	0.	1.	0.	1.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
431	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.
441	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
481	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	3.	0.								

Gm Burela
12-4-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
J1285-5782/AM
File ID: 5a5939.CNF

WHC-SD-WM-DP-057 REV O

Counted on: 12/ 4/93 @ 0:51
Detector: AEA5
Geometry number: 1
Count time: 28806. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1?	11.1	11.1	361.352	361.352	30.000	25.886	15.000	5.977
2	2999.5	2999.5	297.993	297.992	24.000	19.274	12.000	4.839
3	1084.6	1084.6	252.566	251.697	24.000	20.402	12.000	3.228
4?	29.3	29.3	76.494	76.453	274.000	1.000	137.000	0.100
5?	2.7	2.7	42.132	41.093	6.000	0.838	3.000	0.280

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1		????		5.760			0.71	10.6		
2	Am241	0.630	5.480	5.469	0.011	0.09	170.31	0.7	1572.8	0.708E-03
	Pu238		5.499	5.469	0.030				2053.3	0.925E-03
3	Am243	0.295	5.276	5.256	0.020	0.09	79.68	1.2	698.6	0.315E-03
	Pu240		5.144	5.256	-.112				691.7	0.312E-03
4		????		4.450			2.07	6.3		
5		????		4.287			0.07	109.		
Totals:		0.925	<--valid peaks only-->				249.99			

DETECTOR CALIBRATION
Energy(MEV) = 4.098 + (0.0046)*Channel
Energy range (MeV): 4.098 TO 6.453
Efficiency = 0.1152 CPM/DPM

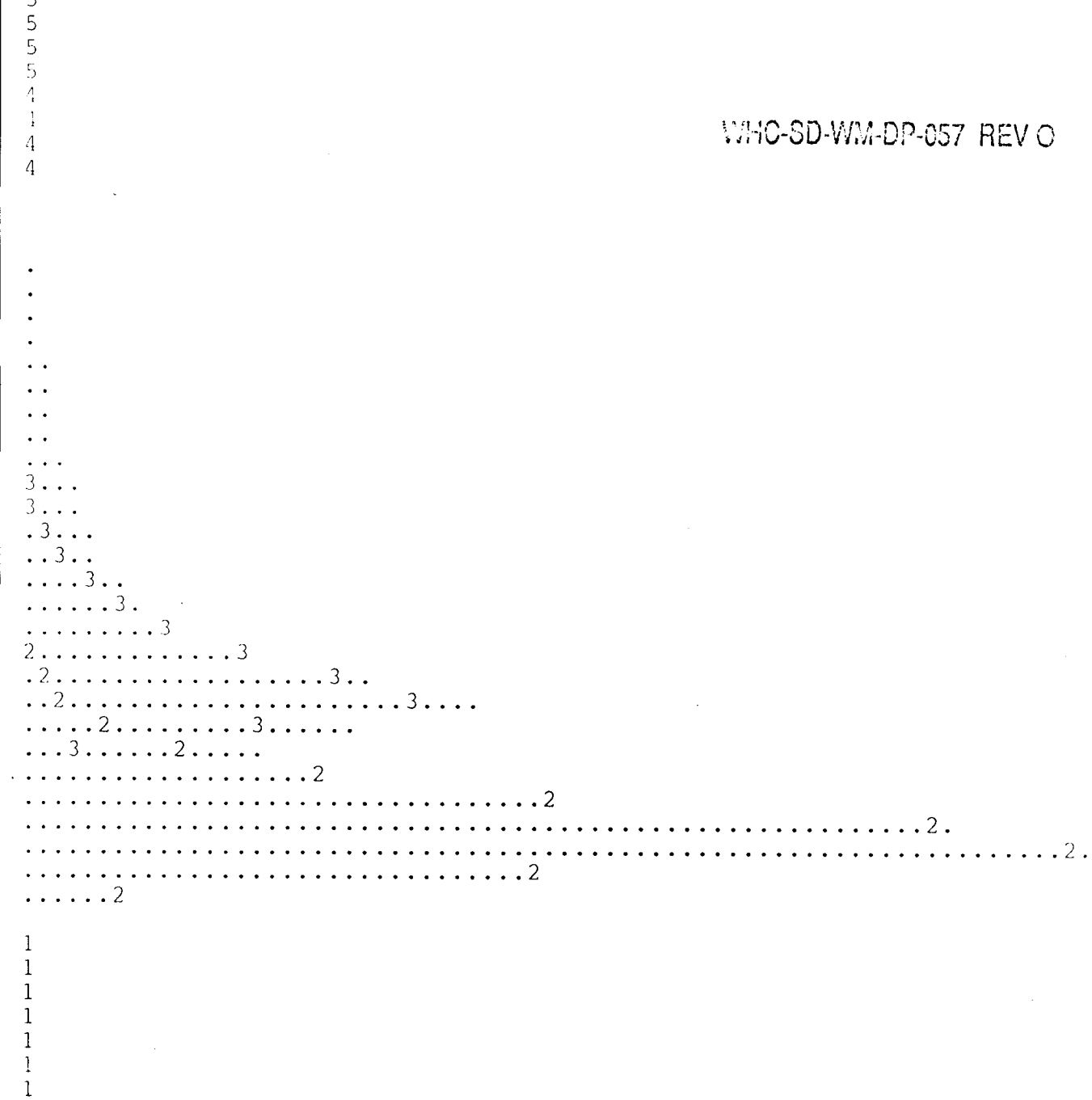
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	129697.0	100.000
Smoothed	129697.0	100.000
Composite fit	121390.2	93.595
Residuals	8306.8	6.405

Analyzed by: _____

Spectrum 5a5939.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 22305.6



WHC-SD-WM-DP-057 REV O

Raw Data Dump for AEA Spectrum: 5a5939.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	4.	12.	5.	8.
21	6.	5.	14.	8.	10.	16.	9.	9.	12.	11.
31	8.	11.	9.	12.	7.	18.	11.	6.	15.	12.
41	13.	18.	14.	11.	12.	16.	7.	13.	10.	16.
51	10.	18.	11.	14.	16.	7.	19.	12.	23.	25.
61	15.	21.	20.	19.	17.	19.	22.	18.	17.	13.
71	32.	23.	24.	18.	26.	30.	27.	21.	26.	24.
81	17.	18.	26.	21.	35.	38.	27.	30.	34.	25.
91	26.	35.	30.	34.	39.	39.	31.	48.	34.	27.
101	29.	33.	44.	35.	32.	39.	31.	43.	40.	51.
111	48.	53.	38.	45.	50.	50.	69.	53.	48.	43.
121	55.	62.	43.	65.	63.	62.	53.	56.	53.	51.
131	70.	83.	70.	69.	58.	59.	72.	65.	93.	101.
141	80.	94.	77.	79.	97.	83.	91.	86.	105.	102.
151	74.	115.	112.	110.	103.	94.	114.	88.	96.	114.
161	117.	111.	116.	120.	113.	117.	137.	134.	122.	140.
171	139.	141.	138.	148.	120.	152.	144.	154.	159.	171.
181	170.	165.	177.	164.	171.	177.	198.	181.	179.	193.
191	199.	206.	190.	213.	212.	203.	221.	217.	184.	230.
201	245.	238.	222.	242.	233.	223.	268.	263.	257.	264.
211	315.	296.	310.	285.	271.	284.	309.	323.	318.	351.
221	346.	377.	339.	377.	365.	404.	376.	430.	409.	417.
231	484.	482.	483.	523.	551.	605.	657.	630.	689.	730.
241	767.	823.	883.	964.	1015.	1045.	1126.	1152.	1195.	1216.
251	1293.	1290.	1250.	1230.	1182.	1242.	1125.	1025.	945.	869.
261	797.	750.	693.	699.	636.	604.	614.	685.	576.	591.
271	631.	606.	652.	717.	726.	751.	838.	889.	898.	1037.
281	1115.	1163.	1292.	1344.	1455.	1547.	1764.	1909.	2097.	2175.
291	2493.	2567.	2653.	2838.	3027.	3046.	3242.	3101.	3052.	2979.
301	2865.	2612.	2479.	2215.	1996.	1724.	1465.	1165.	1029.	828.
311	612.	495.	422.	295.	233.	189.	125.	72.	75.	32.
321	20.	27.	7.	10.	7.	3.	2.	2.	3.	2.
331	3.	1.	4.	0.	3.	3.	2.	0.	1.	1.
341	2.	1.	6.	1.	10.	8.	6.	2.	8.	3.
351	2.	7.	8.	6.	5.	9.	10.	10.	9.	9.
361	13.	15.	7.	12.	4.	5.	10.	8.	12.	11.
371	8.	6.	10.	5.	3.	1.	0.	3.	0.	1.
381	0.	2.	0.	1.	0.	0.	1.	0.	0.	0.
391	1.	1.	0.	0.	0.	0.	0.	1.	1.	0.
401	0.	1.	0.	0.	0.	0.	1.	0.	0.	1.
411	0.	0.	0.	2.	1.	1.	3.	0.	5.	3.
421	1.	3.	1.	2.	1.	2.	1.	1.	2.	3.
431	5.	2.	1.	3.	4.	3.	3.	2.	0.	1.
441	1.	1.	3.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	1.	1.	1.	0.
481	1.	0.	4.	2.	0.	0.	1.	2.	0.	0.
491	1.	0.	0.	1.	0.	0.	0.	0.	0.	0.
511	0.	0.								

Eric Barrera
12-4-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
J1285-5982/AM
File ID: 4a4016.CNF

WHC-SD-WM-DP-057 REV 0

Counted on: 12/ 4/93 @ 0:50
Detector: AEA4
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	161.5	161.5	303.185	303.185	14.000	6.810	7.000	[illegible]
2	74.6	74.6	257.881	257.875	14.000	5.825	7.000	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Pu238	0.651	5.499	5.508	-.009	0.03	4.72	4.1	68.6	0.302E-04
	Am241		5.480	5.508	-.028				52.5	0.237E-04
2	Am243	0.291	5.276	5.295	-.019	0.03	2.11	6.2	22.3	0.100E-04
Totals:		0.941	<--valid peaks only-->				6.83			

DETECTOR CALIBRATION
Energy(MEV) = 4.083 + (0.0047)*Channel
Energy range (MeV): 4.083 TO 6.489
Efficiency = 0.0957 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	3485.0	100.000
Smoothed	3485.0	100.000
Composite fit	3280.1	94.121
Residuals	204.9	5.879

Analyzed by: _____
VR

Spectrum 4a4016.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 1063.6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1.
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.......................................................................1..
.............................................1
..1....
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Raw Data Dump for AEA Spectrum: 4a4016.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
21	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
71	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
81	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	0.	0.	1.	0.	1.	0.	0.	0.	0.	1.
101	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
111	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
121	0.	1.	1.	0.	1.	0.	0.	0.	0.	0.
131	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.
141	1.	3.	2.	0.	1.	0.	0.	0.	0.	0.
151	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
161	0.	0.	1.	1.	0.	0.	1.	0.	0.	1.
171	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.
181	1.	2.	0.	1.	0.	0.	0.	0.	1.	2.
191	5.	1.	1.	2.	0.	1.	0.	0.	0.	0.
201	1.	0.	1.	1.	1.	4.	0.	0.	2.	0.
211	1.	2.	1.	1.	0.	1.	3.	4.	1.	1.
221	0.	5.	0.	1.	1.	1.	2.	3.	2.	1.
231	2.	1.	4.	2.	4.	2.	6.	4.	4.	[illegible]
241	9.	11.	8.	4.	13.	13.	27.	23.	30.	[illegible]
251	19.	37.	52.	65.	65.	86.	93.	74.	82.	[illegible]
261	70.	29.	25.	11.	10.	8.	7.	7.	5.	5.
271	8.	10.	5.	2.	3.	3.	8.	5.	8.	2.
281	9.	5.	4.	9.	14.	20.	13.	22.	15.	23.
291	25.	35.	40.	44.	73.	70.	99.	118.	124.	150.
301	171.	181.	181.	165.	177.	140.	88.	66.	60.	28.
311	28.	22.	14.	10.	10.	6.	9.	2.	2.	0.
321	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
331	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
341	0.	1.	0.	1.	0.	0.	3.	0.	0.	1.
351	0.	0.	3.	0.	1.	0.	0.	0.	0.	0.
361	0.	1.	1.	2.	2.	1.	1.	2.	0.	3.
371	2.	0.	1.	1.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.
481	2.	0.	0.	0.	0.	1.	0.	1.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

Eric Barela
12-4-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV 0

SAMPLE
J1285-5982/AM
File ID: 3a3507.CNF

Counted on: 12/ 4/93 @ 0:49
Detector: AEA3
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	716.9	716.9	305.206	305.206	18.000	12.331	9.000	5.220
2	336.2	336.2	258.939	258.867	18.000	10.771	9.000	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/cm
	Am241	0.666	5.480	5.489	-.0090	06	29.01	1.7	240.9	0.109E-03
	Pu238		5.499	5.489	0.010				314.5	0.142E-03
2	Am243	0.315	5.276	5.276	0.0000	05	13.74	2.5	108.3	0.488E-04
Totals:		0.982	<--valid peaks only-->				42.74			

DETECTOR CALIBRATION
Energy(MEV) = 4.085 + (0.0046)*Channel
Energy range (MeV): 4.085 TO 6.440
Efficiency = 0.1281 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	20903.0	100.000
Smoothed	20903.0	100.000
Composite fit	20516.7	98.152
Residuals	386.3	1.848

Analyzed by: _____
VR

Spectrum 3a3507.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 4726.4


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2
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....2
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...................................2.
1...........2.
2..1.
........ 1
.......................1.
.............................................................1...
.......................................................................1
....................1
1..
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Raw Data Dump for AEA Spectrum: 3a3507.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.
21	1.	0.	0.	0.	0.	0.	1.	0.	1.	0.
31	0.	0.	0.	1.	0.	0.	0.	1.	0.	0.
[illegible]	2.	0.	0.	0.	0.	0.	0.	1.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	1.	1.	1.	0.	1.	0.	0.	1.
71	0.	1.	2.	1.	1.	0.	0.	0.	0.	0.
81	0.	0.	0.	1.	0.	0.	1.	0.	2.	1.
91	3.	1.	0.	0.	1.	0.	0.	0.	1.	0.
101	1.	1.	1.	0.	1.	0.	2.	2.	0.	3.
111	2.	1.	0.	1.	1.	2.	0.	2.	0.	0.
121	0.	0.	0.	1.	0.	1.	0.	0.	0.	2.
131	2.	1.	2.	2.	0.	1.	1.	1.	2.	0.
141	3.	0.	2.	0.	1.	0.	1.	1.	0.	1.
151	1.	1.	1.	1.	1.	1.	3.	0.	0.	1.
161	0.	2.	1.	1.	2.	2.	2.	1.	3.	0.
171	1.	1.	2.	2.	0.	3.	3.	1.	5.	2.
181	1.	3.	2.	2.	3.	1.	2.	6.	2.	1.
191	3.	2.	1.	5.	4.	8.	1.	3.	2.	5.
201	5.	5.	4.	2.	1.	6.	7.	5.	2.	6.
211	7.	5.	4.	11.	4.	9.	14.	12.	17.	13.
221	12.	20.	24.	23.	21.	19.	26.	29.	23.	30.
231	41.	41.	38.	37.	38.	41.	39.	36.	40.	42.
241	57.	53.	70.	103.	92.	131.	139.	126.	183.	186.
251	229.	278.	288.	303.	323.	313.	366.	362.	357.	353.
261	340.	310.	293.	196.	168.	160.	97.	83.	67.	50.
271	36.	44.	38.	45.	46.	29.	30.	34.	47.	28.
281	35.	49.	57.	54.	90.	86.	98.	107.	142.	144.
291	205.	223.	269.	323.	375.	426.	459.	510.	601.	601.
301	677.	730.	689.	760.	757.	761.	721.	667.	529.	482.
[illegible]	418.	330.	243.	201.	185.	103.	97.	62.	59.	53.
[illegible]	27.	24.	17.	7.	3.	4.	1.	0.	1.	0.
331	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
341	0.	0.	0.	1.	0.	1.	2.	0.	0.	1.
351	0.	0.	2.	0.	0.	0.	0.	2.	2.	0.
361	1.	0.	3.	2.	3.	2.	3.	0.	3.	0.
371	1.	3.	0.	1.	0.	0.	1.	0.	2.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	1.	0.	0.	0.	0.	0.	0.	1.	1.
441	2.	0.	1.	0.	0.	0.	1.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.
481	0.	1.	2.	0.	1.	0.	0.	0.	0.	0.
491	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

OA 20

WESTINGHOUSE HANFORD COMPANY

WHC-SD-WM-DP-057 REV 0

222-S LABORATORY

ANALYTICAL BATCH 2259

Lab Segment Serial No. J1285	Customer ID: Backfield KE13A 105KE Basin
Analysis: Am 241	Sample Prep: DIRECT

Instrument: LUB537237	Procedure/ Rev: LA 505-156 / D-0
Technologist: Joelm VanSant	Date: 11-22-93
Starting Time: 0800	Temperature 25°C
Ending Time: 1400	Chemist: L Fitts

Comments:

	Description	Lab ID
1	INITIAL LMCS CHECK STD	J1284-5592
2	REAGENT BLANK	J1300-5682
3	Sample	J1285-5792
4	Sample Duplicate	J1285-5792
5	Sample Triplicate	J1285-5792
6	Spike	J1285-5982
7	Spike Duplicate	J1285-5982
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	63B43 .100mL	-10 - 1mL		
Spike	78B43 .100mL			

A-6000-881 (03/93)

OA

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-503-156

DATE START: November 22, 1993

PREPARED BY: L.L. Fritts LLFritts 11-29-93

DATE COMPLETE: November 29, 1993

	UNITS:	uCi/mL									
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	%REC	DET LIM	% CT ER
STD 63B43	J1284	Am-241	2.98E+1						111.2	1.71E-2	11.1
BLANK	J1300	Am-241	1.79E-5						11.4	1.70E-4	19.4
KE13A	J1285	Am-241	4.52E-2		4.77E-2				20.5	7.47E-4	4.2
									2.3	7.47E-4	11.6
KE13A	J1285	Am-241	86.5	108.8					6.9	1.49E-3	5.9
									8.8	1.49E-3	4.7

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

The results for the spike are in percent recovery.

Rerun requested: Sample blank is an actual value, tracer recovery is low on triplicate sample, and sample duplicate cannot be found.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV O

3 2417

Serial No	Sample Point	Date	Time Issued	Priority
J 1284.-5582	BECHTOLD	11- 4-93	8:47	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	% RECOVERY	E14157	1

Sample Size	Customer ID
100mL-10-1mL + 100mL Spike	

78B43

RERUN

Primary Calculations Results

63543 29.8

STD VAL 26.796 %REC 111.2%

1mL 8mlc HNO3

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	DHMitchell			
Hrs	Hrs	Hrs	Hrs	Hrs
11-22-93	1400			

54-5A00-061 (R 10 93)

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AM-241: LA-503-156 (D-0) LIQUIDS

Serial No.			STANDARD
J1284-5582	Spike (Tracer) Book Number		78B43
Batch ID	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
2259	Spike (Tracer) Volume in mL	(SPKV)	0.1
Rerun No.	Volume of Sample in mL	(SS)	1
1	Dilution Factor	(DF)	101
Analyst	Digest Dilution Factor	(DDF)	1
J VAN SANT	Am-241 Area Peak Height from AEA	(C241)	152
Date	Am-243 Area Peak Height from AEA	(C243)	175
11/22/93	Total AT Count	(ATOT)	1894
	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	7

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	2.98E+01
Am-241 µCi/mL	=	2.98E-02
Relative counting error	=	11.1%
Am-243 Tracer Recovery	=	8.0%

Data Entry by:	Date:	24-Nov-93
Approved by:	Date:	November 29, 1993

Form 3 Rev. 1.2

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#1 11-22-93 DM

1894/30 -7

51284-0582

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV 0

3 3481

Serial No	Sample Point	Date	Time Issued	Priority
J 1300.-5682	BECHTOLD	11- 4-93	15:22	15

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/ml	E14157	1

Sample Size: 1mL 8mHNO3 + .100 mL Spike — 11-22-93

Customer ID: BLK

Remarks Calculations Results

REAGENT BLANK

COUNT AS uCi/L 1.79×10^{-5} uCi/ml

78B43 RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
	1400			
Date	Time Completed	Lab		
11-22-93	1400			

LAP 11-30-93

54-EROC-061 R 10-93

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AM-241: LA-503-156 (D-0) LIQUIDS

			BLANK
Serial No.	Spike (Tracer) Book Number		78B43
J1300-5682	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
2259	Volume of Sample in mL	(SS)	1
Rerun No.	Dilution Factor	(DF)	1
1	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	28
J VAN SANT	Am-243 Area Peak Height from AEA	(C243)	530
Date	Total AT Count	(ATOT)	1388
11/22/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	1

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	1.79E-02
Am-241 µCi/mL	=	1.79E-05
Relative counting error	=	19.4%
Am-243 Tracer Recovery	=	11.4%

Data Entry by: Date: 24-Nov-93

Approved by: Date: November 29, 1993

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Form 3 Rev. 1.2

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#2 11-22-93 DM

1388/30 - 1

51300-5682

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-057 REV O

4 4991

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5782	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/ml	E14157	1

Sample Size	Customer ID
1ml-10-.250mL + .100mL Splits	

Remarks Calculation Results 3 Smpls 78B43

4.52 x 10^-2 uCi/ml

1mL Smthrs

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 11-22-93	Time Completed 1400			

54-6R0C-061 (R 12 93)

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AM-241: LA-503-156 (D-0) LIQUIDS

			SAMPLE
Serial No.	Spike (Tracer) Book Number		78B43
J1285-5782	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
2259	Volume of Sample in mL	(SS)	0.25
Rerun No.	Dilution Factor	(DF)	11
1	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	2268
J VAN SANT	Am-243 Area Peak Height from AEA	(C243)	749
Date	Total AT Count	(ATOT)	9448
11/22/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	4

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	4.52E+01
Am-241 µCi/mL	=	4.52E-02
Relative counting error	=	4.2%
Am-243 Tracer Recovery	=	20.5%

Data Entry by:	Date:	24-Nov-93
Approved by:	Date:	November 24, 1993

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Form 3 Rev. 1.2

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#3 11-22-93 DM

9448/50 -4

J1285-5782

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

5 5915

WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5782	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/ML	E14157	3

Sample Size	Customer ID
? 1mL-10-.250ml + .100ml Spike	KE13A

Remarks Calculations Results Sample Triplicate 78B43 RERUN

COUNT AS uCI/L

4.77×10^{-2} uCi/ml

1mL 8m HNO_3

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D. Williams	Eric Barcelo		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Worker	
11-22-93	1400		

54 6R00-061 (R 10 83)

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AM-241: LA-503-156 (D-0) LIQUIDS

			SAMPLE
Serial No.	Spike (Tracer) Book Number		78B43
J1285-5782	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
2259	Volume of Sample in mL	(SS)	0.25
Rerun No.	Dilution Factor	(DF)	11
3 1 11-24-93	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	310
J VAN SANT	Am-243 Area Peak Height from AEA	(C243)	97
Date	Total AT Count	(ATOT)	1122
11/22/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	1

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	4.77E+01
Am-241 µCi/mL	=	4.77E-02
Relative counting error	=	11.6%
Am-243 Tracer Recovery	=	2.3%

Data Entry by: Date: 24-Nov-93

Approved by: Date: November 24, 1993

465

Form 3 Rev. 1.2

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#2 11-22-93 DM

$\frac{1122}{30}$ -1

J1285-5782

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

6 6822 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285-5982	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AM241	LA-503-156	% RECOVERY	E14157	1

Sample Size	Customer ID
1mL-10-.25mL + 100mL-10-1mL Sth	[illegible]

Spike 68B43

79B43

BLANK VOLUME .200mL

86.5%

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[illegible]	[illegible]	[illegible]		
Hrs	Hrs	Hrs	Hrs	Hrs

11-22-93	1400	[illegible]	[illegible]

54-6R00-061 (R 10 93)

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AM-241: LA-503-156 (D-0) LIQUIDS

			CHK EXT NO.
Serial No.	Spike (Tracer) Book Number		78B43
J1285-5982	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.2
2259	Volume of Sample in mL	(SS)	0.25
Rerun No.	Dilution Factor	(DF)	11
1	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	824
J VAN SANT	Am-243 Area Peak Height from AEA	(C243)	445
Date	Total AT Count	(ATOT)	4596
11/22/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	4

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	5.53E+01
Am-241 µCi/mL	=	5.53E-02
Relative counting error	=	5.9%
Am-243 Tracer Recovery	=	6.9%

Data Entry by:	[illegible]	Date:	29-Nov-93
Approved by:	[illegible]	Date:	November 29, 1993

467

Form 3 Rev. 1.2

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#3 11-22-93 DM

4596/50 -4

J1255-5982

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

7 7358 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5982	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	% RECOVERY	E14157	2

Sample Size	Customer ID
1mL-10-.250mL + .100mL-10-1mL std	KE13A

Remarks, Calculations, Results Spike Rec

SAMPLE SPIKED ID 63BA3

SPIKE ID 78BA3

SPIKE VOLUME .200mL

COUNT AS uCI/L 108.8%

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	D. H. Milligan	Eric Bacci		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11-22-93	1400		

54-6800-061 (R-10-93)

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AM-241: LA-503-156 (D-0) LIQUIDS

			CHK EXT NO.
Serial No.	Spike (Tracer) Book Number		78B43
J1285-5982	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.2
2259	Volume of Sample in mL	(SS)	0.25
Rerun No.	Dilution Factor	(DF)	11
1	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	1376
J VAN SANT	Am-243 Area Peak Height from AEA	(C243)	681
Date	Total AT Count	(ATOT)	6247
11/22/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	7

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	6.04E+01
Am-241 µCi/mL	=	6.04E-02
Relative counting error	=	4.7%
Am-243 Tracer Recovery	=	8.8%

Data Entry by:		Date: 29-Nov-93
Approved by:	469	Date: November 29, 1993

Form 3 Rev. 1.2

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#1 11-22-93 Dm

6247/30 -7

J1285-5982

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Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

SAMPLE
J1284-5582
File ID: 2a2417.CNF

Counted on: 11/23/93 @ 5:53
Detector: AEA2
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	134.0	134.0	300.405	300.405	22.000	16.732	[illegible]	[illegible]
2	155.0	155.0	255.947	255.721	18.000	16.723	[illegible]	[illegible]
3	13.4	13.4	205.360	205.360	32.000	35.868	16.000	1.923

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ml
1	Am241	0.370	5.480	5.489	-.009	0.08	6.55	3.5	59.2	0.[illegible]-04
	Pu238		5.499	5.489	0.010				77.3	0.[illegible]-04
2	Am243	0.499	5.276	5.278	-.002	0.08	8.83	3.1	75.8	0.[illegible]-04
	Pu240		5.144	5.278	-.134				75.1	0.[illegible]-04
3		0.126		5.042		0.17	2.22	8.5	18.9	0.8518-05
Totals:		0.994	<--valid peaks only-->				17.60			

DETECTOR CALIBRATION
Energy(MEV) = 4.077 + (0.0047)*Channel
Energy range (MeV): 4.077 TO 6.483
Efficiency = 0.1177 CPM/DPM

TOTAL COUNT DATA:

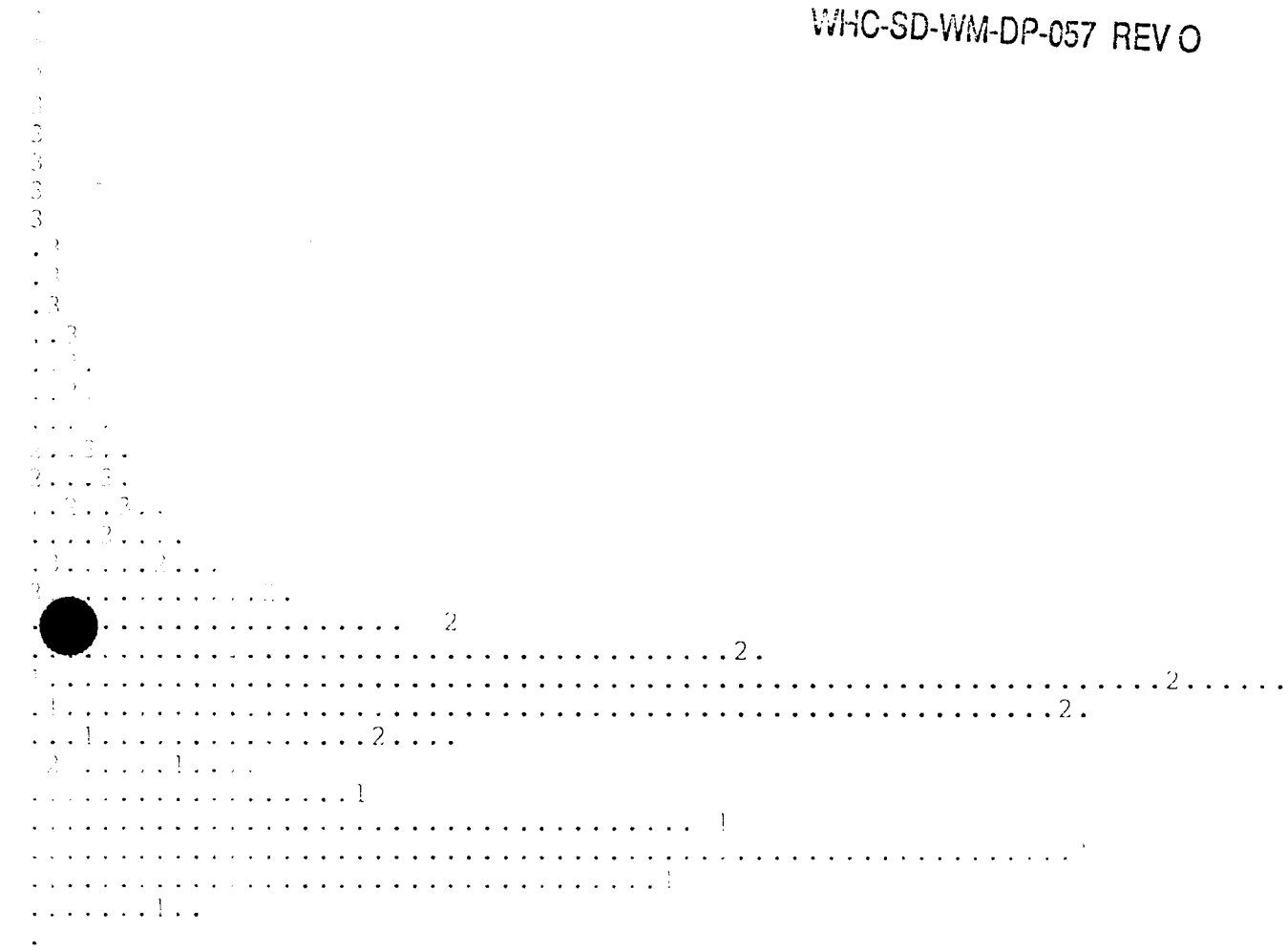
Item	Total	% Recovery
Raw spectrum	8504.0	100.000
Smoothed	8504.0	100.000
Composite fit	8450.4	99.369
Residuals	53.6	0.631

Analyzed by: _____
EMB

Spectrum 2a2417.CNF

Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 1201.7

WHC-SD-WM-DP-057 REV O



Raw Data Dump for AFA Spectrum: 2a2417.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	2.	0.	0.	2.	1.	1.	0.	0.	0.
31	0.	1.	1.	0.	0.	2.	2.	0.	1.	0.
41	0.	2.	0.	2.	1.	4.	1.	3.	2.	1.
51	4.	1.	3.	0.	4.	1.	3.	0.	0.	1.
61	2.	1.	2.	5.	1.	3.	2.	1.	1.	7.
71	3.	3.	4.	0.	3.	5.	1.	3.	1.	1.
81	0.	2.	2.	0.	1.	6.	3.	1.	5.	0.
91	0.	3.	2.	5.	0.	5.	1.	1.	2.	0.
101	0.	1.	4.	6.	1.	0.	5.	1.	3.	0.
111	3.	0.	6.	1.	6.	6.	4.	6.	2.	6.
121	5.	2.	3.	2.	2.	8.	5.	6.	3.	7.
131	3.	2.	6.	7.	6.	8.	2.	9.	2.	12.
141	6.	3.	4.	6.	2.	6.	9.	8.	6.	6.
151	9.	4.	5.	10.	7.	5.	4.	7.	4.	3.
161	7.	7.	11.	8.	11.	11.	12.	9.	10.	6.
171	11.	8.	7.	7.	11.	12.	12.	8.	11.	9.
181	13.	6.	13.	17.	13.	16.	17.	25.	14.	10.
191	11.	12.	12.	10.	21.	6.	17.	23.	13.	13.
201	21.	21.	29.	16.	22.	21.	19.	19.	12.	22.
211	15.	29.	21.	25.	19.	19.	21.	21.	23.	21.
221	24.	27.	31.	31.	31.	26.	31.	11.	14.	1.
231	1.	1.	32.	26.	32.	32.	19.	1.	1.	1.
241	1.	1.	64.	84.	98.	108.	127.	1.	1.	1.
251	1.	4.	137.	167.	161.	149.	141.	167.	1.	1.
261	124.	119.	94.	66.	59.	59.	53.	36.	32.	1.
271	25.	29.	21.	25.	27.	32.	29.	24.	27.	21.
281	29.	31.	32.	33.	47.	43.	65.	58.	65.	71.
291	79.	87.	73.	87.	106.	126.	133.	138.	111.	111.
301	1.	112.	114.	114.	114.	80.	76.	86.	1.	1.
311	27.	27.	34.	22.	21.	26.	9.	6.	1.	1.
321	1.	1.	1.	3.	1.	0.	0.	1.	1.	0.
331	1.	1.	1.	0.	1.	3.	1.	0.	1.	1.
341	1.	1.	1.	4.	2.	1.	1.	2.	1.	1.
351	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.
361	0.	2.	0.	0.	0.	0.	0.	0.	1.	1.
371	0.	0.	0.	0.	0.	1.	0.	0.	1.	1.
381	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
391	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.
401	1.	1.	0.	0.	0.	0.	0.	0.	1.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	1.	0.	0.	0.	0.	0.	1.	0.	1.	1.
431	1.	0.	0.	1.	0.	1.	1.	0.	1.	1.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	2.	1.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
471	0.	2.	1.	1.	1.	0.	2.	0.	1.	0.
481	2.	0.	1.	0.	0.	1.	0.	0.	0.	1.
491	0.	0.	0.	1.	0.	0.	0.	0.	1.	0.
501	0.	0.								

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G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV 0

[illegible]

File In: [illegible]

Counted on: 11/23/93 @ 5:54
Detector: AEA3
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak	Peak height		Peak center		FWHM		[illegible]	
[illegible]	Initial	Final	Initial	Final	Initial	Final	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	295.191	295.191	18.060	11.231	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak	AEA	Peak Centroid				Count	Sep.	[illegible]
[illegible]	Isot.	Exp.	Obs.	Diff.	FWHM	Rate	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.95	[illegible]	[illegible]	[illegible]
[illegible]		5.199	5.490	0.009			[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	16.41	[illegible]	[illegible]
	---					---		
Totals:	0.869	<--valid peaks only-->				17.26		

DETECTOR CALIBRATION
Energy(MEV) = 4.103 + (0.0017)*Channel
Energy range (MeV): 4.103 TO 6.509
Efficiency = 0.1268 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	9528.0	100.000
Smoothed	9528.0	100.000
Composite fit	8282.9	86.933
Residuals	1245.1	13.067

Analyzed by:
RMB

Raw Data Dump for AEA Spectrum: 3a3481.CNF

[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
11	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
21	1.	0.	1.	1.	0.	1.	0.	0.	0.	0.
[illegible]	0.	0.	0.	0.	1.	0.	0.	1.	0.	0.
[illegible]	1.	0.	0.	0.	1.	0.	2.	2.	0.	0.
[illegible]	0.	1.	0.	0.	1.	1.	0.	0.	3.	0.
[illegible]	0.	1.	0.	0.	0.	1.	1.	1.	1.	0.
[illegible]	[illegible]	0.	1.	1.	0.	1.	1.	2.	1.	0.
[illegible]	[illegible]	[illegible]	1.	2.	1.	2.	2.	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	2.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	0.	1.	[illegible]	2.	[illegible]	[illegible]	[illegible]	
111	1.	1.	0.	1.	5.	0.	5.	[illegible]	1.	[illegible]
121	1.	4.	4.	1.	1.	3.	2.	1.	1.	3.
131	4.	5.	4.	4.	3.	3.	2.	3.	0.	2.
141	0.	3.	2.	5.	5.	1.	2.	4.	6.	2.
151	3.	2.	1.	6.	3.	3.	4.	1.	3.	1.
161	2.	6.	2.	3.	6.	3.	6.	3.	5.	5.
171	9.	7.	12.	6.	7.	13.	9.	8.	6.	7.
[illegible]	[illegible]	8.	9.	9.	6.	9.	14.	13.	10.	8.
[illegible]	[illegible]	[illegible]	11.	12.	[illegible]	10.	17.	10.	[illegible]	[illegible]
[illegible]	[illegible]	21.	15.	23.	22.	24.	23.	21.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	25.	[illegible]	37.	43.	27.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	58.	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
231	[illegible]	221.	271.	338.	379.	401.	[illegible]	[illegible]	[illegible]	[illegible]
241	106.	182.	379.	270.	230.	171.	116.	75.	[illegible]	[illegible]
251	12.	15.	45.	45.	24.	14.	30.	12.	12.	[illegible]
261	9.	3.	4.	0.	1.	4.	5.	2.	5.	5.
[illegible]	[illegible]	5.	7.	8.	6.	8.	12.	14.	12.	11.
281	18.	17.	24.	21.	20.	(28.	15.	20.	15.	22.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5.	3.	1.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	0.	0.	1.	0.	[illegible]	0.	0.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	0.	0.	[illegible]	0.	0.	1.	[illegible]	[illegible]
[illegible]	[illegible]	0.	2.	1.	1.	0.	0.	[illegible]	[illegible]	[illegible]
361	1.	1.	0.	0.	1.	0.	0.	0.	[illegible]	1.
371	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
411	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
[illegible]	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
[illegible]	[illegible]	0.	0.	0.	[illegible]	0.	[illegible]	0.	[illegible]	[illegible]
[illegible]	[illegible]	0.	[illegible]	0.	[illegible]	0.	0.	[illegible]	[illegible]	
[illegible]	[illegible]	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

SAMPLE
J-1285-5782
File ID: 4a4991.CNF

Counted on: 11/23/93 @ 5:58
Detector: AEA4
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	1882.7	1882.7	302.854	302.854	12.000	[illegible]	[illegible]	[illegible]
2	628.4	628.4	297.561	297.510	12.000	[illegible]	[illegible]	[illegible]
3	12.	12.5	176.711	176.656	18.[illegible]	[illegible]	[illegible]	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err 99%	d/m	Activity uCi/ml
1	Pu238	0.674	5.499	5.503	-.0040	0.03	57.70	1.2	937.4	[illegible]
	Am241		5.480	5.501	-.022				[illegible]	[illegible]
2	Am243	0.246	5.276	5.299	-.0148	0.03	21.10	2.0	[illegible]	[illegible]
3		0.012		4.919		0.00	1.00	9.0	[illegible]	[illegible]
		---					---			
Totals:		0.932	<--valid peaks only-->				79.80			

DETECTOR CALIBRATION
Energy(MEV) = 4.079 + (0.0047)*Channel
Energy range (MeV): 4.079 TO 6.486
Efficiency = 0.0855 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	41093.0	100.000
Smoothed	41093.0	100.000
Composite fit	38307.1	93.220
Residuals	2785.9	6.780

Analyzed by: _____
EMB

Spectrum 4a4991.CNF

Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 11989.9

WHC-SD-WM-DP-057 REV O

Raw Data Dump for AEA Spectrum: 4a4991.CNF

[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	2.	1.	0.
[illegible]	0.	0.	1.	0.	0.	1.	1.	2.	0.	2.
[illegible]	2.	1.	2.	1.	1.	1.	0.	1.	0.	0.
31	0.	2.	1.	2.	1.	2.	3.	0.	0.	0.
[illegible]	0.	1.	0.	1.	2.	0.	1.	1.	1.	2.
[illegible]	2.	0.	0.	2.	2.	0.	2.	1.	2.	0.
[illegible]	0.	1.	1.	1.	1.	2.	0.	1.	0.	2.
[illegible]	[illegible]	0.	0.	1.	1.	2.	1.	0.	1.	1.
[illegible]	[illegible]	0.	1.	0.	1.	0.	1.	1.	5.	2.
[illegible]	1.	2.	1.	2.	4.	1.	2.	3.	1.	1.
[illegible]	1.	5.	2.	1.	3.	4.	0.	2.	1.	0.
121	2.	2.	2.	1.	3.	3.	3.	2.	4.	2.
131	6.	5.	5.	6.	1.	5.	5.	2.	4.	5.
141	4.	5.	4.	3.	7.	8.	3.	5.	5.	2.
151	1.	6.	5.	7.	5.	9.	7.	6.	6.	5.
161	5.	4.	11.	5.	3.	6.	10.	5.	7.	7.
171	6.	6.	9.	12.	10.	17.	12.	11.	12.	9.
[illegible]	6.	8	8.	16.	15.	13.	14.	8.	14.	15.
[illegible]	[illegible]	14.	12.	13.	21.	15.	12.	20.	29.	27.
[illegible]	[illegible]	22.	22.	20.	31.	25.	27.	25.	31.	32.
[illegible]	[illegible]	[illegible]	29.	45.	36.	40.	40.	32.	48.	53.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	132.	456.	[illegible]	[illegible]	676.	729.	[illegible]	[illegible]	[illegible]
361	210.	282.	221.	175.	133.	142.	131.	132.	[illegible]	[illegible]
371	144.	122.	156.	149.	164.	157.	157.	163.	[illegible]	[illegible]
381	199.	219.	251.	258.	267.	300.	288.	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	396.	621.	681.	831.	870.	1013.	1166.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	2269.	2020.	1587.	1330.	891.	676.	[illegible]	[illegible]
[illegible]	[illegible]	209.	151.	134.	96.	66.	41.	27.	11.	8.
[illegible]	[illegible]	6.	1.	1.	0.	0.	0.	2.	0.	0.
[illegible]	[illegible]	1.	0.	2.	1.	0.	1.	1.	0.	0.
[illegible]	[illegible]	2.	0.	2.	0.	3.	3.	2.	0.	2.
[illegible]	0.	2.	3.	4.	2.	6.	1.	4.	0.	2.
[illegible]	6.	9.	5.	6.	6.	3.	3.	[illegible]	[illegible]	[illegible]
471	10.	11.	9.	6.	8.	1.	0.	1.	[illegible]	[illegible]
[illegible]	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]	[illegible]
[illegible]	0.	0.	0.	0.	0.	0.	1.	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	1.	0.	0.	0.	1.	0.	[illegible]	[illegible]	[illegible]
[illegible]	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.
521	0.	1.	0.	1.	0.	1.	1.	2.	0.	1.
[illegible]	1.	0.	1.	0.	1.	3.	0.	2.	2.	3.
[illegible]	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	0.
[illegible]	0.	0.	1.	0.	1.	0.	0.	0.	[illegible]	[illegible]
[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
511	0.	0.								

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G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV 0

SAMPLE
J-1285-5782
File ID: 6a5915.CNF

Counted on: 11/23/93 @ 5:58
Detector: AEA5
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	20.000	15.970	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PEAK RESULTS
Peak Error Limit: 25%

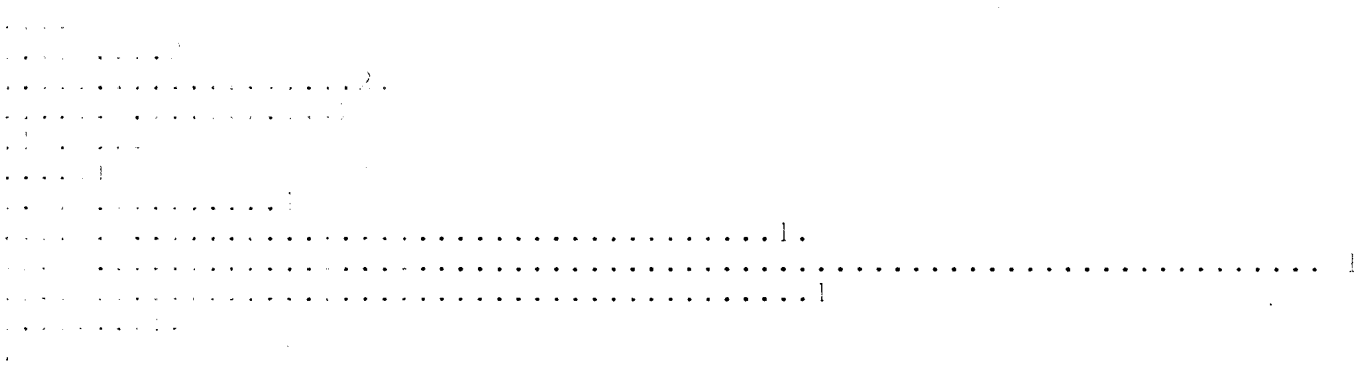
Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	Corr 095	d/m	[illegible]
[illegible]	Am241	0.721	5.480	5.477	0.003	0.07	11.93	2.6	91.7	0.413E-04
[illegible]	Pu239		5.499	5.477	0.022				119.8	0.539E-04
[illegible]	[illegible]	0.241	5.276	5.270	0.006	0.06	4.03	4.7	29.4	0.133E-04
		---					---			
[illegible]		4.96[illegible]	---valid peaks only-->				15.96			

DETECTOR CALIBRATION
[illegible]
Energy Calp (MeV): [illegible]
Efficiency = [illegible] CPM [illegible]

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	7937.0	100.000
Smoothed	7937.0	100.000
Composite fit	7660.2	96.512
Residuals	276.8	3.488

Analyzed by:
[illegible]



Raw Data Dump for AEA Spectrum: 5a5915.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	2.	0.	2.	0.	1.	0.	0.	0.	1.
31	0.	3.	0.	0.	0.	0.	1.	0.	1.	1.
[illegible]	0.	[illegible]	1.	1.	1.	2.	2.	0.	[illegible]	1.
[illegible]	1.	2.	[illegible]	1.	1.	0.	[illegible]	1.	[illegible]	[illegible]
[illegible]	0.	0.	0.	1.	1.	0.	1.	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.	[illegible]	1.	0.	0.	1.	[illegible]
[illegible]	1.	[illegible]	1.	0.	1.	0.	2.	1.	[illegible]	2.
[illegible]	[illegible]	2.	3.	0.	1.	2.	0.	1.	1.	1.
101	[illegible]	1.	0.	0.	2.	1.	0.	0.	1.	2.
111	1.	0.	0.	0.	0.	1.	1.	1.	0.	1.
121	0.	0.	3.	1.	0.	1.	3.	0.	1.	0.
131	3.	1.	2.	0.	2.	2.	1.	1.	1.	0.
[illegible]	1.	3.	0.	1.	0.	0.	1.	0.	2.	3.
151	0.	0.	0.	0.	0.	0.	1.	2.	4.	[illegible]
[illegible]	0.	1.	0.	3.	1.	0.	1.	0.	[illegible]	[illegible]
[illegible]	[illegible]	1.	2.	3.	0.	2.	3.	2.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	1.	[illegible]	[illegible]	2.	0.	2.	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	0.	2.	[illegible]	4.	3.	5.	[illegible]	[illegible]
[illegible]	[illegible]	1.	4.	3.	6.	1.	4.	6.	[illegible]	[illegible]
[illegible]	[illegible]	9.	6.	7.	8.	11.	12.	11.	8.	12.
[illegible]	[illegible]	[illegible]	13.	15.	19.	15.	18.	26.	23.	29.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	58.	47.	54.	66.	[illegible]
[illegible]	[illegible]	[illegible]	89.	97.	96.	93.	93.	92.	85.	[illegible]
[illegible]	[illegible]	60.	40.	[illegible]	[illegible]	31.	25.	29.	27.	16.
[illegible]	[illegible]	13.	21.	18.	[illegible]	24.	17.	22.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	49.	[illegible]	[illegible]	62.	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	221.	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	2.	5.	0.	0.	1.	0.	1.	0.
[illegible]	[illegible]	[illegible]	0.	1.	0.	2.	3.	0.	1.	5.
[illegible]	[illegible]	4.	0.	0.	1.	0.	1.	2.	2.	2.
[illegible]	[illegible]	3.	2.	2.	1.	3.	0.	0.	0.	1.
[illegible]	1.	0.	1.	2.	2.	1.	2.	1.	1.	[illegible]
[illegible]	[illegible]	[illegible]	2.	[illegible]	[illegible]	0.	1.	1.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	1.	[illegible]	[illegible]	0.	0.	0.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.	[illegible]	1.	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	1.	[illegible]	[illegible]	[illegible]	0.	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	0.	1.	0.	0.	0.	1.	[illegible]	[illegible]
[illegible]	[illegible]	2.	0.	9.	0.	0.	0.	0.	[illegible]	2.
151	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.
161	0.	1.	0.	0.	0.	0.	0.	1.	0.	0.
171	0.	0.	0.	3.	0.	1.	2.	1.	0.	1.
181	1.	1.	0.	2.	0.	0.	0.	1.	0.	0.
191	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
[illegible]	0.	0.								

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 2.01

DATA DESCRIPTION REPORT

SAMPLE
G-1285-5982
File ID: 6a6822.CNF

WHC-SD-WM-DP-057 REV 0

Counted on: 11/23/93 @ 5:59
Detector: AEA6
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

[illegible]	Peak height		Peak center		FWHM		[illegible]	
[illegible]	Initial	Final	Initial	Final	Initial	Final	Initial	Final
[illegible]	[illegible]	788.1	298.835	298.835	24.000	24.561	12.000	7.409
[illegible]	[illegible]	378.9	252.386	252.606	24.000	20.805	12.000	6.423
[illegible]	[illegible]	[illegible]	[illegible]	10.568	18.000	1.665	9.000	6.158

PEAK RESULTS
Peak Error Limit: 25%

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Lab.	[illegible]	[illegible]	FWHM	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	5.480	5.181	-.0010.12	44.91	1.3	368.	[illegible]
[illegible]	[illegible]	5.193	5.481	0.018			461.3	[illegible]
[illegible]	5.306	5.276	5.251	0.0129.10	20.28	2.2	153.0	0.715E-04
[illegible]	[illegible]	5.144	5.264	-.120			156.5	0.705E-04
[illegible]	0.010	[illegible]	5.066	0.01	0.70	15.5	5.4	0.242E-05

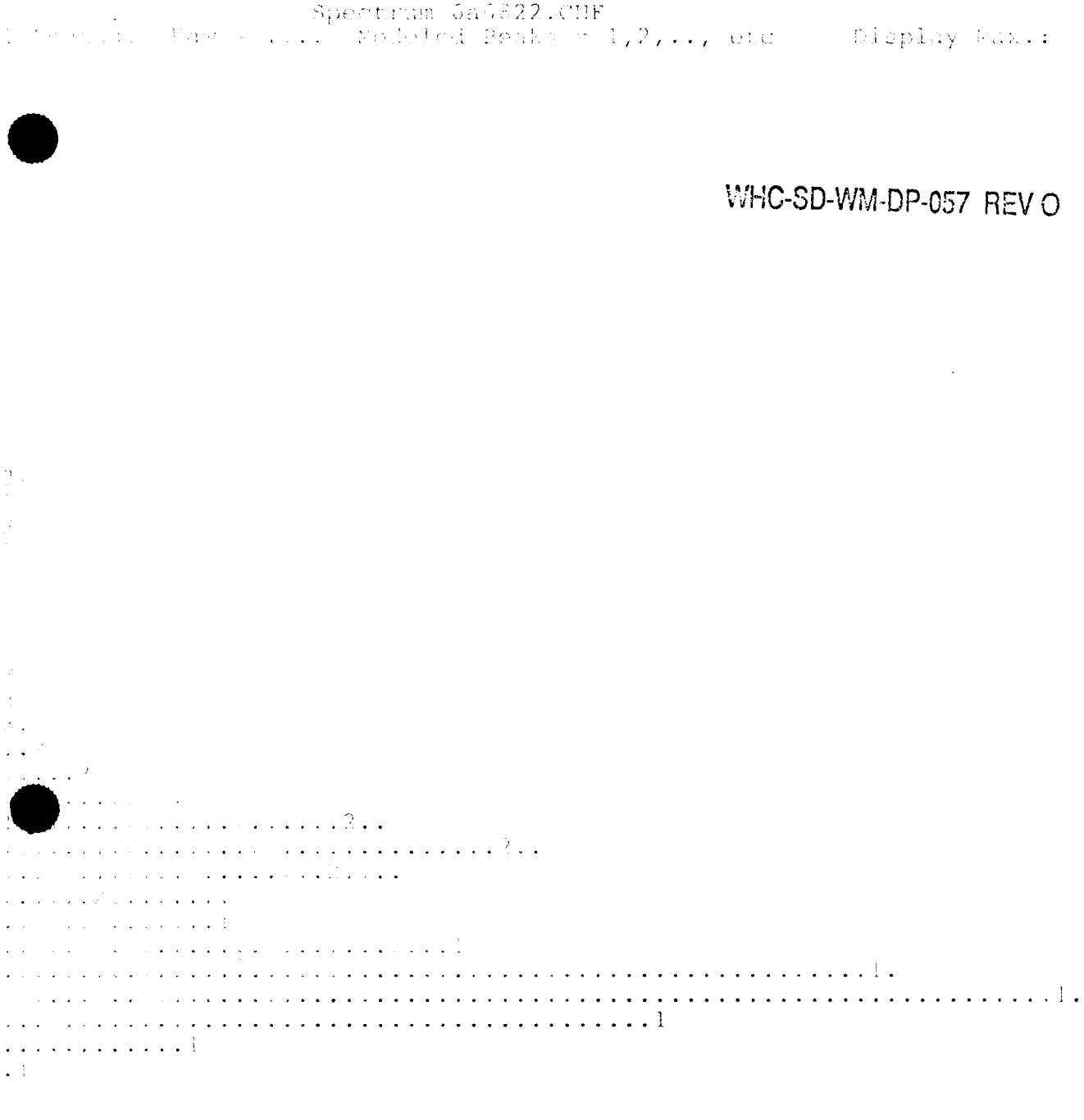
[illegible] <--Valid peaks only--> [illegible]

DETECTOR CALIBRATION
Energy(MEV) = 1.076 + (0.[illegible]*Channel)
Energy range (MeV): 4.076 TO [illegible]
Efficiency = 0.1296 CPS/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	31855.0	100.000
Smoothed	31857.3	100.007
Composite fit	31628.8	99.296
Residuals	226.2	0.71[illegible]

Analyzed by: _____
EMB


Spectrum 5a6822.CHF
Labeled Peaks = 1,2,..., etc
Display Max.: 067.6

Raw Data Dump for AEA Spectrum: 6a6822.CNF

1	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	0.	0.	0.	0.	0.	0.	0.	1.	2.	1.
[illegible]	[illegible]	0.	0.	0.	0.	2.	0.	1.	2.	0.
[illegible]	[illegible]	0.	0.	0.	1.	2.	0.	0.	1.	0.
[illegible]	0.	0.	1.	1.	0.	2.	1.	0.	0.	0.
[illegible]	0.	0.	1.	1.	1.	0.	1.	0.	0.	3.
[illegible]	[illegible]	1.	1.	0.	0.	1.	2.	0.	0.	3.
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
11[illegible]	[illegible]	2.	0.	3.	0.	1.	1.	0.	[illegible]	[illegible]
12[illegible]	[illegible]	1.	0.	5.	2.	2.	0.	3.	4.	1.
13[illegible]	[illegible]	2.	2.	1.	3.	1.	1.	3.	0.	3.
14[illegible]	2.	2.	0.	3.	6.	1.	1.	1.	2.	4.
15[illegible]	2.	4.	4.	4.	3.	1.	1.	1.	3.	2.
16[illegible]	1.	3.	2.	4.	5.	3.	2.	5.	1.	2.
17[illegible]	[illegible]	7.	6.	4.	2.	10.	5.	6.	0.	4.
18[illegible]	[illegible]	7.	5.	9.	2.	9.	7.	7.	7.	11
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	11.	[illegible]	[illegible]		
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]		43.	[illegible]	[illegible]	42.	4[illegible].	[illegible]	1[illegible].	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	101.	11[illegible].	127.	128.	150.	178.	171.	20[illegible].
[illegible]		[illegible]	173.	[illegible]	301.	326.	339.	365.	37[illegible].	[illegible]
[illegible]	[illegible]	445.	108.	361.	417.	388.	338.	338.	307.	305.
[illegible]	[illegible]	211.	217.	195.	172.	167.	159.	151.	131.	156.
[illegible]	1[illegible]	112.	151.	118.	138.	141.	175.	201.	200.	233.
[illegible]	[illegible]	[illegible]	330.	333.	330.	397.	457.	509.	515.	616.
[illegible]	[illegible]	[illegible]	651.	76[illegible].	916.	815.	806.	797.	87[illegible].	[illegible]45.
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	1.	1.	1.	1.	1.	[illegible]		[illegible]
35[illegible]	2.	2.	0.	0.	3.	0.	2.	1.	1.	1.
36[illegible]	[illegible]	2.	1.	4.	3.	2.	1.	1.	4.	4.
[illegible]	[illegible]	[illegible]	2.	7.	1.	1.	1.	3.	3.	1.
[illegible]	[illegible]	[illegible]	0.	0.	0.	1.	0.	0.	0.	0.
[illegible]	[illegible]	[illegible]	0.	1.	0.	0.	0.	0.	0.	0.
[illegible]	[illegible]	[illegible]	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	0.	1.	1.	0.	0.	0.	[illegible]	[illegible]
[illegible]	[illegible]	0.	1.	1.	1.	0.	0.	0.	[illegible]	[illegible]
[illegible]	[illegible]	0.	1.	0.	1.	0.	2.	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		
[illegible]		0.	1.	0.	0.	0.	0.	0.	[illegible]	[illegible]
[illegible]	[illegible]	1.	0.	0.	0.	1.	0.	0.	2.	1.
47[illegible]	1.	1.	2.	1.	1.	2.	1.	2.	0.	0.
[illegible]	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.
[illegible]	[illegible]	1.	1.	2.	2.	9.	5.	2.	0.	1.
[illegible]	[illegible]	0.								

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-057 REV O

Counted on: 11/23/93 @ 6: 0
Detector:. AEA7
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak	Peak height		Peak center		FWHM			
	Final	Initial	Final	Initial	Final	Initial		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	16.000	10.[illegible]	[illegible]	[illegible]	
[illegible]	29.3	[illegible]	216.548	36.000	35.383	18.000	[illegible]	

PEAK RESULTS
Peak Error Limit: 25%

Peak	Area	Peak Centroid			Counts	Conc			
	Final	Initial			Rank	Rate	[illegible]		
[illegible]	[illegible]	5.138	[illegible]	[illegible]	26	41.[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	05	25.15	1.[illegible]	[illegible]	[illegible]
[illegible]	0.041	5.143	5.097	0.046	0.17	2.90	10.0	28.8	[illegible]
[illegible]		5.144	5.097	0.047				28.8	0.130E-0[illegible]
	---					---			
[illegible]:	[illegible]	<--valid peaks only-->				70.37			

DETECTOR CALIBRATION
Energy(MEV) = 4.079 + (0.0047)*Channel
Energy range (MeV): 4.079 TO 6.485
Efficiency = 0.1006 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	34389.0	100.000
Smoothed	34389.0	100.000
Composite fit	33783.9	98.240
Residuals	605.1	1.760

Analyzed by:

[illegible] for ACA Spectrum: [illegible].CNF

	[illegible]	[illegible]	0.	0.	[illegible]	0.	0.	[illegible]	[illegible]	[illegible]
	0.	[illegible]	0.	0.	0.	5.	0.	1.	[illegible]	[illegible]
	1.	0.	0.	1.	0.	2.	1.	0.	1.	0.
	0.	1.	1.	1.	0.	0.	1.	0.	0.	2.
	0.	0.	1.	1.	0.	0.	0.	1.	0.	3.
	2.	3.	0.	1.	0.	4.	0.	1.	0.	0.
	0.	0.	0.	1.	1.	2.	0.	0.	1.	1.
	1.	2.	0.	0.	0.	0.	1.	0.	3.	1.
	1.	2.	0.	3.	2.	3.	3.	1.	0.	1.
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	2.	1.	1.	1.	[illegible]	2.	[illegible]	[illegible]
	[illegible]	3.	3.	3.	2.	2.	3.	[illegible]	[illegible]	[illegible]
	[illegible]	2.	3.	5.	5.	3.	1.	3.	1.	4.
	6.	6.	1.	4.	3.	4.	6.	1.	3.	5.
	8.	5.	3.	4.	9.	3.	7.	5.	3.	7.
161	[illegible]	3.	5.	8.	5.	2.	6.	8.	10.	4.
171	14.	8.	5.	9.	10.	10.	8.	9.	13.	6.
	11.	10.	7.	7.	12.	19.	17.	10.	18.	16.
	18.	17.	10.	10.	15.	20.	14.	22.	17.	28.
	[illegible]	24.	23.	16.	19.	27.	24.	26.	22.	[illegible]
	27.	21.	28.	27.	13.	35.	21.	[illegible]	[illegible]	[illegible]
	24.	[illegible]	31.	[illegible]	12.	[illegible]	[illegible]	[illegible]		
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
	[illegible]	[illegible]	252.	192.	179.	136.	123.	132.	[illegible]	[illegible]
	[illegible]	92	106.	88.	103.	99.	97.	88.	101.	133.
	[illegible]	144.	179.	190.	179.	194.	213.	219.	286.	344.
	[illegible]	141.	492.	545.	681.	736.	870.	1060.	1217.	1238.
	[illegible]	[illegible]	1242.	1211.	1159.	977.	799.	651.	506.	395.
	[illegible]	[illegible]	192.	[illegible]	[illegible]	37.	[illegible]	35.	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	1.	[illegible]	2.	1.	0.	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	2.	[illegible]	[illegible]	[illegible]	2.	[illegible]	[illegible]	[illegible]	
	2.	[illegible]	2.	2.	1.	1.	1.	[illegible]		
	[illegible]	[illegible]	3.	5.	2.	5.	2.	5.		[illegible]
	[illegible]	[illegible]	4.	4.	1.	1.	2.	2.	[illegible]	1.
	[illegible]	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
	[illegible]	1.	0.	0.	1.	0.	0.	0.	0.	0.
	[illegible]	[illegible]	0.	0.	0.	0.	0.	0.	1.	[illegible]
	[illegible]	[illegible]	1.	0.	[illegible]	0.	[illegible]	0.	[illegible]	[illegible]
	[illegible]	0.	[illegible]	1.	1.	0.	2.	0.	[illegible]	0.
	1.	1.	3.	1.	[illegible]	2.	3.	3.	[illegible]	3.
	1.	1.	0.	1.	[illegible]	0.	0.	0.	[illegible]	[illegible]
	0.	0.	0.	0.	[illegible]	0.	0.	0.	[illegible]	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
471	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
	[illegible]	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
511	2.	0.								

WESTINGHOUSE HANFORD COMPANY Batch 2099

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-057 REV 0

Lab Segment Serial No. T-1285	Customer ID: LAP 11-30-93 105 Rebeam Bechtold
Analysis: Am 241	Sample Prep:

Instrument: WB537237	Procedure/ Rev: 503-150 (0)
Technologist: M Bielman	Date: 11/17/93
Starting Time: 1600	Temperature 25°
Ending Time: 2330	Chemist: Larry Ritter

Comments:

	Description		Lab ID
1	LMCS	T	1284-5582
2	Blank	T	1300-5602
3	sample	T	1285-5782
4	sample dup	T	1285-5782
5	sample trip	T	1285-5782
6	sample sph	T	1285-5782
7	sample sph dup	T	1285-5782
8			
9			
10			

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	63843 .100-10	-10 ml		
Tracer	78843 .100-.200	ml		

A-6000-881 (03/92)

QA

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-057 REV 0

METHOD: **LA-503-156**

DATE START: **November 17, 1993**

PREPARED BY: **L.L. Fritts** LLFritts 11-22-93

DATE COMPLETE: **November 22, 1993**

	UNITS:	uCi/mL									
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	RESULT #3	AVERAGE	2*SD	PREC	%REC	DET LIM	% CT ER
STD 63B43	J1284	Am-241	2.91E+1						108.6	1.71E-3	4.2
BLANK	J1300	Am-241	<1.70E-5						29.3	1.70E-5	16.2
KE13A	J1285	Am-241	5.37E-2	4.99E-2	4.50E-2	4.95E-2	8.72E-3	17.6	6.8	3.73E-3	10.5
									32.9	3.73E-3	3.8
									7.9	3.73E-3	7.4
KE13A	J1285	241 Spike	66.5	97.8					8.0	7.47E-3	4.4
									5.5	7.47E-3	5.1

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

The results for the spike are in percent recovery.

Rerun requested: Spike recovery values are outside control limits.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

8 8557 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1284.-5582	BECHTOLD	11- 4-93	8:47	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	% RECOVERY	E14157	0

Sample Size	Customer ID
100-10-1.0 ml	

Remarks Calculation Results

78B43 RESULT 2.91 E+1

STD VAL 26.8 %REC 108.59

78B43 ,100 ml

Dil. in 8% HNO3

Out for RR

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
				11-22-93
Hrs	Hrs 11-18-93	Hrs	Hrs	
Date	Time Completed			

54-6800-061 (R-10-83)

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AM-241: LA-503-156 (D-0) LIQUIDS

			STANDARD
Serial No.	Spike (Tracer) Book Number		78B43
J1284-5582	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
2099	Volume of Sample in mL	(SS)	1
Rerun No.	Dilution Factor	(DF)	101
0	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	1063
M BIERMAN	Am-243 Area Peak Height from AEA	(C243)	1254
Date	Total AT Count	(ATOT)	7072
11/17/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	6

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	2.91E+01
Am-241 µCi/mL	=	2.91E-02
Relative counting error	=	4.2%
Am-243 Tracer Recovery	=	33.0%

Data Entry by:		Date:	19-Nov-93
Approved by:		Date:	November 23, 1993

Form 3 Rev. 1.2

#1 11-13-93

7072/30 - 6

J1284-5582

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

7 7343 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1300.-5682	BECHTOLD	11- 4-93	15:32	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
? 1ml	BLK

Remarks Calculations Results

REAGENT BLANK

COUNT AS uCi/L

78B43 .100-1

1ml 8M HNO3

<1.70X10^-5 uCi/ml

"ACAP - 480 MIN" AT 30 PRINTOUT

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 11-18-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr.	
11/17/93	2330		

54-EB00-061 (R-10-83)

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AM-241: LA-503-156 (D-0) LIQUIDS

			BLANK
Serial No.	Spike (Tracer) Book Number		78B43
J1300-5682	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
2099	Volume of Sample in mL	(SS)	1
Rerun No.	Dilution Factor	(DF)	1
0	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	39
M BIERMAN	Am-243 Area Peak Height from AEA	(C243)	1416
Date	Total AT Count	(ATOT)	3429
11/17/93	AT Count Time in Minutes	(MIN CT'd)	30
	Background in CPM	(BKG)	1

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CT'd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

NOTE: Reported result is a LESS THAN value using 5% of the Am-243 peak as the Am-241 peak.

Am-241 µCi/L	=	< 1.70E-02
Am-241 µCi/mL	=	< 1.70E-05
Relative counting error	=	16.2%
Am-243 Tracer Recovery	=	29.3%

Data Entry by:		Date: 19-Nov-93
Approved by:		Date: November 22, 1993

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Form 3 Rev. 1.2

#2 11-18-93 AG

3429/30 - 1

J1300-5682

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

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2 2401

WHC-SD-WM-DP-057 REV O

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5782	BECHTOLD	11- 4-93	8:48	18

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
1.0-10-.05ml	[illegible]

Remarks Calculations Results

Sample

78B43 .100-1
Dilution 8M HNO3
1ml 8M HNO3

5.37X10^{-2} uCi/ml

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 11-18-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Chief	
11/18/93	[illegible]	[illegible]	[illegible]

54-EE00-061 R 10-83

AM-241: LA-503-156 (D-0) LIQUIDS

			SAMPLE
Serial No.	Spike (Tracer) Book Number		78B43
J1285-5782	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
2099	Volume of Sample in mL	(SS)	0.05
Rerun No.	Dilution Factor	(DF)	11
0	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	156
M BIERMAN	Am-243 Area Peak Height from AEA	(C243)	217
Date	Total AT Count	(ATOT)	1433
11/17/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	4

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))
µCi/mL = µCi/L / (1000mL/L)
Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100
Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	5.37E+01
Am-241 µCi/mL	=	5.37E-02
Relative counting error	=	10.5%
Am-243 Tracer Recovery	=	6.8%

Data Entry by: [illegible]		Date:	22-Nov-93
Approved by: [illegible]	495	Date:	November 22 1993

Form 3 Rev. 1.2

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#3 11-18-93

1433/30 -4

J1255-5782

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

10 2585 WHC-SD-WM-DP-057 REV.0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5782	BECHTOLD	11- 4-93	8:58	16

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/ML	E14157	0

Sample Size	Customer ID
? 1.0-10-.05 ml	KE13A

Remarks Calculations Results

COUNT AS uCi/L Duplicate

78B43 .100 ml

D.I. in 8M HNO3

1ml 8M HNO3

4.99 X 10^{-2} µCi/ml

"AEA" - 480MIN ATACH PRINTOUT

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit	
11/17/93	2330		

54-6800-0E1 (R-10-83)

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AM-241: LA-503-156 (D-0) LIQUIDS

			SAMPLE
Serial No.	Spike (Tracer) Book Number		78B43
J1285-5782	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
2099	Volume of Sample in mL	(SS)	0.05
Rerun No.	Dilution Factor	(DF)	11
0	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	1171
M BIERMAN	Am-243 Area Peak Height from AEA	(C243)	1754
Date	Total AT Count	(ATOT)	6392
11/17/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	6

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	4.99E+01
Am-241 µCi/mL	=	4.99E-02
Relative counting error	=	3.8%
Am-243 Tracer Recovery	=	32.9%

Data Entry by:		Date:	19-Nov-93
Approved by:		Date:	November 22, 1993

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Form 3 Rev. 1.2

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#1 11-8-93

J1285-5782

6392 -6
30

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

11 3262 WHC-SD-WM-DP-057 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
J 1285.-5782	BECHTOLD	11- 4-93	8:58	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AM241	LA-503-156	UCI/ML	E14157	0

Sample Size	Customer ID
? 1.0 → 10 → .05 ml	KE19A

Remarks Calculations Results

Duplicate

78B43 100 ml
Dilution 8 2 HNO3
1 ml 8 2 HNO3

4.50×10^{-2} µCi/ml

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed		
11/17/93	2330		

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AM-241: LA-503-156 (D-0) LIQUIDS

			SAMPLE
Serial No.	Spike (Tracer) Book Number		78B43
J1285-5782	Activity of Am243 Tracer in dpm/mL	(SPKA)	7537
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
2099	Volume of Sample in mL	(SS)	0.05
Rerun No.	Dilution Factor	(DF)	11
0	Digest Dilution Factor	(DDF)	1
Analyst	Am-241 Area Peak Height from AEA	(C241)	294
M BIERMAN	Am-243 Area Peak Height from AEA	(C243)	488
Date	Total AT Count	(ATOT)	1462
11/17/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	1

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))
µCi/mL = µCi/L / (1000mL/L)
Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100
Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	4.50E+01
Am-241 µCi/mL	=	4.50E-02
Relative counting error	=	7.4%
Am-243 Tracer Recovery	=	7.9%

Data Entry by:		Date:	19-Nov-93
Approved by:	499	Date:	November 22, 1993

Form 3 Rev. 1.2