

CORRES CONTROL

LTR. NO

K H Corres #



RMRS Rocky Mountain
Remediation Services, L L C
protecting the environment

Rocky Flats Environmental Technology Site
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Originator Ltr Log #

5LG-001-97

97 - RF -

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BARTHEL, J M		
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FITZ, R C		
GUINN L A		
HUGHES F P		
MCANALLY J L		
POWER A P		
REED A B		
TYSON A.M.		
WAGNER M J		
WHEELER M		

June 26, 1997

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Subject TRANSMITTAL OF WASTE PROFILES FOR GRANULAR ACTIVATED CARBON FROM ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE - SLG-001-97

Attached please find for review the waste profile for the spent granular activated carbon (GAC) that we have been discussing as a possible candidate for incineration at WERF. The Waste Profile includes an executive summary, INEEL L-0435 10 - L-0435-12 forms, and various attachments supporting the waste profile. The Generator Certifier Signature on form L-0435 12 has not yet been signed by Rocky Flats Waste Certification Organization personnel. In the interest of completing the review and approval process to support a late July update of the INEEL Site Treatment Plan, we are sending the waste profiles in draft form, awaiting final waste certification approval by the Rocky Flats Waste Certification Organization.

As was discussed in our June 18, 1997 meeting, we will be working to complete the INEEL L-0435 14 - L-0435 17 forms by August 9, 1997 to support the shipment to INEEL if the waste stream is approved. In addition, our Waste Management Organization continues to make progress toward the completion of the waste profiles for various non-hazardous, low level radioactive waste oils at RFETS. Incineration of these waste oils in substitution for new will be a significant waste minimization success if achieved.

We look forward to working with you to complete the treatment of this waste. If you have any questions please call me at (303) 966-6588 or Hopi Salomon at (303) 966-6627.


Shaun L. Garner
Project Manager

HS/aw

RMRS RECORDS X X

RF CORRES CONTROL
TRAFFIC
PATS/T130G

CLASSIFICATION

UCNI
UNCLASSIFIED
CONFIDENTIAL
SECRET

AUTHORIZED CLASSIFIER
SIGNATURE

Date **6-26-97**

IN REPLY TO RF CC NO

ACTION ITEM STATUS

PARTIAL/OPEN
 CLOSED

LTR APPROVALS

ORIG & TYPIST INITIALS
HS:aw

ADMIN RECORD

EXECUTIVE SUMMARY WASTE PROFILE
FOR GRANULATED ACTIVATED CARBON
A SUBSET OF PARTICULATE SLUDGE (RF-W071)

Rocky Flats Environmental Technology Site (RFETS) has generated a granulated activated carbon mixed waste stream from several environmental restoration projects. This waste stream is identified as a subset of Particulate Sludge, Site Treatment Plan number RF-W071. The RFETS Site Treatment Plan, Rebaseline, identifies catalytic chemical oxidation (a process that is currently being de-funded) as the primary treatment option for this waste. This profile is being submitted to INEEL for review and potential approval for processing at the WERF incinerator, as a new, contingency treatment option.

ANALYTICAL INFORMATION/PROCESS KNOWLEDGE

This material has been determined to be a mixed waste based on sample results and process knowledge. The waste stream consists of granulated activated carbon (GAC). The GAC originated from several Environmental Restoration based sources. The GAC was used to polish the airstream from low temperature thermal desorption units (TDUs), which were used in processing radioactive soils and debris contaminated with VOCs. Other GAC originated at the Consolidated Water Treatment Facility (CWTF) where it was used as a final organic polishing step on treated wastewater originally generated from various ER activities including condensate from the TDUs described above.

Some of the soil and drums originally treated in the TDUs contained VOCs from listed sources (F001 and F002 - Ryan's Pit Project). Treatment residuals (e.g., GAC) would therefore be considered hazardous via the RCRA derived from rule. In addition, some of the treated soil and drums contained VOCs that did not originate from listed sources (Trenches T-3 and T-4 Project) and were evaluated with respect to their RCRA characteristics. Samples from this GAC exceeded select RCRA TCLP standards (TCE and mercury), and contained slightly elevated levels of uranium, plutonium and americium isotopes. As a result, the spent GAC is classified as mixed waste. Because the GAC greatly exceeds LDR treatment standards for various VOCs (e.g., the PCE LDR level is 6 ppm, a sample of the waste was 7,400 ppm), the waste must be treated prior to disposal. The waste codes that apply to this waste are F001 and F002 (for the spent solvents TCE, PCE and 1,1,1-Trichloroethane from the Ryan's Pit Project) and D040 (TCE) and D009 (mercury) from the Trenches T-3 and T-4 Project. Listed and characteristic waste codes apply for TCE because the GAC contains TCE from both types of sources.

Other VOCs such as Benzene and Toluene were detected in the GAC. These constituents can be associated with RCRA listed hazardous waste codes (e.g., F005). However, these contaminants are suspected to have originated as components of gasoline, and not a solvent process. Therefore, the GAC does not carry listed codes for these types of constituents. Since mercury is a volatile metal, it was sorbed onto the GAC in the same manner as the VOCs during the TDU treatment.

Process knowledge and full suite TCLP results indicate that no other hazardous waste codes apply to this waste stream. A draft Land Disposal Notification and Certification Form is included with this submittal as Attachment 1. Because the GAC came from multiple sources, some of which were not listed or did not exceed a TCLP limit, not all waste codes associated with this profile are on all GAC waste containers. Attachment 2 contains a table which ties waste origination to waste codes, individual waste containers and corresponding sample numbers.

GENERAL CHARACTERIZATION APPROACH

Samples collected in support of this waste profile were collected to represent highest concentrations of contaminants from each of the two GAC sources (the TDU's and the CWTF). Waste removed from the TDUs carbon units were placed into ten, 55 gallon drums and four, 4' x 4' x 7' wooden waste crates. GAC contained in drum D87122 came from one of three parallel carbon units that was used in processing a greater volume of soil and debris than any other carbon unit. This drum was sampled three times to complete the waste profile (samples DB00012RM, DB00015RM, DB00038RM).

Samples of GAC from the CWTF originated from GAC that was removed from the top of the influent side of the GAC unit. This GAC would contain the highest levels of absorbed contaminants. Samples of the CWTF GAC are FT20601RG, FT20604RG, and DB00039RM. Attachment 3 contains a summary table of the GAC analytical results, the Form 1 Analytical Results and the log sheets and chain of custody forms used in the sample collection process.

Exceptions to the INEEL RRWAC

RRWAC, Section 4 6 2 1

Currently RF-W071 has not received treatment approval via the INEEL-Site Treatment Plan (STP) and is therefore not recognized by the Waste Analysis Plan.

RRWAC, Section 4 6 2 9

GAC is packaged as follows

thirty - 55 gallon drums with 2 plastic liners

four - 4' x 4' x 7' wooden waste crates with 1 cardboard liner, and one plastic inner liner

L-0435 Waste Profile Information

L-0435 10 Generators Certification and Information

Item (6) Rate of Generation

The rate of generation is listed as ongoing at a 775.5 ft³/yr. This section also lists the mass at 24156 lbs. The GAC generation rate of 775.5 ft³/yr represents the volume of GAC generated from a number of projects completed in approximately one year. It is anticipated that this waste stream will be generated from similar projects in the future at relatively like rates. Future projects will generate GAC with the same or similar waste codes, suites of contaminants, and at contaminant levels consistent with what is represented by this L-0435 form. As necessary, modifications to the L-0435's or other supporting documentation will be completed to represent future GAC waste streams. Attachment 4 gives the calculations and assumptions used at arriving the stated rate.

L-0435 11 Characterization of Material

Item (2)(d)(1) Heat of Combustion and item (2)(d)(2) Ash Content

Ash content and BTU content are listed as

Ash Content 5-10%

Heat of Combustion 5,000 - 10,000 BTU/lb

These estimates were given by Jim Sherbondy, Technical Representative for TIGG Corporation (412) 257-8520, an original supplier of the GAC in a telephone conversation with H. Salomon at Rocky Flats (303) 966-6627, on March 31, 1997.

Item (2)(d)(3) Total Halogen Content

Total halogen content is listed as <15 to 8,479 ppm

The only halogens present in this GAC are expected to be from the chlorinated volatile organic compounds for which samples have been collected and analyzed. These samples evaluated total VOCs in the waste stream. Using these results and the molecular weights of the chlorinated compounds detected, the concentration of the chlorine (the only halogen expected) can be calculated. A copy of the spread sheet used to calculate the chlorine from the total VOC results is included as Attachment 5. These results represent the maximum expected chlorine (halogen) concentration from a biased grab sample (sample # DB00015RMDL).

L-0435 12· Radiological Characteristics of Material

Item (i) Other Isotopes Present

Analytical results used for the quantitation of some isotopes in the GAC are reported as a combination of the isotopes (e g , Uranium-233/234) Analytical results themselves do not allow for the identification of the specific isotope In the case of Uranium-233/234 all results reported are attributable to the isotope Uranium-234, and are listed this way in section (i) of the L-0435 12 form Operations requiring the generation, storage or use of Uranium-233 have not been performed at RFETS Information regarding the use and storage of this isotope in the DOE system can be found in *Uranium-233 Storage Safety At Department of Energy Facilities*, Defense Nuclear Facilities Safety Board Technical Report, DNFSB/TECH-13, February, 1997

- Daughter Products were calculated using the computer software *Raddecay Programming and File Structure Information*, Grove Engineering, Inc , October, 1987 Only isotopes calculated to exceed the Section 4 6 2(7) RRWAC criteria of 0 1 pCi/g for alpha or beta emitters or 1 pCi/g for gamma emitters are listed on the form The isotopes calculated to exceed this criteria are thorium-231 which is in equilibrium with uranium-235, thorium-234 and protactinium-234m which are both in equilibrium with uranium-238 A thirty three year age was assumed as the initial generation of the isotopes, which corresponds to the opening of the first burial trench of which the GAC is a treatment residue from

Supporting Information Used to Complete the Waste Profile

<u>Attachment No</u>	<u>Description</u>
1	LDR Notification and Certification Form - Including UTS
2	Table Tying Waste Origination to Waste Codes, Waste Containers and Corresponding Sample Numbers
3	Analytical Summary Tables, Analytical Data (Form 1's), Log Sheets, and Chain of Custody Forms
4	Assumptions Used for the Calculation of Volume, Mass and Rate of GAC Generation
5	Calculation of Maximum Chlorine (Halogen) Concentration
6	MSDSs for Granulated Activated Carbon and Radsorb
7	RFETS Waste Packaging Variance Request and Industrial Hygiene VOC Monitoring Results



MATERIAL AND WASTE CHARACTERIZATION GENERATOR'S CERTIFICATION AND INFORMATION

FORM L-0435 10#
(07-96 - Rev #00)

Receiving Organization Use Only						
Approved by Signature _____			Printed Name _____			
_____ RWMC _____ WROC _____ TAN _____ Pollution Prevention _____ ICPP						
Characterization ID No _____			Content Code(s) _____		Date _____	
A Generator's Certification						
I certify that the information on this form L-0669# and attachments is true and accurate. I have put forth a good faith effort to acquire and verify the information used to complete this characterization. Willful and deliberate omissions have not been made. All known and suspected hazards have to the best of my knowledge been disclosed.						
Generator Certifier Signature _____			Printed Name _____		Date <u>June 26, 1997</u>	
Phone _____			Mailstop _____		Facsimile No _____	
					E-Mail ID <u>shaun.garner@rfets.gov</u>	
Generating Facility <u>Rocky Flats Environmental Technol Site</u>			Building <u>T 3/T-4 Ryans Pit Building 891</u>		Organization <u>Environmental Restoration Projects</u>	
B General Information						
1 <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Will material and waste characterization be fully capable of complying with applicable RRWAC Subsection? If "No" receiving organization approval and completion of the following is required						
a. INEL-RRWAC requirement(s) not met (list each) _____						
b. Receiving organization approval letter number for nonstandard material or waste _____						
Contact	Name	E-Mail ID	Phone	Pager	Mail Stop	Charge Number
2 Generator	Mike Pepping		(303) 966-3075	966-4000 (7464)	T893B	NA
3 Technical	Hopi Salomon	hopi.salomon@rfets.gov	(303) 966-6627	966-4000 (5129)	T893B	NA
4 Material or Waste Type and action <u>4 6 2 mixed LLW to be incinerated at the WERF</u>						
5 Common Name of Material <u>Spent Granulated Activated Carbon (GAC)</u>						
6 Rate of Generation _____ One Time Only Liquid _____ gal Solid _____ lb or _____ ft ³ _____ m ³ <input checked="" type="checkbox"/> On-going Liquid _____ gal/yr Solid <u>24156</u> lb or <u>775.5</u> ft ³ /yr _____ m ³ /yr						
7 Generating Process Description * <u>This GAC was used to polish an airstream from a low-temperature thermal desorption unit used to treat VOC contaminated soil and debris, and from a CERCLA wastewater treatment unit (Building 891) where it was used as a final polishing step during processing of water from ER activities</u>						
8 Physical State at 70°F (solid liquid sludge gel etc) <u>solid</u>						
9 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Does material contain free liquids?						
10 <input type="checkbox"/> Yes <input type="checkbox"/> No Current Waste Minimization Plan (INEL Generators Only)						
11 Indicate all that apply <input checked="" type="checkbox"/> CERCLA <input type="checkbox"/> Scrap Metal <input checked="" type="checkbox"/> OSHA Carcinogen <input type="checkbox"/> PCB ≥ 50 ppm <input type="checkbox"/> Etiologic Agent <input type="checkbox"/> Nonfriable Asbestos <input type="checkbox"/> FIFRA <input type="checkbox"/> Unused Material <input type="checkbox"/> Used Oil <input type="checkbox"/> Aerosol Cans <input type="checkbox"/> Compressed Gas Cylinders <input type="checkbox"/> Friable Asbestos <input type="checkbox"/> Soil <input type="checkbox"/> Debris <input type="checkbox"/> Spill Cleanup <input type="checkbox"/> Wastewater <input type="checkbox"/> Classified Material <input checked="" type="checkbox"/> > 100 PPM VOCs <input type="checkbox"/> Accountable Nuclear Material						
12 <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Is this DOT regulated hazardous material? If yes identify DOT primary hazard <u>Class 9, Hazardous Waste Solid</u> and DOT subsidiary <u>none</u>						
13 <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No At the point of generation did this material contain any RCRA F K U or P listed waste in pure form as a mixture or as a treatment residue (i.e. ash leachate spill cleanup) or "D" characteristic waste? If yes give applicable EPA Hazardous Waste Numbers and attach applicable LDR notification and certification (40 CFR 261) _____ F001 _____ F002 _____ D040 _____ D009 _____						
* Indicate when a continuation sheet is used						



MATERIAL AND WASTE CHARACTERIZATION GENERATOR'S CERTIFICATION AND INFORMATION

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14 RCRA hazardous waste determination was made by Waste Analysis and/or process knowledge. Include appropriate information as required by the GI.

15 For mixed waste, if Characterization ID No. is different than the INEL Site Treatment Plan Waste Stream (STP) ID No., the STP ID No. is RF-W071-GAC

16 Yes No Is Section C1 Physical Characteristics of Material required by the GI? If yes, complete Section C1.

17 Yes No Is Section C2 Chemical Characteristics of Material required? If yes, complete Section C2.

18 Yes No Does the GI require radiological characterization? If yes, complete Section C3 Radiological Characteristics of Material per GI instructions.

19 Yes No Is this a lab pack? If yes, complete Item D Lab Pack Inventory List.

20 Yes No Does the GI require any additional information? If yes, see instructions.

21 Yes No Is determination of Underlying Hazardous Constituents required?

22 Yes No Is supporting documentation submitted? Is yes, list: 1) LDR Notification and Certification Form, 2) Table Tying Waste Origination to Waste Codes, Waste Containers, and Corresponding Sample Numbers, 3) Analytical Summary Tables, Analytical Data (Form 1 s), Log Sheets, and COC forms, 4) Assumptions Used for Calculation of Volume, Mass and Rate of GAC Generation, 5) Calculation of Maximum Chlorine (Halogen) Concentration, 6) MSDSs for GAC and RADSORB, 7) RFETS Waste Packaging Variance Request and Industrial Hygiene VOC Monitoring Results (performed in accordance with 40 CFR Part 60, Appendix A, Method 21)



MATERIAL AND WASTE CHARACTERIZATION CHARACTERIZATION OF MATERIAL

FORM L-0435 11#
(07-96 - Rev #00)

Characterization Identification No _____

C Characterization of Material

1 Physical Characteristics of Material

a General characteristics (number from top to bottom For nonlayered No 1 is 100%)

Layer No	Physical state at 70°F	Range of Percentage of Total	Color (as required by GI)
1	solid	98 to 100	black granular material (GAC)
2	solid	0 to 2	white, fine granular material (RADSORB - absorbent)
3	_____	to _____	_____
4	_____	to _____	_____
5	_____	to _____	_____

b Yes No Is density required? If yes give density range of representative sample
 Liquid _____ to _____ g/mL Solid 0.25 to 0.6 g/cc

c Yes No Is this aqueous waste to be processed in the PWTU? If yes give total solids range for representative sample _____ to _____ g/mL

d Yes No Is this WERF incinerable liquid? If yes give viscosity _____ to _____ SSU

2 Chemical Characteristics of Material

a Does the material contain any of the following? For each item (1)-(14) checked yes must include corresponding quantitative information in C2b with the corresponding number (1)-(14) from this list.

YES	NO	(1)-(14) Description	YES	NO	Quantitative Information
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(1) Organic free liquid	For liquid waste only		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Aqueous free liquid	<input type="checkbox"/>	<input type="checkbox"/>	Nickel and/or its compounds (as Ni) ≥ 134 mg/L
		If yes give pH range _____ to _____	<input type="checkbox"/>	<input type="checkbox"/>	Thallium and/or its compounds (as Tl) ≥ 103 mg/L
<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2) Absorbents	<input type="checkbox"/>	<input type="checkbox"/>	Halogenated organic compounds ≥ 1000 mg/L
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(3) Chelating agents	as listed in 40 CFR 268 Appendix III		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(4) Aqueous liquid with reactive cyanide ≥ 250 ppm	For solid waste only		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(5) Aqueous liquid with reactive sulfide ≥ 500 ppm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Halogenated organic compounds ≥ 1000 mg/kg as listed in 40 CFR 268 Appendix III
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(6) Air reactive	For used oil only		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(7) Water reactive	<input type="checkbox"/>	<input type="checkbox"/>	Arsenic ≥ 5 ppm
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(8) Other reactive	<input type="checkbox"/>	<input type="checkbox"/>	Cadmium ≥ 2 ppm
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(9) Fuming acids or acid gases	<input type="checkbox"/>	<input type="checkbox"/>	Chromium ≥ 10 ppm
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(10) Shock sensitive constituents	<input type="checkbox"/>	<input type="checkbox"/>	Lead ≥ 100 ppm
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(11) Explosives	<input type="checkbox"/>	<input type="checkbox"/>	PCBs ≥ 2 ppm
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(12) Pyrophores	<input type="checkbox"/>	<input type="checkbox"/>	Total halogens ≥ 4 000 ppm
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(13) Petroleum products	<input type="checkbox"/>	<input type="checkbox"/>	Total halogens ≥ 1 000 ppm
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(14) Oxidizers	For fluid to be processed in the PWTU only		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Benzene	<input type="checkbox"/>	<input type="checkbox"/>	Oil and grease ≥ 10 mg/L
<input type="checkbox"/>	<input checked="" type="checkbox"/>	PCBs ≥ 25 ppm			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	PCBs ≥ 5 ppm			



MATERIAL AND WASTE CHARACTERIZATION CHARACTERIZATION OF MATERIAL

FORM L-0435 11#
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Characterization Identification No _____

C Characterization of Material

2 Continued

2a Continued

YES	NO		YES	NO	
For WERF incinerable wastes only					
<input type="checkbox"/>	<input checked="" type="checkbox"/>	PCB liquids	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Chlorine in any form
<input type="checkbox"/>	<input checked="" type="checkbox"/>	PCB capacitors/ballasts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Bromine in any form
<input type="checkbox"/>	<input checked="" type="checkbox"/>	PCB transformers/regulators	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Iodine in any form
<input type="checkbox"/>	<input type="checkbox"/>	If yes check the following as applicable	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Flourine in any form
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Full <input type="checkbox"/> Drained Only <input type="checkbox"/> Drained and flushed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sulfur in any form
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is the material PCB-liquid-contaminated debris or derived from a spill of PCB liquid? If yes give range or original PCB concentration _____ to _____ ppm	<input type="checkbox"/>	<input checked="" type="checkbox"/>	PCBs ≥ 2 ppm

b Chemical Characteristics of Material For all the items checked in 2a, enter the common name as indicated and quantitative data as required Also enter the number 1 e (1-14) as checked in 2a when appropriate

Composition (as required by GI)

Name of Material or Chemical	2a Item No	OSHA Carcinogen?		FIFRA Regulated?		Composition Range _____ weight % or <input checked="" type="checkbox"/> ppm	
		Yes	No	Yes	No	_____	_____
Absorbent (RADSORB)	(2)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	2,000	to 20,000
Benzene		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<0.6	to 270
Halogenated organic compounds >1000 mg/kg		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No		to
Tetrachloroethene (perchloroethene, PCE)		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	12	to 7,400
Trichloroethene (TCE)		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	0.83	to 2,300
Sulfur in any form (total sulfur)		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	0.945	to 77

Continuation sheet included? Yes No

c Yes No Is flash point required? If yes complete the following

Flash point is _____ to _____ °F (_____ 400 _____ 400 _____ °C) Method used Open Cup Closed Cup Other

(specify) flash point data gathered from MSDS - ASTM method (for dry, virgin state - however, not tested on this spent GAC)

d Information for WERF incinerable waste only

(1) Heat of combustion 5,000 to 10,000 Btu/lb (2) Ash content 5 to 10 %

(3) Total halogen content <15 to 8,479 ppm (4) Water content _____ to _____ %

(5) Suspended particulate content _____ to _____ ppm

e Yes No Is RCRA Waste analysis required? If yes enter data below as applicable

Yes No Were the sampling and analysis protocols used in full compliance with SW 846 protocol or other equivalent regulatory agency approved methods? If no, explain in Section B Items 20 and 22



MATERIAL AND WASTE CHARACTERIZATION CHARACTERIZATION OF MATERIAL

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Characterization Identification No _____

C. Characterization of Material

2 f Analyte Data

Analyte	Underlying Hazardous Constituent? (Y/N)	Type of Analysis Indicate		Expected Concentration Range ____mg/kg or ____mg/L	Representative Sample Analysis x mg/kg or ____mg/L	Detection Limit ____mg/kg or ____mg/L
		Total	or TCLP			
1 tetrachlorethene	y	x		to	7,400	
2 trichloroethene	y	x		to	2,300	
3 1,2 Dichloropropane	y	x		to	280	
4 benzene	y	x		to	270	
5 toluene	y	x		to	190	
6 carbon tetrachloride	y	x		to	170	
7 1,1,1-trichloroethane	y	x		to	120	
8 chloroform	y	x		to	78	
9 xylene (total)	y	x		to	70	
10 ethylbenzene	y	x		to	56 (J)	
11 4-methyl-2-pentanone	y	x		to	38 (J)	
12 MEK (2-Butanone)	y	x		to	0.54 - 110 (J)	
13 styrene	n	x		to	16 (J)	
14 pyridine	y		x	to	0.7 (E) mg/L	
15 mercury	y		x	to	0.0033-0.617 mg/L	
16 mercury	y	x		to	2.5-41.3	
17 copper	n	x		to	19.4 - 51,348.4	
18				to		
19				to		
20				to		
21				to		
22				to		
23				to		
24				to		
25				to		
26				to		
27				to		
28				to		
29				to		
30				to		
31				to		
32				to		
33				to		
34				to		
35				to		
36				to		
37				to		



MATERIAL AND WASTE CHARACTERIZATION RADIOLOGICAL CHARACTERISTICS OF MATERIAL

FORM L-0435 12#
(07-96 - Rev #00)

Characterization Identification No _____

C Characterization of Material

3 Radiological Characteristics of Material

- a For MLLW and MTRU give (check one) Known or Estimated date of initial generation at or before October 1964
- b Yes No Is waste treatment plan for MLLW on file with INEL MLLW coordinator?
- c Yes No Is fissile material present? If yes waste matrix group _____ (RWMC Acceptance Only)
- d Yes No Are transuranic isotopes present? If yes complete items 3e 3f and 3h
- e Total activity per gram of waste of alpha emitting transuranic isotopes with half-lives greater than 20 years
- Yes No ≤ 10 nCi/g (LLW) or
- Yes No > 10 nCi/g and ≤ 100 nCi/g (SCW) or
- Yes No > 100 nCi/g (TRU)

f Transuranic isotope inventory

Isotope	Activity Range		Fissionable Material Range		Representative Sample Analysis	
	Units	(pCi/g)	g / kg		Activity (nCi/g)	Fissionable Material g / kg
<u>Pu-239/240</u>	<u>0 013+/- 0 005</u>	to <u>0 376+/- 0 034</u>	<u>N A</u>	to <u>N A</u>	_____	_____
<u>Am 241</u>	<u>0 004+/- 0 004</u>	to <u>0 382+/- 0 050</u>	<u>N A</u>	to <u>N A</u>	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
_____	_____	to _____	_____	to _____	_____	_____
Summation	<u>0 017</u>	to <u>0 758</u>	_____	to _____	_____	_____

g Yes No Is U-233 or U-235 present? If yes complete data below and item 3h

Isotope	Activity Range		Fissionable Material Range		Representative Sample Analysis	
	Units	(pCi/g)	g / kg		Activity (Ci/g)	Fissionable Material g / kg
U-233	_____	to _____	_____	to _____	_____	_____
	enriched to _____ %					
U-235	<u>0 013+/- 0 013</u>	to <u>0 240+/- 0 032</u>	<u>N A</u>	to <u>N A</u>	_____	_____
	enriched to <u>0</u> %					

h Fissionable material range summation N A to N A (grams)

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM (UTS)

Generator Name U.S Dept. of Energy/ Rocky Flats ETS Manifest Doc No

CWM Profile Number R F W 0 7 1 (Spent Granulated Activated Carbon) State Manifest No NA

- 1 Is this waste a non wastewater or a wastewater? (See 40 CFR 268.2) Check ONE Non Wastewater Wastewater
 2 If this waste is subject to any California List restrictions enter the letter from below (either A, B1, or B2) next to each restriction that is applicable.
 _____ HOCs _____ PCBs _____ Metals _____ Acid _____ Cyanides **(Removed from regulation per 62FR 26005)**
 3 Identify ALL US EPA hazardous waste codes that apply to this waste shipment as defined by 40 CFR 261. For each waste code identify the corresponding subcategory or check NONE if the waste code has no subcategory. Spent solvent and California List treatment standards are listed on the back of this form. If F039 multi source leachate applies those constituents must be listed and attached by the generator. If D001, D002 or D012, D043 requires treatment of the characteristic and meet 268.48 standards then the underlying hazardous constituent(s) present in the waste must be listed and attached.

R E F #	4 US EPA HAZARDOUS WASTE CODE(S)	5 SUBCATEGORY ENTER THE SUBCATEGORY DESCRIPTION IF NOT APPLICABLE SIMPLY CHECK NONE		6 HOW MUST THE WASTE BE MANAGED? ENTER THE LETTER FROM BELOW
		DESCRIPTION	NONE	
1	F001		X	A
2	F002		X	A
3	D040		X	A
4	D009	(Low Mercury Subcategory)		A
5				
6				
7				
8				
9				
10				

To identify F039 or D001, D002, D012, D043 underlying hazardous constituent(s) use the F039/Underlying Hazardous Constituent Form provided (CWM 2004) and check here
 If no UHCs are present in the waste upon its initial generation check here
 To list additional US EPA waste code(s) and subcategory(s) use the supplemental sheet provided (CWM 2005 B) and check here

HOW MUST THE WASTE BE MANAGED? In column 7 above enter the letter (A, B1, B2, B3, C, D or E) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3 or D you are making the appropriate certification as provided below.

- A RESTRICTED WASTE REQUIRES TREATMENT**
 This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D 268.32 or RCRA Section 3004(d).
 For Hazardous Debris "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."
- B 1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS**
 I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that based on my inquiry of those individuals immediately responsible for obtaining this information I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification including the possibility of fine and imprisonment."
- B 2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)**
 I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification including the possibility of fine and imprisonment."
- B 3 GOOD FAITH ANALYTICAL CERTIFICATION - FOR INCINERATED ORGANICS**
 "I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that based on my inquiry of those individuals immediately responsible for obtaining this information I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or 40 CFR Part 265 Subpart O or by combustion in fuel substitution units operating in accordance with applicable technical requirements and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification including the possibility of fine and imprisonment."
- C RESTRICTED WASTE SUBJECT TO A VARIANCE**
 This waste is subject to a national capacity variance, a treatability variance or a case by-case extension. Enter the effective date of prohibition in column 7 above.
 For Hazardous Debris "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."
- D RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT**
 I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d) and therefore can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above. I certify under penalty of law that I have personally examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certification including the possibility of a fine and imprisonment."
- E WASTE IS NOT CURRENTLY SUBJECT TO PART 268 RESTRICTIONS**
 This waste is a newly identified waste that is not currently subject to any 40 CFR 268 restrictions.

I hereby certify that all information submitted in this and all associated documents is complete and accurate to the best of my knowledge and information.
 Signature *Shawn L. Hance* Title *PROJECT MANAGER* Date *6-24-97*

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM - REVERSE SIDE

SOLVENT AND CALIFORNIA LIST TREATMENT STANDARDS

If the waste identified on the other side of this form is described by any of the following US EPA hazardous waste codes F001 F002 F003 F004 F005 and all solvent constituents will not be monitored by the treater and/or this hazardous waste is subject to any prohibitions identified as California List restrictions (40 CFR 268.32 and/or RCRA Section 3004(d)) then each constituent MUST be identified below by checking the appropriate box and this page must accompany the shipment along with the opposite side of this form. If the waste code F039 describes this waste then the corresponding list of constituents must be attached. If D001 D002 or D012 D043 require treatment to 268.48 standards then the underlying hazardous constituent(s) must also be attached.

SOLVENT WASTE TREATMENT STANDARDS							
✓	F001 through F005 spent solvent constituents and their associated US EPA hazardous waste code(s)	Treatment Standard ¹		✓	F001 through F005 spent solvent constituents and their associated US EPA hazardous waste code(s)	Treatment Standard ¹	
		Wastewaters	Nonwastewaters			Wastewaters	Nonwastewaters
	Acetone (F003)	0.28	160		Methylene chloride (F001 F002)	0.089	30
	Benzene (F005)	0.14	10		Methyl ethyl ketone (F005)	0.28	36
	n Butyl alcohol (F003)	5.6	2.6		Methyl isobutyl ketone (F003)	0.14	33
	Carbon disulfide (F005)	3.8	4.8 TCLP		Nitrobenzene (F004)	0.068	14
	Carbon tetrachloride (F001)	0.057	6.0		2 Nitropropane (F005)	[(WETOX or CHOXD) followed by CARBN] OR INCIN	INCIN
	Chlorobenzene (F002)	0.057	6.0				
	O Cresol (F004)	0.11	5.6		Pyridine (F005)	0.014	16
	Cresols (m and p isomers) (F004)	0.77	5.6	X	Tetrachloroethylene (F001 F002)	0.056	6.0
	Cyclohexanone (F003)	0.36	0.75 TCLP		Toluene (F005)	0.08	10
	o Dichlorobenzene (F002)	0.088	6.0	X	1,1,1 Trichloroethane (F001 F002)	0.054	6.0
	2-Ethoxyethanol (F005) (also called ethylene glycol monomethyl ether)	INCIN or BIODG	INCIN		1,1,2 Trichloroethane (F002)	0.054	6.0
				1,1,2 Trichloroethane (F002)	0.057	30	
	Ethyl acetate (F003)	0.34	33		1,2,2 Trifluoroethane (F002)	0.057	30
	Ethyl benzene (F003)	0.057	10	X	Trichloroethylene (F001 F002)	0.054	6.0
	Ethyl ether (F003)	0.12	160		Trichloromonofluoromethane (F002)	0.02	30
	Isobutanol (F005)	5.6	170		Xylenes (F003) (sum of o, p and m isomers)	0.32	30
	Methanol (F003)	5.6	0.75 TCLP				

¹ All spent solvent treatment standards are measured through a total waste analysis (TCA) unless otherwise noted. Wastewater units are mg/l, nonwastewater are mg/kg.

CALIFORNIA LIST TREATMENT STANDARDS - 40 CFR 268.32, 40 CFR 268.42 and RCRA Section 3004(d)		
A waste must first be designated as a US EPA Hazardous waste before the waste can be subject to the California List restrictions		
Restricted waste description	Prohibition	Treatment Standard
Liquid or nonliquid wastes containing Halogenated Organic Compounds listed in 40 CFR 268 Appendix III	Liquid wastes Greater than or equal to 1,000 mg/l Nonliquid wastes Greater than or equal to 1,000 mg/kg	40 CFR 268.42(a)(2) - INCIN or FSUBS
Liquid wastes containing PolyChlorinated Biphenyls (PCBs)	Greater than or equal to 50 ppm	40 CFR 268.42(a)(1) - INCIN or FSUBS Also see 40 CFR 761.60 and 70
Liquid wastes containing Metals Note: Hazardous wastes containing As, Cd, Cr, Hg, Pb, or Se must also be evaluated if not characteristically hazardous for that metal.	One or more of the following metals (or elements) at a concentration greater than or equal to the following: Nickel and/or compounds as Ni: 134 mg/l Thallium and/or compounds as Th: 130 mg/l	RCRA Section 3004(d)

CWM 2005A (12/94)

For the definition of "liquid" refer to Method 9095, the Paint Filter Liquids Test from EPA manual SW 846.

SUBCATEGORY REFERENCE

- D001 A. Ignitable characteristic wastes, except for the 40 CFR 261.21(a)(1) High TOC subcategory, that are managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems
- B. Ignitable characteristic wastes, except for the 40 CFR 261.21(a)(1) High TOC subcategory, that are managed in CWA/CWA equivalent or Class I SDWA systems
- C. High TOC ignitable characteristic liquids subcategory based on 40 CFR 261.21(a)(1) Greater than or equal to 10% total organic carbon
- D002 D. Corrosive characteristic wastes that are managed in non-CWA/non-CWA equivalent/non-Class I SDWA systems
- E. Corrosive characteristic wastes that are managed in CWA/CWA equivalent or Class I SDWA systems

UNDERLYING HAZARDOUS CONSTITUENT FORM (UTS)

Generator Name U S Dept of Energy/Rocky Flats ETS Manifest Doc No _____

Waste ID No : RF-W071 (Spent Granulated Activated Carbon) State Manifest No. N A

If D001, D002, D003 or D012-D043 requires treatment to 268 48 standards, then each underlying hazardous constituent present in the waste at the point of generation, and at a level above the UTS constituent specific treatment standard, must be listed. Write the letter (A, B1, B3, or C which corresponds to the letter on the Land Disposal Notification and Certification Form (UTS)) beside each constituent present to properly describe how the constituent(s) must be managed under 40 CFR 268.7

CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)	CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)
ORGANIC				Carbosulfan		0.028	1.4
A2213		0.003	1.4	Chlordane (alpha and gamma isomers)		0.0033	0.26
Acenaphthene		0.059	3.4	p-Chloroaniline		0.46	16
Acenaphthylene		0.059	3.4	Chlorobenzene		0.057	6.0
Acetone		0.28	160	Chlorobenzilate		0.10	NA
Acetonitrile		5.6	38	2-Chloro-1,3-butadiene		0.057	0.28
Acetophenone		0.010	9.7	Chlorodibromomethane		0.057	15
2-Acetylamino fluorane		0.059	140	Chloroethane		0.27	6.0
Acrolein		0.29	NA	bis(2-Chloroethoxy)methane		0.036	7.2
Acrylamide		19	23	bis(2-Chloroethyl)ether		0.033	6.0
Acrylonitrile		0.24	84	2-Chloroethyl vinyl ether		0.062	NA
Alkyl carb sulfone		0.056	0.28	Chloroform	A	0.046	6.0
Aldrin		0.021	0.066	bis(2-Chloroisopropyl)ether		0.055	7.2
4-Aminobiphenyl		0.13	NA	p-Chloro-m-cresol		0.018	14
Aniline		0.81	14	Chloromethane/Methyl chloride		0.19	30
Anthracene		0.059	3.4	2-Chloronaphthalene		0.055	5.6
Aramid		0.38	NA	2-Chlorophenol		0.044	5.7
Barbituric acid		0.056	1.4	3-Chloropropylene		0.036	30
Benzocarb		0.056	1.4	Chrysene		0.059	3.4
Benzocarb phenol		0.056	1.4	o-Cresol		0.11	5.6
Benzoin		0.056	1.4	m-Cresol (difficult to distinguish from p-Cresol)		0.77	5.6
Benz(a)anthracene		0.059	3.4	p-Cresol (difficult to distinguish from m-Cresol)		0.77	5.6
Benzal chloride		0.053	6.0	m-Cumenyl methyl carbamate		0.056	1.4
Benzene	A	0.14	10	Cyclohexane		0.003	1.4
Benzo(b)fluoranthene (difficult to distinguish from benzo(k)fluoranthene)		0.11	6.8	Cyclohexanone		0.36	0.75 mg/l TCLP
Benzo(k)fluoranthene (difficult to distinguish from benzo(b)fluoranthene)		0.11	6.8	o,p' DDD		0.023	0.087
Benzo(g,h,i)perylene		0.0055	1.8	p,p'-DDD		0.023	0.087
Benzo(a)pyrene		0.061	3.4	o,p'-DDE		0.031	0.27
alpha-BHC		0.00014	0.066	p,p'-DDE		0.031	0.087
beta-BHC		0.00014	0.066	o,p'-DDT		0.0039	0.087
delta-BHC		0.023	0.066	p,p'-DDT		0.0039	0.087
gamma-BHC		0.0017	0.066	Dibenz(a,h)anthracene		0.055	8.2
Bromodichloromethane		0.35	15	Dibenz(a,e)pyrene		0.061	NA
Bromomethane/Methyl bromide		0.11	15	1,2-Dibromo-3-chloropropane		0.11	15
4-Bromophenyl phenyl ether		0.053	15	1,2-Dibromoethane/Ethylene dibromide		0.028	15
n-Butyl alcohol		5.6	2.6	Dibromomethane		0.11	15
Butyl benzyl phthalate		0.017	28	m-Dichlorobenzene		0.036	6.0
Butylate		0.003	1.4	o-Dichlorobenzene		0.088	6.0
2-sec-Butyl-4,6-dinitrophenol/Dinitoseb		0.066	2.5	p-Dichlorobenzene		0.090	6.0
Carbaryl		0.006	0.14	Dichlorodifluoromethane		0.21	7.2
Carbenzadim		0.056	1.4	1,1-Dichloroethane		0.059	6.0
Carbofuran		0.006	0.14	1,2-Dichloroethane		0.21	6.0
Carbofuran phenol		0.056	1.4	1,1-Dichloroethylene		0.025	6.0
Carbon disulfide		3.8	4.8 mg/l TCLP	trans-1,2-Dichloroethylene		0.054	30
Carbon tetrachloride	A	0.057	6.0	2,4-Dichlorophenol		0.044	14

CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)	CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)
2,6-Dichlorophenol		0.044	14	HxCDFs (All HexachloroDibenzofurans)		0.000063	0.001
2,4-Dichlorophenoxyacetic acid/2,4-D		0.72	10	Iodans (1,2,3-a,d) pyrene		0.0055	3.4
1,2-Dichloropropane	A	0.85	18	Iodomethane		0.19	65
cis-1,3-Dichloropropylene		0.036	18	3-Iodo-2-propynyl n-butylcarbamate		0.056	1.4
trans-1,3-Dichloropropylene		0.036	18	Isobutyl alcohol		5.6	170
Dieldrin		0.017	0.13	Isodrin		0.021	0.066
Diethyl phthalate		0.20	28	Isolan		0.056	1.4
Diethylene glycol, dicarbamate		0.056	1.4	Isomafrole		0.081	2.6
p-Dimethylaminoazobenzene		0.13	NA	Kepons		0.0011	0.13
2,4-Dimethyl phenol		0.036	14	Methacrylonitrile		0.24	84
Dimethyl phthalate		0.047	28	Methanol		5.6	0.75 mg/l TCLP
Dimethlan		0.056	1.4	Methacrylonitrile		0.081	1.5
Di-n-butyl phthalate		0.057	28	Methocarb		0.056	1.4
1,4-Dinitrobenzene		0.32	2.3	Methomyl		0.028	0.14
4,6-Dinitro-o-cresol		0.28	160	Methoxychlor		0.25	0.18
2,4-Dinitrophenol		0.12	160	Methyl ethyl ketone		0.28	36
2,4-Dinitrotoluene		0.32	140	Methyl isobutyl ketone	A	0.14	33
2,6-Dinitrotoluene		0.55	28	Methyl methacrylate	A	0.14	160
Di-n-octyl phthalate		0.017	28	Methyl methanesulfonate		0.018	NA
Di-n-propylstrosamine		0.40	14	Methyl parathion		0.014	4.6
1,4-Dioxane		12.0	170	3-Methylcholanthrene		0.0055	15
Diphenylamine (difficult to distinguish from diphenylmethane)		0.92	13	4,4-Methylene bis(2-chloroaniline)		0.50	30
Diphenylnitrosamine (difficult to distinguish from diphenylamine)		0.92	13	Methylene chloride		0.089	30
1,2-Diphenylhydrazine		0.087	NA	Metolcarb		0.056	1.4
Disulfone		0.017	6.2	Mexcarb		0.056	1.4
Dithiocarbamates (total)		0.028	28	Mofinate		0.003	1.4
Endosulfan I		0.023	0.066	Naphthalene		0.059	5.6
Endosulfan II		0.29	0.13	2-Naphthylamine		0.52	NA
Endosulfan sulfate		0.029	0.13	o-Nitroaniline		0.27	14
Endrin		0.0028	0.13	p-Nitroaniline		0.028	28
Endrin aldehyde		0.025	0.13	Nitrobenzene		0.068	14
EPTC		0.003	1.4	5-Nitro-o-toluidine		0.32	23
Ethyl acetate		0.34	33	o-Nitrophenol		0.028	13
Ethyl benzene	A	0.057	10	p-Nitrophenol		0.12	29
Ethyl cyanide/Propanenitrile		0.24	360	N-Nitrosodiethylamine		0.40	28
Ethyl ether		0.12	160	N-Nitrosodimethylamine		0.40	2.3
Ethyl methacrylate		0.14	160	N-Nitroso-di-n-butylamine		0.40	17
Ethylene oxide		0.12	NA	N-Nitrosomethylthylamine		0.40	2.3
but(2-Ethylhexyl) phthalate		0.28	28	N-Nitrosomorpholine		0.40	2.3
Famphur		0.017	15	N-Nitrosopiperidine		0.013	35
Fluoranthene		0.068	3.4	N-Nitrosopyrrolidine		0.013	35
Fluorene		0.059	3.4	Oxamyl		0.056	0.28
Formetanate hydrochloride		0.056	1.4	Parathion		0.014	4.6
Formparanate		0.056	1.4	Total PCBs (sum of all PCB isomers, or all Aroclors)		0.10	10
Heptachlor		0.0012	0.066	Pebutate		0.003	1.4
Heptachlor epoxide		0.016	0.066	Pentachlorobenzene		0.055	10
Hexachlorobenzene		0.055	10	PeCDDs (All PentachloroDibenzop-Gordas)		0.000063	0.001
Hexachlorobutadiene		0.055	5.6	PeCDFs (All PentachloroDibenzofurans)		0.000035	0.001
Hexachlorocyclopentadiene		0.057	2.4	Pentachloroethane		0.055	6.0
Hexachloroethane		0.055	30	Pentachloronitrobenzene		0.055	4.8
Hexachloropropylene		0.035	30	Pentachlorophenol		0.089	7.4
HxCDDs (All HexachloroDibenzop-Gordas)		0.000063	0.001	Phenacetin		0.081	16

CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)	CONSTITUENT	HOW MUST CONSTITUENT BE MANAGED?	WW (mg/l)	NWW (mg/Kg)
Phenanthrene		0.059	5.6	1,1,1-Trichloroethane	A	0.054	6.0
Phenol		0.039	6.2	1,1,2-Trichloroethane		0.054	6.0
o-Phenylenediamine		0.056	5.6	Trichloroethylene	A	0.054	6.0
Phorate		0.021	4.6	Trichloromonofluoromethane		0.020	3.0
Phthalic acid		0.055	28	2,4,5-Trichlorophenol		0.18	7.4
Phthalic anhydride		0.055	28	2,4,6-Trichlorophenol		0.035	7.4
Physostigmine		0.056	1.4	2,4,5-Trichlorophenoxyacetic acid/2,4,5-T		0.72	7.9
Physostigmine salicylate		0.056	1.4	1,2,3-Trichloropropane		0.85	3.0
Promecarb		0.056	1.4	1,1,2-Trichloro-2,2,2-trifluoroethane		0.057	3.0
Propamide		0.093	1.5	Triethylamine		0.081	1.5
Propam		0.056	1.4	tris-(1,3-Dibromopropyl) phosphate		0.11	0.10
Propoxur		0.056	1.4	Verolite		0.003	1.4
Prothifocarb		0.003	1.4	Vinyl chloride		0.27	6.0
Pyreos		0.067	8.2	Xylenes-mixed isomers (sum of o-, m-, and p-xylenes concentrations)	A	0.32	3.0
Pyridine	A	0.014	16	INORGANIC			
Safrole		0.081	23	Arsine		1.9	2.1 mg/l TCLP
Silvex 72,4,5-TP		0.72	7.9	Arsenic		1.4	5.0 mg/l TCLP
1,2,4,5-Tetrachlorobenzene		0.055	14	Boron		1.2	7.6 mg/l TCLP
TCDDs (All Tetrachlorodibenzo-p-dioxins)		0.000063	0.001	Beryllium		0.82	0.014 mg/l TCLP
TCDFs (All Tetrachlorodibenzofurans)		0.000063	0.001	Cadmium		0.69	0.19 mg/l TCLP
1,1,1,2-Tetrachloroethane		0.057	6.0	Chromium (Total)		2.77	0.86 mg/l TCLP
1,1,2,2-Tetrachloroethane		0.057	6.0	Cyanides (Total) ¹		1.2	390
Tetrachloroethylene	A	0.056	6.0	Cyanides (Amenable) ²		0.86	3.0
2,3,4,6-Tetrachlorophenol		0.030	7.4	Lead		0.69	0.37 mg/l TCLP
Thiodicarb		0.019	1.4	Mercury-Nonwastewater from Retort		NA	0.20 mg/l TCLP
Thiophanate-methyl		0.056	1.4	Mercury-All Others	A	0.15	0.025 mg/l TCLP
Tirpate		0.056	0.28	Nickel		3.98	5.0 mg/l TCLP
Toluene	A	0.080	10	Selenium		0.82	0.16 mg/l TCLP
Toxaphene		0.0095	2.6	Silver		0.43	0.30 mg/l TCLP
Triallate		0.003	1.4	Sulfide		14	NA
Tribromomethane/Bromoform		0.63	15	Thallium		1.4	0.78 mg/l TCLP
1,2,4-Trichlorobenzene		0.055	19				

Notes to table

¹Concentration standards for wastewaters are expressed in mg/l and are based on analysis of composite samples.

²Except for Metals (EP or TCLP) and Cyanides (Total and Amenable) the nonwastewater treatment standards are expressed as a concentration were established, is part based upon incineration in units operated in accordance with the technical requirements of 40 CFR part 264, subpart O or 40 CFR part 265, subpart O, or based upon combustion in fuel substitution units operating in accordance with applicable technical requirements. A facility may comply with these treatment standards according to provisions in 40 CFR 268.40(d). All concentration standards for nonwastewaters are based on analysis of grab samples.

Both Cyanides (Total) and Cyanides (Amenable) for nonwastewaters are to be analyzed using Method 9010 or 9012, found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" EPA Publication SW-846, as incorporated by reference in 40 CFR 260.11, with a sample size of 10 grams and a distillation time of one hour and 15 minutes.

Table A2-1 Tie Between Waste Origination, Waste Codes, Individual Waste Containers and Corresponding Sample Numbers for Granulated Activated Carbon (GAC) Proposed for Incineration at INEEL WERF June 25, 1997 (4 02PM)

Debris Type	Regulatory Classification	Packaging	NRWOL/ Container numbers	Interim Storage	Expected Disposition	Sampling Analysis/Media	Approx Volume (yd ³)
radioactive GAC - T-3/T-4	Mixed Waste D009, D040	4 waste crates and 10, 55-gal drums	12524-8/ P02172, P02173, P02174, P02175, D87113, D87117, D87118, D87119, D87121, D87122, D87126, D87128, D87130, D87132	Unit 13, and 15a	incineration at INEL's WERF, ash disposal at Envirocare	DB00012RM TCLP (full suite), reactive sulfide, reactive cyanide, DB00015RM VOA screen, DB00038RM Isotopic alpha, sulfur, total metals	15
radioactive GAC - Ryan's Pit & T 3/T-4	Mixed Waste F001/F002 (derived from rule) D009, D040	3 waste crates	NRWOL T0083928/ P02176, P02243, P02245	Unit 13	incineration at INEL's WERF, ash disposal at Envirocare	Same as above	7
radioactive GAC - Building 891 (CWTF)	Mixed Waste F001/F002 (derived from rule)	20, 55-gal drums	T0089808-1/ D87311, D87384, D87308, D87307, D87306, D87305, D87127, D87385, D87304, D87382, D87388, D87387, D87389, D87310, D87386, D87383, D87302, D87303, D87309, D87712	Unit 1804	incineration at INEL's WERF, ash disposal at Envirocare	Sample FT20601RG total VOAs, total metals, isotopic alpha Sample FT20604RG TCLP VOAs, TCLP metals, reactive sulfide, reactive cyanide, pH, DB00039RM sulfur	5

Table A3-1 Summary Results of GAC Samples June 25, 1997 (2:50PM)

Sample Number	Sample Date	Analyses	Media	Results	Comments
DB00012RM DB00013RM	8/26/96	Full suite TCLP (+Cu, Zn), +reactive sulfide and cyanide	T3/T4 spent GAC from System 1 (worst case) - from drum D87122	0 45 mg/l PCE 0 55 mg/l TCE - Hazardous 2 0 mg/l 2-Butanone (methyl- ethyl-ketone) 0 14 mg/l Benzene 0 052 mg/l Carbon tetrachloride 0 12 mg/l Chloroform 0 7 mg/l Pyridine (E) (probable UTS) 0 304 mg/l Barium 0 617 mg/l mercury-Hazardous 0 239 mg/l Zinc 0 2 mg/kg - Reactive Cyanide	Hazardous for TCE and mercury DB00013RM is the QC trip blank
DB00015RM	9/10/96	VOA Screen	T3/T4 spent GAC from System 1 (worst case) - from drum D87122	8,200 ppm PCE (E) 2,300 ppm TCE 280 ppm 1,2-Dichloropropane 270 ppm Benzene 190 ppm Toluene 170 ppm Carbon tetrachloride 120 ppm 1,1,1-Trichloroethane 78 ppm Chloroform 70 ppm Xylene (total) 43 ppm ethylbenzene (J) 38 ppm 4-Methyl-2-Pentanone 16 ppm styrene (J) Sample was re-run because of the "E" flag on PCE (sample DB00015RM-DL) 7,400 ppm PCE 2,100 ppm TCE 240 ppm 1,2-Dichloropropane(J) 250 ppm Benzene 180 ppm Toluene(J) 160 ppm Carbon tetrachloride(J) 120 ppm 1,1,1-Trichloroethane(J) 76 ppm Chloroform(J) 52 ppm Xylene (total) 56 ppm ethylbenzene (J)	Process knowledge indicates that would be the highest VOA concentration GAC
DB00038RM	5/28/97	Total sulfur Total Metals Isotopics	T3/T4 spent GAC from System 1 (worst case) - from drum D87122	0 945 mg/kg sulfur 41 3 mg/kg mercury isotopics 0 20+/-0 066 pCi/g U-238 (MDA 0 041) 0 013+/-0 013 pCi/g U-235 (MDA 0 050) 0 037+/-0 032 pCi/g U-233/234 (MDA 0 041) 0 002+/-0 003 pCi/g Pu-238 (MDA 0 006) 0 013+/-0 005 pCi/g Pu-239/240 (MDA 0 005) 0 004+/-0 004 pCi/g Am-241 (MDA 0 004) -0 004+/-0 007 pCi/g Th-232 (MDA 0 027) 0 025+/-0 028 pCi/g Th-228 (MDA 0 051)	

Sample Number	Sample Date	Analyses	Media	Results	Comments
FT20601RG	12/05/96	Total VOAs, total metals, isotopics	GAC from CWTF	VOAS 12 ppm PCE 0.830 ppm TCE 0.39 ppm Toluene(J) 0.33 ppm 1,1,1-Trichloroethane(J) 1.1 ppm Xylene (total) 0.31 ppm ethylbenzene (J) 0.19 ppm 4-methyl-2-pentanone (J) significant metal detections 51,348.4 ppm copper isotopics 9.88 +/- 0.36 pCi/g U-238 (MDA 0.01) 0.240 +/- 0.032 pCi/g U-235 (MDA 0.011) 7.21 +/- 0.27 pCi/g U-233/234 (MDA 0.03) 0.376 +/- 0.034 pCi/g Pu-239/240 (MDA 0.016) 0.382 +/- 0.050 pCi/g Am-241 (MDA 0.028)	
FT20604RG	01/28/97	Reactive sulfide and cyanide, pH, TCLP VOAs, TCLP metals	GAC from CWTF	4.8 mg/kg reactive cyanide 8.0 mg/kg reactive sulfide 7.6 pH TCLP VOAs = all non detects TCLP metals 0.0033 mg/L mercury	
DB0039RM	5/28/97	Total sulfur	GAC from CWTF	7.7 mg/kg sulfur	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

DB00012RM

Lab Name QUANTERRA MO Contract 262-01
 Lab Code ITMO Case No V93301 SDG No S1235
 Matrix (soil/water) WATER Lab Sample ID 11933-001
 Sample wt/vol 5 00 (g/mL) ML Lab File ID F6663
 Level (low/med) LOW Date Received 08/26/96
 % Moisture not dec Date Analyzed 09/10/96
 Column (pack/cap) CAP Dilution Factor 10

CONCENTRATION UNITS
(ug/L or ug/Kg) UG/L

Q

CAS NO	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl Chloride	100	U
75-35-4	1,1-Dichloroethene	50	U
67-66-3	Chloroform	120	
107-06-2	1,2-Dichloroethane	50	U
78-93-3	2-Butanone	2000	
56-23-5	Carbon Tetrachloride	52	
79-01-6	Trichloroethene	550	
71-43-2	Benzene	140	
127-18-4	Tetrachloroethene	450	
108-90-7	Chlorobenzene	50	U

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

DB00012RM

Lab Name QUANTERRA, MO Contract 262-01

Lab Code ITMO Case No _____ SAS No _____ SDG No S1233

Matrix (soil/water) TCLP Lab Sample ID 11933-001

Sample wt/vol 100 (g/ml) ML Lab File ID _____

Level (low/med) LOW Date Sampled 08-26-96

% Moisture not dec _____ dec _____ Date Extracted 09-12-96

Extraction (SepF/Cont/Sonc) SEPF Date Analyzed 09-13-96

GPC Cleanup (Y/N) N pH _____ Dilution Factor 1

CONCENTRATION UNITS

CAS NO Compound (ug/L or ug/Kg) UG/L Q

58-89-9-----	gamma-BHC (Lindane)	0 50	U
76-14-8-----	Heptachlor	0 50	U
1024-57-3-----	Heptachlor epoxide	0 50	U
72-20-8-----	Endrin	0 50	U
72-43-5-----	Methoxychlor	1 0	U
57-74-9-----	Chlordane (technical)	5 0	U
8001-35-2-----	Toxaphene	20	U

U Concentration of analyte is less than the value given

FORM I PEST

000006

1D
HERBICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DB00012RM

Lab Name QUANTERRA, MO Contract 262 01

Lab Code ITMO Case No _____ SAS No _____ SDG No S1232

Matrix (soil/water) TCLP Lab Sample ID 11933-001

Sample wt/vol 00 (g/ml) ml Lab File ID _____

Level (low/med) LOW Date Sampled 08-26-96

% Moisture not dec _____ dec _____ Date Extracted 09-16-96

Extraction (Sep/Cont/Sonc/Shak) SEPF Date Analyzed 09-18-96

GPC Cleanup (Y/N) N pH. _____ Dilution Factor 1

CONCENTRATION UNITS

CAS NO Compound (ug/L or ug/L) ug/L Q

94-75-7-----	-2,4-D	40	U
93-72-1-----	-2,4,5-TP	10	U

U Concentration of analyte is less than the value given

SEP-27-96 FRI 10:46

08/27/96 08:56

BLDG 881 ROOM 212

2314 298 8757

FAX NO. 303 966 3400

QUANTERRA

P. 02

003/003

1B SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

Lab Name QUANTERRA MO

Contract: 262-02

DB00012RM

Lab Code: ITMO

Case No . S93301

SAS No..

SDG No.: 61230

Matrix: (soil/water) WATER

Lab Sample ID 11933-001

Sample wt/vol. 200 0 (g/mL) ML

Lab File ID: D0306

Level: (low/med) LOW

Date Received: 08/26/96

Moisture decanted: (Y/N)

Date Extracted: 09/19/96

Concentrated Extract Volume: 1000 (uL)

Date Analyzed 09/20/96

Injection Volume 2.0 (uL)

Dilution Factor. 1.0

GPC Cleanup: (Y/N) N

pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO

COMPOUND

Q

110-86-1	Pyridine	700	E
106-46-7	1,4-Dichlorobenzene	50	U
95-48-7	2-Methylphenol	50	U
106-44-5	4-Methylphenol	50	U
67-72-1	Hexachloroethane	50	U
98-95-3	Nitrobenzene	50	U
87-68-3	Hexachlorobutadiene	50	U
88-06-2	2,4,6-Trichlorophenol	50	U
95-95-4	2,4,5-Trichlorophenol	50	U
121-14-2	2,4-Dinitrotoluene	50	U
118-74-1	Hexachlorobenzene	50	U
87-86-5	Pentachlorophenol	250	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DE00012RMDL

Lab Name: QUANTERRA MO Contract: 262-02
 Lab Code: ITMO Case No.: 893301 SAS No SDG No.: S1230
 Matrix (soil/water) WATER Lab Sample ID: 11933-001DL
 Sample wt/vol: 200.0 (g/mL) ML Lab File ID H8139
 Level: (low/med) LOW Date Received: 08/26/96
 % Moisture: decanted: (Y/N) Date Extracted: 09/19/96
 Concentrated Extract Volume: 1000 (uL) Date Analyzed 09/22/96
 Injection Volume: 2.0 (uL) Dilution Factor: 4.0
 GPC Cleanup: (Y/N) N pH.

CAS NO. COMPOUND CONCENTRATION UNITS (ug/L or ug/Kg) UG/L Q

110-86-1	Pyridine	630	D
106-46-7	1,4-Dichlorobenzene	200	U
95-48-7	2-Methylphenol	200	U
106-44-5	4-Methylphenol	200	U
67-72-1	Hexachloroethane	200	U
98-95-3	Nitrobenzene	200	U
87-68-3	Hexachlorobutadiene	200	U
88-06-2	2,4,6-Trichlorophenol	200	U
95-95-4	2,4,5-Trichlorophenol	200	U
121-14-2	2,4-Dinitrotoluene	200	U
118-74-1	Hexachlorobenzene	200	U
87-86-5	Pentachlorophenol	1000	U



46L1091

Report Date: 09/26/95

Client ID	Quanterra ID	Analyte	Analysis Date	Result	Units	Det Lmt	Dil
DB00012RM	11933-001	Reactive Sulfide	09/04/96	<22.2	mg/kg	22.2	1
-	QCBLK111571	Reactive Sulfide	09/04/96	<4.44	mg/kg	4.44	1
-	QCLCS111571	Reactive Sulfide	09/04/96	96	%Recovery	4.44	1
DB00012RM	11933-001	Reactive Cyanide	09/03/96	0.20	mg/kg	0.10	1
-	QCBLK111378	Reactive Cyanide	09/03/96	<0.10	mg/kg	0.10	1
-	QCLCS111378	Reactive Cyanide	09/03/96	16	%Recovery	0.10	1



1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

DB00013RM

Lab Name	QUANTERRA MO	Contract	262-01
Lab Code	ITMO	Case No	V93302
		SDG No	S1236
Matrix (soil/water)	WATER	Lab Sample ID	11933-002
Sample wt/vol	5 00 (g/mL)	Lab File ID	F6616
Level (low/med)	LOW	Date Received	08/26/96
% Moisture	not dec	Date Analyzed	09/08/96
Column (pack/cap)	CAP	Dilution Factor	1 0

CAS NO	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) UG/L	Q
74-87-3	-----Chloromethane	10	U
74-83-9	-----Bromomethane	10	U
75-01-4	-----Vinyl Chloride	10	U
75-00-3	-----Chloroethane	10	U
75-09-2	-----Methylene Chloride	5	U
67-64-1	-----Acetone	100	U
75-15-0	-----Carbon Disulfide	5	U
75-35-4	-----1,1-Dichloroethene	5	U
75-34-3	-----1,1-Dichloroethane	5	U
156-60-5	-----trans-1,2-Dichloroethene	5	U
67-66-3	-----Chloroform	5	U
107-06-2	-----1,2-Dichloroethane	5	U
78-93-3	-----2-Butanone	100	U
71-55-6	-----1,1,1-Trichloroethane	5	U
56-23-5	-----Carbon Tetrachloride	5	U
108-05-4	-----Vinyl Acetate	50	U
75-27-4	-----Bromodichloromethane	5	U
78-87-5	-----1,2-Dichloropropane	5	U
10061-01-5	-----cis-1,3-Dichloropropene	5	U
79-01-6	-----Trichloroethene	5	U
124-48-1	-----Dibromochloromethane	5	U
79-00-5	-----1,1,2-Trichloroethane	5	U
71-43-2	-----Benzene	5	U
110-75-8	-----2-Chloroethyl Vinyl Ether	10	U
10061-02-6	-----trans-1,3-Dichloropropene	5	U
75-25-2	-----Bromoform	5	U
108-10-1	-----4-Methyl-2-Pentanone	50	U
591-78-6	-----2-Hexanone	50	U
127-18-4	-----Tetrachloroethene	5	U
79-34-5	-----1,1,2,2-Tetrachloroethane	5	U
108-88-3	-----Toluene	5	U
108-90-7	-----Chlorobenzene	5	U
100-41-4	-----Ethylbenzene	5	U
100-42-5	-----Styrene	5	U
1330-20-7	-----Xylene (total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

Lab Name E G &G , Rocky Flats Contract
 Lab Code GLAB Case No SAS No SDG No
 Matrix (soil/water) SOIL Lab Sample ID DB00015RM
 Sample wt/vol 4 000 (g/mL) G Lab File ID SEP1002
 Level (low/med) MED Date Received 09/10/96
 % Moisture not dec 0 Date Analyzed 09/10/96
 GC Column DBVRX ID 32 (mm) Dilution Factor 12,500

CAS NO	COMPOUND	CONCENTRATION UNITS	MG/KG
74-87-3	Chloromethane	120	U
74-83-9	Bromomethane	120	U
75-01-4	Vinyl Chloride	120	U
75-00-3	Chloroethane	120	U
75-09-2	Methylene Chloride	60	U
67-64-1	Acetone	120	U
75-15-0	Carbon Disulfide	60	U
75-35-4	1,1-Dichloroethene	60	U
75-34-3	1,1-Dichloroethane	60	U
544-59-2	1,2-Dichloroethene (total)	62	U
67-66-3	Chloroform	78	
107-06-2	1,2-Dichloroethane	60	U
78-93-3	2-Butanone	120	U
71-55-6	1,1,1-Trichloroethane	120	
56-23-5	Carbon Tetrachloride	170	
75-27-4	Bromodichloromethane	60	U
78-87-5	1,2-Dichloropropane	280	
10061-01-5	cis-1,3-Dichloropropene	60	U
79-01-6	Trichloroethene	2300	
124-48-1	Dibromochloromethane	60	U
79-00-5	1,1,2-Trichloroethane	60	U
71-43-2	Benzene	270	
10061-02-6	trans-1,3-Dichloropropene	60	U
75-25-2	Bromoform	60	U
108-10-1	4-Methyl-2-Pentanone	38	J
591-78-6	2-Hexanone	120	U
127-18-4	Tetrachloroethene	8200	E
79-34-5	1,1,2,2-Tetrachloroethane	60	U
108-88-3	Toluene	190	
108-90-7	Chlorobenzene	60	U
100-41-4	Ethylbenzene	43	J
100-42-5	Styrene	16	J
1330-20-7	Xylene (total)	70	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

Lab Name E G &G , Rocky Flats Contract
 Lab Code GLAB Case No SAS No SDG No
 Matrix (soil/water) SOIL Lab Sample ID DB00015RM-DL
 Sample wt/vol 4 000 (g/mL) G Lab File ID SEP1301
 Level (low/med) MED Date Received 09/10/96
 % Moisture not dec 0 Date Analyzed 09/13/96
 GC Column DBVRX ID 32 (mm) Dilution Factor 25000

CAS NO	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) UG/KG	Q
74-87-3	-----Chloromethane	250000	U
74-83-9	-----Bromomethane	250000	U
75-01-4	-----Vinyl Chloride	250000	U
75-00-3	-----Chloroethane	250000	U
75-09-2	-----Methylene Chloride	120000	U
67-64-1	-----Acetone	130000	J
75-15-0	-----Carbon Disulfide	120000	U
75-35-4	-----1,1-Dichloroethene	120000	U
75-34-3	-----1,1-Dichloroethane	120000	U
544-59-2	-----1,2-Dichloroethene (total)	120000	U
67-66-3	-----Chloroform	66000	J
107-06-2	-----1,2-Dichloroethane	120000	U
78-93-3	-----2-Butanone	100000	J
71-55-6	-----1,1,1-Trichloroethane	120000	J
56-23-5	-----Carbon Tetrachloride	160000	
75-27-4	-----Bromodichloromethane	120000	U
78-87-5	-----1,2-Dichloropropane	240000	
10061-01-5	-----cis-1,3-Dichloropropene	120000	U
79-01-6	-----Trichloroethene	2100000	
124-48-1	-----Dibromochloromethane	120000	U
79-00-5	-----1,1,2-Trichloroethane	120000	U
71-43-2	-----Benzene	240000	
10061-02-6	-----trans-1,3-Dichloropropene	120000	U
75-25-2	-----Bromoform	120000	U
108-10-1	-----4-Methyl-2-Pentanone	250000	U
591-78-6	-----2-Hexanone	28000	J
127-18-4	-----Tetrachloroethene	7400000	E
79-34-5	-----1,1,2,2-Tetrachloroethane	120000	U
108-88-3	-----Toluene	180000	
108-90-7	-----Chlorobenzene	120000	U
100-41-4	-----Ethylbenzene	56000	J
100-42-5	-----Styrene	120000	U
1330-20-7	-----Xylene (total)	65000	J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name E G & G , Rocky Flats Contract
 Lab Code GLAB Case No SAS No SDG No
 Matrix (soil/water) SOIL Lab Sample ID DB00015RM-DL
 Sample wt/vol 4.000 (g/mL) G Lab File ID SEP1303
 Level (low/med) MED Date Received 09/10/96
 % Moisture not dec 0 Date Analyzed 09/13/96
 GC Column DBVRX ID 32 (mm) Dilution Factor 50000

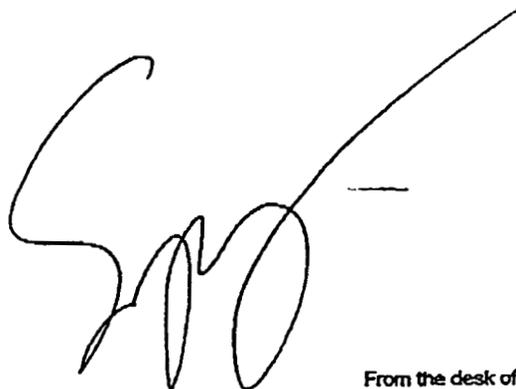
CAS NO	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) UG/KG	Q
74-87-3	-----Chloromethane	490000	U
74-83-9	-----Bromomethane	490000	U
75-01-4	-----Vinyl Chloride	490000	U
75-00-3	-----Chloroethane	490000	U
75-09-2	-----Methylene Chloride	240000	U
67-64-1	-----Acetone	140000	J
75-15-0	-----Carbon Disulfide	240000	U
75-35-4	-----1,1-Dichloroethene	240000	U
75-34-3	-----1,1-Dichloroethane	240000	U
544-59-2	-----1,2-Dichloroethene (total)	240000	U
67-66-3	-----Chloroform	76000	J
107-06-2	-----1,2-Dichloroethane	240000	U
78-93-3	-----2-Butanone	110000	J
71-55-6	-----1,1,1-Trichloroethane	120000	J
56-23-5	-----Carbon Tetrachloride	150000	J
75-27-4	-----Bromodichloromethane	240000	U
78-87-5	-----1,2-Dichloropropane	240000	J
10061-01-5	-----cis-1,3-Dichloropropene	240000	U
79-01-6	-----Trichloroethene	2100000	
124-48-1	-----Dibromochloromethane	240000	U
79-00-5	-----1,1,2-Trichloroethane	240000	U
71-43-2	-----Benzene	250000	
10061-02-6	-----trans-1,3-Dichloropropene	240000	U
75-25-2	-----Bromoform	240000	U
108-10-1	-----4-Methyl-2-Pentanone	490000	U
591-78-6	-----2-Hexanone	490000	U
127 18-4	-----Tetrachloroethene	7400000	
79-34-5	--- 1,1 2,2-Tetrachloroethane	240000	U
108-88-3	---Toluene	180000	J
108-90-7	-----Chlorobenzene	240000	U
100 41-4	-----Ethylbenzene	240000	U
100-42 5	---Styrene	240000	U
1330-20-7	-----Xylene (total)	52000	J

facsimile
TRANSMITTAL

to: Norm Stoner, Kaiser Hill
fax #: 303-966-3400
re: wo 11491 samples rec'd 5-29-97
date: June 6, 1997
pages: 2, including this cover sheet

Attached please find the sulfur results for samples received 5-29-97. Samples were run in duplicate and the average is reported. A hard copy of the data is to follow.

97A1780



From the desk of

Sydney Gorton
Senior Technician
Southwest Research Institute
6220 Culebra Road
San Antonio, Texas 78228

210-522-2476
Fax: 210-522-2021

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Lab Name Southwest Research Institute

Client: Kaiser Hill

Lab Code SwRI

Date Received: 05/29/97

Matrix Solid

Project No 01-8359-164

Sample ID	Lab System ID	Sulfur Result (ug/g)
PBW	—	<150
DB00038RM	90153	945
DB00039RM	90154	7700

Detection Limit 150 ug/g

97A1780

U S EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO

A1780

Lab Name WESTON_FMT _____ Contract _____

Lab Code WESEMT Case No _____ SAS No _____ SDG No ⁹⁷ A1780_

Matrix (soil/water) SOIL_ Lab Sample ID: 9705G943-001

Level (low/med) LOW_ Date Received 05/29/97

% Solids 100 0

Concentration Units (ug/l, or mg/kg dry weight) MG/KG

CAS No	Analyte	Concentration	C	Q	M
7429 90-5	Aluminum	29 2			P
7440-36-0	Antimony	0 14	U	N	P
7440-38-2	Arsenic	0 20	U		P
7440-39-3	Barium	1 2	B		P
7440-41-1	Beryllium	0 02	B		P
7440-43-9	Cadmium	0 03	U		P
7440-70-2	Calcium	246	B		P
7440-47-3	Chromium	0 41			P
7440-48-4	Cobalt	0 08	B		P
7440-50-8	Copper	19 4		N*	P
7439-89-6	Iron	58 5			P
7439-92-1	Lead	0 32			P
7439-95-4	Magnesium	178	B		P
7439-96-5	Manganese	3.4			P
7439-97-6	Mercury	41 3			CV
7440-07-0	Nickel	0 17	B		P
7440-09-7	Potassium	6910			P
7782-49-2	Selenium	0 59	B	N	P
7440-22-4	Silver	0 89		*	P
7440-23-5	Sodium	451	B		P
7440-28-0	Thallium	0.22	U	N	P
7440-62-2	Vanadium	0 12	B		P
7440 66-6	Zinc	2 8	B		P
	Cyanide				NR

Color Before BLACK_ Clarity Before _____ Texture COARSE

Color After GREY_ Clarity After _____ Artifacts _____

Comments
 Client ID: DB00038RM

97A 100

Thermo NUTech
QC RESULTS

SDG <u>2042</u>	Client <u>KAISER HILL</u>
Work Order <u>N705081</u>	Contract <u>KH224141EA3</u>
Received Date <u>05/29/97</u>	Matrix <u>SOLID</u>

Lab	Sample ID	Nuclide	Results	Units	Amount Added	MDA	Evaluation
<u>BLANK</u>							
	2042-003	Americium 241	0.013 ± 0.009	pCi/Smpl	NA	0.008	
		Plutonium 238	0 ± 0.007	pCi/Smpl	NA	0.015	<MDA
		Plutonium 239/240	0.002 ± 0.002	pCi/Smpl	NA	0.012	<MDA
		Uranium 233/234	0 ± 0.012	pCi/Smpl	NA	0.047	<MDA
		Uranium 235	0 ± 0.015	pCi/Smpl	NA	0.057	<MDA
		Uranium 238	0 ± 0.012	pCi/Smpl	NA	0.047	<MDA
<u>LCS</u>							
	2042-002	Americium 241	0.95 ± 0.080	pCi/Smpl	0.902	0.019	105% recovery
		Plutonium 238	1.0 ± 0.086	pCi/Smpl	1.02	0.020	98% recovery
		Plutonium 239/240	1.0 ± 0.086	pCi/Smpl	0.926	0.012	108% recovery
		Uranium 233/234	4.8 ± 0.49	pCi/Smpl	4.86	0.22	99% recovery
		Uranium 235	3.9 ± 0.42	pCi/Smpl	3.72	0.051	105% recovery
		Uranium 238	4.6 ± 0.47	pCi/Smpl	4.83	0.21	95% recovery

<u>DUPLICATES</u>				<u>ORIGINALS</u>			
Sample ID	Nuclide	Results ± 2σ	MDA	Sample ID	Results ± 2σ	MDA	RPD (Tot) Eval
2042-004	Americium 241	0.006 ± 0.004	0.005	2042-001	0.004 ± 0.004	0.004	40 171 satis
	Plutonium 238	0.003 ± 0.005	0.008		0.002 ± 0.003	0.006	- satis
	Plutonium 239/240	0.035 ± 0.008	0.005		0.013 ± 0.005	0.005	92 59 unsat
	Uranium 233/234	0.039 ± 0.034	0.043		0.037 ± 0.032	0.041	- satis
	Uranium 235	0.014 ± 0.014	0.052		0.013 ± 0.013	0.050	- satis
	Uranium 238	0.17 ± 0.068	0.043		0.20 ± 0.066	0.041	16 77 satis

Certified by Prelim J
Report Date 06/13/97
Page 2

Thermo NUTech
ANALYSIS RESULTS

97A1780

SDG <u>2042</u>	Client <u>KAISER HILL</u>
Work Order <u>N705081</u>	Contract <u>KH224141EA3</u>
Received Date <u>05/29/97</u>	Matrix <u>WATER</u> <u>GAC</u> <u>Qra/19</u>

Client	Lab	Sample ID	Collected	Analyzed	Nuclide	Results ± 2σ	Units	MDA
DB00038RM	2042-001		05/28/97	06/09/97	Am 241	0 004 ± 0 004	pCi/g	0 004
				06/12/97	Pu 238	0 002 ± 0 003	pCi/g	0 006
				06/12/97	Pu 239/240	0 013 ± 0 005	pCi/g	0 005
				06/18/97	Th 232	-0 004 ± 0 007	pCi/g	0 027
				06/18/97	Th 230	U	pCi/g	0 043
				06/18/97	Th 228	0 025 ± 0 028	pCi/g	0 051
				06/03/97	U 233/234	0 037 ± 0 032	pCi/g	0 041
				06/03/97	U 235	0 013 ± 0 013	pCi/g	0 050
				06/03/97	U 238	0 20 ± 0 066	pCi/g	0 041

Certified by _____
Report Date 06/19/97
Page 1

96L0236 501

U.S. EPA - CLP

EPA SAMPLE NO

1
INORGANIC ANALYSIS DATA SHEET

L02361

Lab Name: ROCKY FLATS ANALYTICAL

Contract.

Lab Code: B559

Case No

SAS No . 97L

SDG No . L0236A

Matrix (soil/water) . SOIL

Lab Sample ID FT20601RG

Level (low/med) . LOW

Date Received 12/05/97

* Solids 0 0

Concentration Units (ug/L or mg/kg dry weight) MG/KG

CAS No	Analyte	Concentration	C	Q	M
7440-22-4	Silver				
7440-38-2	Arsenic	2.0		N	F
7440-43-9	Cadmium				
7440-46-2	Cesium	5.0	U		A
7439-97-6	Mercury				
7439-92-1	Lead	8.7			F
7782-49-2	Selenium	1.6			F
7440-28-0	Thallium	0.50	U		F

Color Before. BROWN

Clarity Before: CLOUDY

Texture COURSE

Color After. BROWN

Clarity After CLOUDY

Artifacts YES

Comments:

1/17/97

DEC-10-96 TUE 16:44

BLDG 881 ROOM 212

FAX NO. 303 966 3400

P. 06

DEC-10-96 TUE 14:44

GENERAL LABORATORY 881

FAX NO. 303 988 4385

P. 08

P. 07

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

23601

Lab Name: E.G & G., Rocky Flats

Contract:

Lab Code: GLAB

Case No.:

SAS No.: 97L0

SDG No.:

GAC

Matrix: (soil/water) SOIL

Lab Sample ID: FT20601RG

Sample wt./vol. 4 000 (g/mL) G

Lab File ID: DEC0901

Level: (low/med) MED

Date Received: 12/05/96

* Moisture: not dec Not Det.

Date Analyzed: 12/09/96

GC Column: DBVRX ID: .32 (mm)

Dilution Factor: 125.0

Soil Extract Volume: 10000. (uL)

Soil Aliquot Volume: 100. (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.

COMPOUND

Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1200.	U
74-83-9	Bromomethane	1200.	U
75-01-4	Vinyl Chloride	1200.	U
75-00-3	Chloroethane	1200.	U
75-09-2	Methylene Chloride	600.	U
67-64-1	Acetone	720.	BJ
75-15-0	Carbon Disulfide	600.	U
75-35-4	1,1-Dichloroethene	600.	U
75-34-3	1,1-Dichloroethane	600.	U
544-59-2	1,2-Dichloroethane (total)	620.	U
67-66-3	Chloroform	600.	U
107-06-2	1,2-Dichloroethane	600.	U
78-93-3	2-Butanone	540.	BJ
71-55-6	1,1,1-Trichloroethane	330.	J
56-23-5	Carbon Tetrachloride	600.	U
75-27-4	Bromodichloromethane	500.	U
78-87-5	1,2-Dichloropropane	500.	U
10061-01-5	cis-1,3-Dichloropropene	600.	U
79-01-6	Trichloroethene	830.	U
124-48-1	Dibromochloromethane	600.	U
79-00-5	1,1,2-Trichloroethane	600.	U
71-43-2	Benzene	600.	U
10061-02-6	trans-1,3-Dichloropropene	600.	U
75-25-2	Bromoform	600.	U
108-10-1	4-Methyl-2-Pentanone	190.	J
591-78-6	2-Hexanone	1200.	U
127-18-4	Tetrachloroethene	12000.	U
79-34-5	1,1,2,2-Tetrachloroethane	600.	U
108-88-3	Toluene	390.	J
108-90-7	Chlorobenzene	600.	U
100-41-4	Ethylbenzene	310.	J
100-42-5	Styrene	600.	U
1330-20-7	Xylene (total)	1100.	U

DEC-10-96 TUE 16:45
DEC-10-96 TUE 14:44

BLDG 881 ROOM 212

FAX NO. 303 966 3400

P. 07
P. 07
P. 08

GENERAL LABORATORY 881

FAX NO. 303 966 4385

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

23601

Lab Name: E.G.&G., Rocky Flats Contract.
Lab Code: GLAB Case No.: SAS No.: 97L0 SDG No.:
Matrix: (soil/water) SOIL Lab Sample ID: FT20601RG
Sample wt/vol: 4.000 (g/mL) G Lab File ID: DEC0901
Level: (Low/med) MED Date Received: 12/05/96
% Moisture: not dec. Not Det. Date Analyzed: 12/09/96
GC Column: DBVRX ID: .32 (mm) Dilution Factor: 125.0
Soil Extract Volume 10000. (uL) Soil Aliquot Volume: 100. (uL)

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	BST CONC.	Q
1. 470-82-6	Eucalyptol	30.42	800.	J N
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
FORM 1A-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Building 881 General Laboratories Sample No: 1
 APC Sample ID: 97L0236-001 FT20601R0 RSS
 Section: ICPAES
 % Solids (0 = N/A): 100.00 BDG No.: DEC17 001
 Date Sampled: 12/05/96 QC Report No.: 9/LD236.CPT
 Lab Receipt Date: 12/05/96
 Report Date: 12/17/96 BOW No.: N/A
 Contract: N/A
 Matrix Level (Soil, Water): OTHER LOW

Elements Identified and Measured

Concentration Units (MG/KG) As Received

Gas No	Analyte	Concentration	C	D	M
7429-00-5	Aluminum	494.1			P
7440-36-0	Antimony	18.9	U	N	P
7440-38-2	Arsenic	78.4	U		P
7440-39-3	Barium	21.9	B		P
7440-41-7	Beryllium	1.4	B		P
7440-43-0	Cadmium	2.8	U		P
7440-70-2	Calcium	1553.4	B		P
7440-47-3	Chromium	8.9			P
7440-48-4	Cobalt	4.0	U		P
7440-60-8	Copper	81348.4			P
7439-89-6	Iron (L)	2369.1			P
7439-89-8	Iron (H)	2157.8			P
7439-92-1	Lead	36.4	U		P
7439-93-2	Lithium	2.0	U		P
7439-95-4	Magnesium	112.6	B		P
7439-96-5	Manganese	8.1	B		P
7439-98-7	Molybdenum	8.8	U	N	P
7440-02-0	Nickel	13.2	U		P
7440-09-7	Potassium	498.4	U		P
7782-49-2	Selenium	33.1	U		P
7440-21-3	Silicon	331.6		N	P
7440-22-4	Silver	30.3			P
7440-23-5	Sodium	80.8	B		P
7440-24-6	Strontium	28.4	B		P
7440-31-5	Tin	13.4	B		P
7440-32-8	Titanium	72.9			P
11-08-8	Uranium	79.4	U		P
7440-62-2	Vanadium	4.8	B		P
7440-68-6	Zinc	39.5			P

Color Before: Black Clarity Before: Opaque

Color After: Green Clarity After: Clear

Texture:

Appearance: Coarse grayish black particulates left over after total metals digestion.

Comments: Sample = 100.00 % Solids. CLP Total Metals Digestion Results |
 Deionized Water R Blank PBW is the Reagent Blank for this Sample Set
 TL channel not operational.

FAXED APG
12/18/96

U S EPA - CLP

EPA SAMPLE NO

1
INORGANIC ANALYSIS DATA SHEET

L02361

Lab Name ROCKY FLATS ANALYTICAL

Contract

Lab Code B559

Case No.

SAS No : 97L

SDG No L0236

Matrix (soil/water). SOIL

Lab Sample ID FT20601RG

Level (low/med) LOW

Date Received. 12/05/96

% Solids 0 0

Concentration Units (ug/L or mg/kg dry weight) MG/KG

CAS No	Analyte	Concentration	C	Q	M
7440-22-4	Silver				
7440-38-2	Arsenic				
7440-43-9	Cadmium				
7440-46-2	Cesium				
7439-97-6	Mercury	2.5			CV
7439-92-1	Lead				
7782-49-2	Selenium				
7440-28-0	Thallium				

Color Before N/A

Clarity Before N/A

Texture N/A

Color After N/A

Clarity After N/A

Artifacts N/A

Comments

General Lab, Building 881

Lab Number: 97L0236

Report Date: 1/22/97
Sample Date 12/05/96RADIOCHEMISTRY REPORT
ISOTOPIC ANALYSIS RESULTS BY ALPHA SPECTROMETRY

SAMPLE ID	PLUTONIUM 239/240 (pCi/g)	BATCH #
FT20601RG	0.376 ± 0.034 (MDA 0.018)	ISO97-002
FT20601RG D	0.320 ± 0.038 (MDA 0.030)	ISO97-002

SAMPLE ID	AMERICIUM 241 (pCi/g)	BATCH #
FT20601RG	0.382 ± 0.050 (MDA 0.028)	ISO97-002
FT20601RG D	0.276 ± 0.037 (MDA 0.023)	ISO97-002

GAC

General Lab, Building 881

Lab Number 97L0236

Report Date 1/22/97
 Sample Date 12/05/96

**RADIOCHEMISTRY REPORT
 ISOTOPIC ANALYSIS RESULTS BY ALPHA SPECTROMETRY**

SAMPLE ID	URANIUM 238 (pCi/g)	BATCH #
FT20601RG	9 88 ± 0 36 (MDA 0 01)	ISO97-002
FT20601RG D	8 80 ± 0 31 (MDA 0 01)	ISO97-002

SAMPLE ID	URANIUM 235 (pCi/g)	BATCH #
FT20601RG	0 240 ± 0 032 (MDA 0 011)	ISO97-002
FT20601RG D	0 231 ± 0 030 (MDA 0 010)	ISO97-002

SAMPLE ID	URANIUM 233/234 (pCi/g)	BATCH #
FT20601RG	7 21 ± 0 27 (MDA 0 03)	ISO97-002
FT20601RG D	5 96 ± 0 22 (MDA 0 03)	ISO97-002

GAC

General Inorganics

9710242

Client Name: Kaiser-Hill
Client ID: FT20604 RG
Lab ID: 053519-0001-SA
Matrix: SOIL
Authorized: 29 JAN 97

Sampled: 28 JAN 97
Prepared: See Below

Received: 29 JAN 97
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Cyanide, Reactive	4.8	mg/kg	0.20	9010	04 FEB 97	07 FEB 97
Sulfide, Reactive	8.0	mg/kg	5.0	9030	04 FEB 97	10 FEB 97

ND = Not detected
NA = Not applicable

Reported By: Judy Lange

Approved By:

General Inorganics

9720242

Client Name: Kaiser-Hill
Client ID: FT20604 RG
Lab ID: 053519-0001-SA
Matrix: SOIL
Authorized: 29 JAN 97

Sampled: 28 JAN 97
Prepared: See Below

Received: 29 JAN 97
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	7.6	units	0.10	150.1	NA	06 FEB 97

ND = Not detected
NA = Not applicable

Reported By: Mark Foster

Approved By:

Spent GAC

VCA/TCLP-Analysis by SW846 8240B-Regulated
TCLP Leachate
Method 8240B

9710242

Client Name: Kaiser-Hill
Client ID: FT20604 RG
Lab ID 053519-0001-SA
Matrix SOIL

Sampled: 28 JAN 97
Received: 29 JAN 97
Authorized: 29 JAN 97
Leached 30 JAN 97
Prepared: 30 JAN 97
Analyzed: 10 FEB 97

Parameter	Result	Units	Reporting Limit
Benzene	ND	mg/L	0.50
2-Butanone	ND	mg/L	200
Carbon tetrachloride	ND	mg/L	0.50
Chlorobenzene	ND	mg/L	100
Chloroform	ND	mg/L	60
1,2-Dichloroethane	ND	mg/L	0.50
1,1-Dichloroethene	ND	mg/L	0.70
Tetrachloroethene	ND	mg/L	0.70
Trichloroethene	ND	mg/L	0.50
Vinyl chloride	ND	mg/L	0.20
Surrogate	Recovery		
1,2-Dichloroethane-d4	94	%	
4-Bromofluorobenzene	102	%	
Toluene-d8	102	%	

ND = Not detected
NA = Not applicable

Reported By: Steven Francis

Approved By: Audrey Cornell

Metals
TCLP Leachate

97L0242

Client Name: Kaiser-Hill
Client ID. FT20604 RG
Lab ID- 053519-0001-SA
Matrix SOIL

Sampled: 28 JAN 97
Received: 29 JAN 97
Authorized: 29 JAN 97
Leached: 04 FEB 97
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	mg/L	5.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Barium	ND	mg/L	100	CLP ILM03.0	06 FEB 97	06 FEB 97
Cadmium	ND	mg/L	1.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Chromium	ND	mg/L	5.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Lead	ND	mg/L	5.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Mercury	0.0033	mg/L	0.0010	CLP ILM03.0	10 FEB 97	10 FEB 97
Selenium	ND	mg/L	1.0	CLP ILM03.0	06 FEB 97	06 FEB 97
Silver	ND	mg/L	5.0	CLP ILM03.0	06 FEB 97	06 FEB 97

ND = Not detected
NA = Not applicable

Reported By. Doug Gomer

Approved By: Jamie Wickham

T-3/T-4 Source Removal Project

Rocky Mountain Remediation Services

Date August 26, 1996

Sample Team Leader Erik Thompson - MH

Project Number 951878ES

Member Haji Salomon

Log Book Number: ERPD-OU2-LB-96-00176

Member Randy Scott

Time	Batch #	Sample Type	Sample Number	Location	Container Type, Size, Units	QC Code	QC Partner Sample #	Media	Preserv	Analyses Requested	COC #
0705	NA DB		DB00011RM	CONDENSER SYSTEM 2	4oz G	REAL	NONE	S	4°C	VX	RFP900414
<p>Comments Sample came from bottom of system 2 condenser. Sample is silt/clay fraction w/ lots of water</p>											
0705	NA DB		DB00011RM	CONDENSER SYSTEM 2	P, 250 ml	REAL	NONE	S	NONE	RH	RFP945935
<p>Comments SAMPLE COMMENTS AS ABOVE</p>											
1050	NA DB		DB00012RM	Drum from OAC, SYSTEM I	6, 500 ml	REAL	(Trip blank) DB00013RM	S	4°C	SFA - TELPVA SFB - TELP 5YOL SFC - TELP Post/Pre SFD - TELP mthb	RFP900415
<p>Comments See Attached comment sheet for explanation</p>											
1050	NA DB		DB00013RM	NA	(2) 6.40 ml	Trip b	(REAL) DB00012RM	W	4°C HCl, pH=2	VBC	RFP900415
<p>Comments</p>											
<p>Comments</p>											
<p>Comments</p>											

Sampler Haji Salomon Sign [Signature] Date 8/26/96

QC/Peer Review [Signature]

Date 8/26/96

Page of

Sign

Date

DB00012RM

T-3/T-4 Source Removal Project

Rocky Mountain Remediation Services

Date August 26, 1996

Sample Team Leader Randy Scott

Project Number 951878ES

Member Hapi Salomon

Log Book Number ERPD-OU2-LB-96-00176

Member

Comments on Sample # DB00012RM

Sample DB00012RM was collected to meet the analytical requirements to determine if the Spent T-3/T-4 GAC can be classified as non-hazardous, and be eventually shipped to Envirocare of Utah, Inc., for commercial disposal as LLW. The sample was collected by Randy Scott of M-H in level B PPE from drum # D87122 which is spent GAC from System I of the M-H TDU system. This GAC was used for the entire project in the System I Carbon bed and recently transferred to a waste drum. When opened, an FID was placed into the drum and VOCs were measured >1000 ppm. System I GAC was chosen because both the RMRS Supervisor (treatment) Mark Wood, and the M-H project Supervisor, Ben Hill, have confidence that System I GAC, because of its use through out the project, would have the greatest probability for being classified as a hazardous waste. Therefore, this sample is expected to represent a worst case scenario. The sample was collected directly from the drum to the sample jar. (No sampling equip used).

Verification of statement above: Mark B Wood RMRS TDU Field Supervisor 8/26/96

Sampler Hapi Salomon 8/26/96 Date

QC/Peer Review Sarah Gardner 8/26/96 Date
Sign

Ronnie Dohill, M-H Superintendent 8/26/96

976L1091

CONTRACTOR R.MRS SAMPLERS Erik Thompson (M-H), Hopi Solomon, Rusty Scott ANALYTICAL CHARGE # 951878AW

SITE CONTACT/PHONE Hopi Solomon X 6627 FAX EXT 4046 LAB/LOCATION Q-SL

C O C NUMBER RFPJ0415

EG&G ROCKY FLATS, CHAIN OF CUSTODY

General Chemistry

DATE	TIME	SAMPLE NUMBER	LOCATION CODE	CONTAINER TYPE, SIZE, UNITS
8/26/96	1050	DB00012RM	2003 2003 I	6, 500 ml
8/26/96	1050	DB00013RM	NA	6, 40 ml

BOTTLE CODES		PRESERVATIVE		LAB/LOCATION																								
VOA CLP	VOA 5242 com.	COOLED TO 4°C	NAOH	HNO3	H2SO4	HQ	VOA CLP	BNA CLP	PCBS/PEST CLP	TOTAL Metals-CLP+(1)	DISS Metals-CLP+(1)	WATER QUALITY (2)	NH3	OIL & GREASE	Ortho-Phosphate	CYANIDE	COD	TOC	DOC	H2S	Cr VI	TOTAL Metals 2240	TCLP Y04	TCLP 5 Y02	TCLP PEST/Hech	TCLP Metals + Cu + Zn		
V	V																											
		X				X																						
		X																										

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME	LABORATORY USE ONLY
<i>[Signature]</i>	8/26/96 1415	<i>[Signature]</i>	8/26/96 1415	PCKG REC'D/CUSTODY SEALS INTACT
<i>[Signature]</i>	8/26/96 1420	<i>[Signature]</i>	8/26/96 0900	SAMPLE LABELS/COCs AGREE
				TEMPERATURE WITHIN SPECIFICATION <u>2</u> - <u>C</u>
				CORRECTED COPY ATTACHED
				PROBLEMS OR DISCREPANCIES

REMARKS (1) INCLUDES Cs LI, Sr, Mo, Si, Sn (2) ISS TDS CIF 504 CO3 HCO³⁻ SHIPMENT METHOD FedEx AIR BILL NO 6648146562

FAX Results to Hopi Solomon (203) 966-4046

0133

T-3/T-4 Source Removal Project
 Rocky Mountain Remediation Services

Date 9/10/96

Sample Team Leader FE KELLON

Project Number 951878ES

Member WA SEARLE

Log Book Number ERPD-OU2-LB-96-00176

Member H SALLMON

Time	Batch #	Sample Type	Sample Number	Location	Container Type, Size, Units	QC Code	QC Partner Sample #	Media	Presery	Analyses Requested	COC #
1103	N/A	DB	DB00015RM	DRUM FROM GAC, SYSTEM	4 OZ G	Lead	N/A	S	4°C	VX	RFP 900417
Comments GAC FROM DRUM DB7122 18 ppm READING ON OVM ON CONTACT WITH GAC											
1138	N/A	DB	DB00016RM	UNTREATED HEPA	4 OZ G	Lead	N/A	S	4°C	VX	RFP 900417
Comments											
1138	N/A	DB	DB00017RM	UNTREATED HEPA	4 OZ G	Lead	N/A	S	4°C	VX	RFP 900417
Comments											
1126	N/A	DB	DB00018RM	RMRS GREEN CANVAS TARP	4 OZ G	Lead	N/A	S	4°C	VX	RFP 900417
Comments											
1126	N/A	DB	DB00019RM	RMRS GREEN CANVAS TARP	4 OZ G	Lead	N/A	S	4°C	VX	RFP 900417
Comments											

T-3/T-4 Source Removal Project

Date MAY 28, 1997

Rocky Mountain Remediation Services

Sample Team Leader Hopi Salmon

Project Number 951878ES

Member William Searle (Collecting SAMPLE)

Log Book Number ERPD-OU2-LB-96-00176

Member Ray Kellow - Assisting

Note SAMPLES OF SPENT GAL to support incineration at INEEL WERE INCINERATED

Time	Batch #	Sample Type	Sample Number	Location	Container Type, Size, Units	QC Code	QC Partner Sample #	Media	Preserv	Analyses Requested	COC #
0945	NA DB	DB	(97A1780-001-002) DB00038RM	D87122	glass, 125 ml	REAL	NONE	S	NONE	Pu, Am, U, Th Isotopes	REP 945963
Sniffed drum # D87122 after lid was removed outside of 2 plastic liners with Jerome mercury vapor analyzer Trace mercury 0.003 ug/m ³ was detected would expect higher levels if we had sniffed inside inner bag Jerome Sars (# = 2536) calibrated by Steve Alredge, th Comments morning This gal originated from system I of the B/T4 TDU system (worst case). This drum was previously sampled (Decommission, DB0015 RM)											
0945	NA DB	DB	(97A1780-001-001) DB00038RM	D87122	glass, 250 ml	REAL	NONE	S	4°C	Total metals + Hg	REP 900449
SAME AS ABOVE											
Comments											
0945	NA DB	DB	(97A1780-001-003) DB00038RM	D87122	glass, 125 ml	REAL	NONE	S	4°C	Total Sulfur	REP 900450
SAME AS ABOVE											
Comments											
1015	NA DB	DB	(97A1780-002-001) DB00039RM	D87309	glass, 125 ml	REAL	NONE	S	4°C	Total Sulfur	REP 900450
Sniffed drum D87309 contents (inside inner bag) with Jerome mercury vapor analyzer - No mercury detected PPE, sampling scoops are being exposed by Mike Rapping Steve Alredge evaluated (sniffed) bag of PPE, scoops with OVA, Mercury vapor analyzer and detected nothing Comments This gal originated from the CWTF (Building 89)											
 (97A1780-002-001) DB00039RM D87309 glass, 125 ml REAL NONE S 4°C Total Sulfur REP 900450 											
 # 5/28/97 											
Comments											

COC # KFR 445765

14 Day Turn Around

SAMPLERS (ature) W. Seal 510963 / 1 Re 510875 / 1 1/2 Sub

REPORT IDENTIFICATION NUMBER (RIN) 97A1780

LAB/LOCATION Thermo-Nutech - NoRcal

RFETS CONTRACTOR RMS

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE CHAIN OF CUSTODY

DATE	TIME	EVENT	BOTTLE	USER ID	LOCATION	CONTAINER	MATRIX
5/28/97	0945	001	002	D800038RM	D8712A	125 ml g/4	GAC

[Signature]
5/28/97

Preservation	Analysis										
	Coled to 4 C	NaOH	HNO3	H2SO4	HCl	Isotopic Py Am, U	Isotopic Thorium				
	X					X					

Relinquished By [Signature] 5/28/97 1100

Received By Organization [Signature] 5/28/97 1100

LABORATORY USE ONLY

PKG REC DICUSTODY SEALS INTACT

SAMPLE LABELS/COCs AGREE

TEMPERATURE AT TIME OF RECEIPT ___ C

Charge # C8033074

Project # _____

REMARKS

Overnight Delivery 2 Day Delivery Air Bill No _____

COC # RFF 900450

3 Day turn-around

SAMPLERS (Location) Site 510963 / 1st

5/18/97

April Sullivan

REPORT IDENTIFICATION NUMBER (RIN) 7A178D

LAB/LOCATION Southwest Research Lab

RFETS CONTRACTOR RWRS

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE CHAIN OF CUSTODY

DATE	TIME	EVENT	BOTTLE	USER ID	LOCATION	CONTAINER	MATRIX	Cooled to 4 C	NaOH	HNO3	H2SO4	HCl	Preservation	Analysis
5/28/97	0945	001	003	DB00038RM	D87122	125 ml g	GAC	X						
5/28/97	1015	002	001	DB00039RM	D87309	125 ml g	GAC	X						
<p><u>5/28/97</u></p> <p><u>Total Sulfur</u></p>														

Relinquished By: [Signature] Date: 5/28/97 Time: 1100

Received By/Organization: [Signature]

LABORATORY USE ONLY

PCKG REC D/CUSTODY SEALS INTACT

SAMPLE LABELS/COCs AGREE

TEMPERATURE AT TIME OF RECEIPT ___ C

REMARKS

Charge # C8033014

Project #

Required delivery time Overnight Delivery 2 Day Delivery Air Bill No _____



Rocky Mountain
Remediation Services, L.L.C.
protecting the environment

**INTEROFFICE
MEMORANDUM**

DATE February 20, 1997

TO M K Pepping, Operations, T893B, X3075

FROM *JRC* J R Cinlo, Water Treatment and Management, T891B X5876

SUBJECT CHARACTERIZATION OF SPENT GRANULAR ACTIVATED CARBON AND ION EXCHANGE RESIN - JRC-006-97

Action Ensure proper characterization

Recently five drums of Ion Exchange (IX) resin and 20 drums of Granular Activated Carbon (GAC) were generated under the treatment activities at the Building 891 treatment facility. A review of these wastes is necessary to ensure proper characterization, handling, storage and disposal. Both standard analysis and TCLP sampling were performed for anticipated constituents.

Samples were taken for radioactive constituents on both the ion exchange and granular activated carbon. The carbon exhibited low levels of radioactive elements above "background" levels and qualifies as a low level waste per radiological engineering written guidance. The ion exchange resin is designed to remove uranium contamination which was confirmed with sample results of ~500 pCi/g total uranium. This waste also qualifies as a low level waste.

Both the ion exchange resin and the granular activated carbon were used to treat F-listed, contained-in wastes. Therefore, the carbon and IX resin would also be considered hazardous waste unless a reasonable argument could be presented that all of the F listed constituents had been removed prior to contact with the IX treatment media. In this case, this type of positive proof can not be established and the wastes will therefore remain listed hazardous wastes.

The results that were received on the ion exchange resin indicate that it meets LDRs, i.e., it is not prohibited from land disposal. However, the granular activated carbon analysis indicates that the waste does not meet the land disposal treatment standard of 60 ppm for tetrachloroethene. The result of 24 ppm tetrachloroethene is well above the standard. Therefore, the granular activated carbon is subject to the prohibition on land disposal and will either have to be treated before disposal or handled in an alternative fashion (i.e., regeneration, incineration etc.).

Please feel free to contact me if you have any questions.

JRC slm

cc
J E Law
J P Schmuck
A M Tyson
RMRS Records

Pcs*-it* Fax Note 7671		Date	# of pages
To	<i>Hop. Solomon</i>	From	<i>JRC</i>
Co./Dept		Co	<i>Cinlo</i>
Phone #		Phone #	
Fax #	<i>4046</i>	Fax #	

12/09/96	DA Barmis, WJ Tadino, DWR Russell sampled VIRGIN
late entry	GAC Grab sample 1320hrs FT20603RG
entered by	Black Carbon RFP943274 Fed-X to HOLD
13 1/8/96	CK200000 97L2039 CK Bogert
1/28/97	Reviewed by Russ Cirillo JRC
1/28/97 CB	CK Bogert Sampling spurt GAC out of drums
	D87303 FT20604RG RS9 1045hrs Grab
	0-6" RFP902817 to QDEN 1/29/97
	97L0242 CK200000 3x 8oz glass
	pH, Reactivity, TCLP VOA + metals Rush
	2wk TA per R. Cirillo. Samples were
	chilled w/Blue ice for delivery. Attempt
	was made to sample around the Radsorb
	in the drum Sampled w/stainless
	spoon Everything cleared out by DA Barmis
	CK Bogert
2/11/97	CK Bogert + md Schreckengast sampling paint
	in T900C trailer Gray paint from
	angle iron T900C-97-02-11-64-01 yellow
	paint from angle iron T900C-97-02-11-64-02
	both attached to floor of trailer
	PO. CB034000 to Schuller Lab via ASI
	IH CDC 97J1234 RUSH 3day TA
	Gray paint for Pb, Cd, Cr Yellow for Pb, Cd, Cr, As
	CK Bogert
02/25/97 CB	CK Bogert + BT Walden sampling out 2 Remotes
	(Samples were taken w/stainless beaker
	Bottles were prepreserved & pH's confirmed - except
	VOA's (Samples were chilled w/blue ice &
	delivered to the T891C lab refrigerator. pH/cond/temp
	were performed @ T891C lab) CK 200000 97L0244
	GenChem. RFP902818 hand carry to QDEN
	Rads RFP943279 FedX to Thermo-NuTech (JMAN)
Sample	Location Time °C pH Cond uS/cm Comments
FT20605RB	SW059 1020 21.0 6.5 882
FT20606RB	SW061 1100 21.0 6.27 1415

ENGINEERING/SCIENTIFIC NOTE PAD



SUBJECT: **GAL MASS/VOLUME CALCULATIONS**
 Project No: **GAC Disposal** Prepared By: **Hapi Salomon**
 Client: **DOE-REFETS** Reviewed By:

Sheet 1 of 1
 Date: **6/23/97**

From **13/TH, Ryan P.f., 891 (CWTF)**

Inventory: **7, full waste crates (4'x4'x7')**
30, 55 gal drums

Mike Pepping (generator) notes to Hapi Salomon on 6/23/97 that the waste crates are approximately **75% full** and the drums are **~85% full**

$$7 \times 4' \times 4' \times 7' \times 0.75 = 588 \text{ ft}^3$$

$$30 \times 55 \text{ gal} \times \frac{\text{ft}^3}{7.48 \text{ gal}} \times 0.85 = 187.5 \text{ ft}^3$$

$$\begin{array}{r} 588 \text{ ft}^3 \\ + 187.5 \text{ ft}^3 \\ \hline 775.5 \text{ ft}^3 \end{array} \quad \leftarrow \text{Assume } 775 \frac{\text{ft}^3}{\text{yr}}$$

Bulk density's given from MSDS are **0.25 - 0.6 g/cc**

Per Scott Roessners suggestion on 6/18/97 (meeting @ INEEL) suggest using **0.5 g/cc** average bulk density.

Therefore MASS

$$775.5 \text{ ft}^3 \times \frac{0.5 \text{ g}}{\text{cm}^3} \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times 2.54 \times 2.54 \times \frac{12 \text{ in}}{\text{ft}} \times 12 \times 12 =$$

$$10979857 \text{ grams} = 10980 \text{ kg}$$

$$10980 \text{ kg} \times \frac{2.2 \text{ lbs}}{1 \text{ kg}} = 24156 \text{ lbs} \quad \leftarrow$$

T-3/T-4 Spent GAC Chlorine Calculation from VOA sample DB00015RMDL						
compound	formula	molecular wg	mol wgt Cl	% chlorine	sample con (mg/kg)	Cl concent (mg/kg)
chloroform	CHCl ₃	119.4	106.35	89.1	76	67.7
carbon tetrachloride	CCl ₄	153.8	141.6	92.1	160	147.3
trichloroethylene	C ₂ HCl ₃	131.4	106.35	80.9	2,100	1,699.7
perchloroethylene	C ₂ Cl ₄	165.8	141.6	85.4	7,400	6,319.9
trichloroethane	C ₂ H ₃ Cl ₃	133.4	106.35	79.7	120	95.7
1,2-dichloropropane	C ₃ H ₆ Cl ₂	113	70.2	62.1	240	149.1
					tot Cl conc	8,479.3
					%Cl	0.9

The GAC from T3/T4 and Ryan's Pit source removals should contain chlorine from only one source, the chlorinated VOCs that were adsorbed on it as part of the polishing efforts in the thermal desorption treatment process. Chlorine concentration was calculated from total VOA data (sample # DB00015RMDL). This sample represented what was assumed to be the highest VOC containing GAC (GAC that was in the system the longest (the entire treatment operation)). This data may assist if the GAC is to be incinerated.

Signed
 Hopi Salomon

 10/25/96

GAC used for T3/T4 GAC + Ryens PIT

TIGG 5C AND 5D SERIES ADSORBENTS

MATERIAL SAFETY DATA SHEET

NOTE. May cover other activated carbons as listed 8x30

SECTION 1

SUPPLIER'S NAME TIGG CORPORATION
EMERGENCY TELEPHONE 412 563-4300
ADDRESS P O BOX 11661, PITTSBURGH, PA 15228
CHEMICAL NAME AND SYNONYMS ACTIVATED CARBON
FORMULA C

SECTION 2 HAZARDOUS INGREDIENTS

CARBON (ACTIVATED CARBON)

CAS# 7440-44-0
% BY WEIGHT 100%
ORAL LD₅₀ > 10g/Kg (RAT)
TLV

ACGIH. N/A
OSHA. N/A
OTHER: N/A

CAUTION! WET ACTIVATED CARBON REMOVES OXYGEN FROM AIR CAUSING A SEVERE HAZARD TO WORKERS INSIDE CARBON VESSELS AND ENCLOSED OR CONFINED SPACES BEFORE ENTERING SUCH AN AREA, SAMPLING AND WORK PROCEDURES FOR LOW OXYGEN LEVELS SHOULD BE TAKEN TO ENSURE AMPLE OXYGEN AVAILABILITY, OBSERVING ALL LOCAL, STATE, AND FEDERAL REGULATIONS

SECTION 3 PHYSICAL DATA

BOILING POINT (°F) N/A
VAPOR PRESSURE (mmHg) N/A
VAPOR DENSITY (AIR = 1) N/A
SOLUBILITY IN WATER INSOLUBLE
SPECIFIC GRAVITY (H₂O = 1) 1.8 2.1
PERCENT VOLATILE BY VOLUME (%) 0
pH 5.0-8.0
PACKING DENSITY 0.4-0.5 g/cc
APPEARANCE AND ODOR: BLACK PARTICULATE SOLID

SECTION 4 FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 400 °C ASTM (DRY VIRGIN STATE)

FLAMMABLE LIMITS.

LEL N/A
UEL N/A

EXTINGUISHING MEDIA FLOOD WITH WATER IF WATER IS UNAVAILABLE, NITROGEN OR FOAM MAY BE USED TO BLANKET THE ADSORBENT BED IF THE MATERIAL IS IN A CLOSED VESSEL, A BOTTOM INLET MAY BE BLOCKED TO DEPRIVE THE FIRE OF OXYGEN BUT THE VESSEL SHOULD REMAIN VENTED FOR RELEASING STEAM OR OTHER HOT GASES

SPECIAL FIRE FIGHTING PROCEDURES WEAR PROTECTIVE CLOTHING SELF CONTAINED BREATHING APPARATUS IF NECESSARY

UNUSUAL FIRE AND EXPLOSION HAZARDS FLOODING THE VESSEL WITH WATER WILL EXTINGUISH ANY HOT ZONES. COPIOUS VOLUMES OF STEAM MAY BE GENERATED IN THE PROCESS OF EXTINGUISHING THE HOT ZONES. STEAM GENERATION IS REDUCED WHEN FLOODING OCCURS FROM THE BOTTOM UP AS OPPOSED TO A SPRAY FROM ABOVE. THE CARBON ITSELF MAY NOT EXHIBIT FLAMING ALTHOUGH ANY COMBUSTIBLE MATERIAL IN CONTACT WITH IT WILL. AT TEMPERATURES AROUND 900 °C, CARBON CAN REACT WITH FIRE-FIGHTING MATERIALS SUCH AS WATER OR CARBON DIOXIDE TO FORM HYDROGEN AND/OR CARBON MONOXIDE WHICH COULD REACH LEVELS HAZARDOUS TO RESPIRATION OR REPRESENTING A COMBUSTIBLE OFF-GAS

SECTION 5 HEALTH HAZARD DATA

EFFECT OF OVER EXPOSURE

A ACUTE

- 1 INGESTION
THE PRODUCT IS NON TOXIC THROUGH INGESTION THE ACUTE ORAL LD₅₀ (RAT) IS > 10g/Kg
- 2 INHALATION
THE ACUTE INHALATION LC₅₀ (RAT) IS > 64.4 MG/L (NOMINAL CONCENTRATION) FOR ACTIVATED CARBON



TIGG CORPORATION
BOX 11661
PITTSBURGH PA 15228

TELEPHONE (412) 563-4300
TELEX 269312 (RCA)
FAX 412-563-6155
CABLE TIGGCOR PITTSBURGH

GAC used for Building 891



MATERIAL SAFETY DATA SHEET

SECTION I

		Product Name	ACTIVATED CARBON, CC SERIES, KG SERIES, KP SERIES
Manufacturer	WESTATES CARBON, INC	MSDS Number*	100
	2130 Leo Avenue	CAS Number*	CAS 7440-44-0
	Los Angeles, California 90040-1634	Date Prepared	NOVEMBER 28, 1993
Phone Number (For Information)	(213) 722-7500	Prepared By*	MARGARET JEFFERSON
Emergency Phone Number	(800) 659-1771	Note	Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

SECTION II - MATERIAL IDENTIFICATION AND INFORMATION

COMPONENTS - Chemical Name & Common Names (Hazardous Components 1% or greater; Carcinogens 0.1% or greater)	%*	OSHA PEL	ACGIH TLV	OTHER LIMITS RECOMMENDED
ACTIVATED CARBON	100%	2.5 mg/m ³	1.5 mg/m ³	NONE
NON-HAZARDOUS INGREDIENTS				
TOTAL	100			

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT	not applicable	SPECIFIC GRAVITY (H ₂ O = 1)	0.25 - 0.60 g/cc
VAPOR PRESSURE (mm HG AND TEMPERATURE)	zero	MELTING POINT	not applicable
VAPOR DENSITY (AIR = 1)	not applicable	EVAPORATION RATE (_____ = 1)	not applicable
SOLUBILITY IN WATER	Insoluble in water and solvents	WATER REACTIVE	non-reactive
APPEARANCE AND ODOR	Black granules without taste or odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT AND METHOD USED	N/A	Auto-Ignition Temperature	> 450°C ANSI/ASTM D 3468	Flammability Limits in Air % by Volume	N/A	LEL	N/A	UEL	N/A
EXTINGUISHER MEDIA	Water (fog or fine spray), carbon dioxide								
SPECIAL FIRE FIGHTING PROCEDURES	Avoid procedures that may stir up dust clouds								
USUAL FIRE AND EXPLOSION HAZARDS	Avoid contact with strong oxidizers, airborne dust may be a weak explosion hazard								

* OPTIONAL

MATERIAL SAFETY DATA SHEET

CC SERIES, KG SERIES, KP SERIES

SECTION V - REACTIVITY HAZARD DATA

STABILITY <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable	CONDITIONS TO AVOID Contact with strong oxidizers
INCOMPATIBILITY (MATERIALS TO AVOID) Strong oxidizing agents	HAZARDOUS DECOMPOSITION PRODUCTS. Carbon Dioxide Carbon Monoxide
HAZARDOUS POLYMERIZATION <input type="checkbox"/> May Occur <input checked="" type="checkbox"/> Will Not Occur	CONDITIONS TO AVOID not applicable

SECTION VI - HEALTH HAZARD DATA

PRIMARY ROUTES <input checked="" type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion	CARCINOGEN LISTED IN <input type="checkbox"/> NTP <input type="checkbox"/> OSHA <input type="checkbox"/> IARC Monograph <input checked="" type="checkbox"/> Not Listed
HEALTH HAZARDS LD50 VALUES not available ACUTE not available CHRONIC No effects from chronic exposure are known	
EMERGENCY FIRST AID PROCEDURES Seek medical assistance for further treatment observation and support, if necessary	
EYE CONTACT Immediately flush with copious amounts of water If redness, itching or a burning sensation develops, have eyes examined and treated by medical personnel.	
SKIN CONTACT Wash material off the skin with soap and water If redness, itching or a burning sensation develops, get medical attention	
INHALATION Remove victim to fresh air If cough or other respiratory symptoms develop, consult medical personnel	
INGESTION Give one or two glasses of water to drink If gastrointestinal symptoms develop, consult medical personnel (Never give anything by mouth to an unconscious person)	

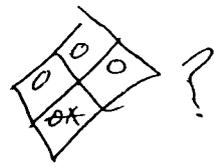
SECTION VII CONTROL AND PROTECTIVE MEASURES

RESPIRATORY PROTECTION (SPECIFY TYPE) Use MSA-NIOSH approved respirator for respirable dusts mists and fumes
PROTECTIVE GLOVES Rubber latex
EYE PROTECTION Safety glasses with side shields Contact lenses should not be worn when working with carbon
VENTILATION TO BE USED <input checked="" type="checkbox"/> Local Exhaust <input type="checkbox"/> Mechanical (general) <input type="checkbox"/> Special <input type="checkbox"/> Other (specify)
OTHER PROTECTIVE CLOTHING AND EQUIPMENT NONE
HYGIENIC WORK PRACTICES Wash contacted skin areas after handling

SECTION VIII - PRECAUTIONS FOR SAFE HANDLING AND USE/LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED Wear respiratory protection during clean up Sweep up and recover or mix material with moist absorbent for dust control and pick up and shovel into waste container Use detergent in spill area after clean up and flush with plenty of water	
WASTE DISPOSAL METHODS Dispose of virgin (unused) carbon (waste or spillage) per local regulations	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Activated carbon can be safely stored in any normal storage area, but away from direct heat	
OTHER PRECAUTIONS AND OR SPECIAL HAZARDS An oxygen deficiency may be created when activated carbon is stored in an enclosed space/silo Ventilate or wear self-contained breathing apparatus Follow all procedures for confined space entry	
NFPA Rating* Health 1 Flammability 1 Reactivity 0	HMIS Rating* Health 1 Flammability 1 Reactivity 0 Special <input type="checkbox"/>

STATE MAKES NO WARRANTIES, GUARANTEES OR REPRESENTATIONS OF ANY KIND OR NATURE WITH RESPECT TO THE PRODUCT OR DATA EITHER EXPRESSED OR IMPLIED, AND WHETHER ARISING BY LAW OR OTHERWISE, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF PERSONAL INJURY, PROPERTY OR OTHER DAMAGES OF ANY NATURE WHATSOEVER, WHETHER SPECIAL, INDIRECT, CONSEQUENTIAL OR COMPENSATORY, DIRECTLY OR INDIRECTLY RESULTING FROM THE PUBLICATION, USE OR RELIANCE UPON THIS DATA.



MATERIAL SAFETY DATA SHEET

RADSORB

SECTION 1 - IDENTIFICATION

MANUFACTURER'S NAME ENVIRONMENTAL SCIENTIFIC, INC
 ADDRESS 5400 SOUTH MIAMI BLVD
 MORRISVILLE, NC 27560
 EMERGENCY PHONE NUMBER FOR TRANSPORTATION EMERGENCY
 Call 919-941-0847
 Ingestion or skin contact call ENVIRONMENTAL
 SCIENTIFIC 919/941-0847
 PHONE NUMBER 919-941-0847
 EFFECTIVE DATE 3-30-94
 CHEMICAL FAMILY Polyacrylate/polyacrylamide crosslinked

TRADE NAME RADSORB
 DOT CLASSIFICATION Not applicable
 DOT HAZARD CLASS Not applicable

SECTION 2 - HAZARDOUS INGREDIENTS

HAZARDOUS COMPONENTS	HAZARDOUS %	TLV (Units)
one	0 0%	None

SECTION 3 - PHYSICAL DATA

VOLATILITY (%) None
 SOLUBILITY IN WATER Insoluble but swellable in aqueous fluids
 pH VALUE 6.5 +/- 1.0
 PHYSICAL FORM Granular solid
 PARTICLE SIZE 200 +/- 100 μ
 MOISTURE CONTENT <5%
 BULK DENSITY 40 +/- 5 lbs/ft³

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not applicable
 EXTINGUISH MEDIA Water CO₂, foam dry powder
 UNUSUAL FIRE AND FIRE HAZARD None

SECTION 5 - HEALTH EFFECTS INFORMATION

SKIN CONTACT Prolonged contact may cause slight irritation due to the somewhat abrasive powder
 EYE CONTACT May cause slight irritation and swelling of mucous membrane
 HALATION May cause irritation to the respiratory tract and lungs

RADSORB MSDS continued

FIRST AID

SKIN CONTACT Wash with soap and water
EYE CONTACT Rinse with plenty of water for at least 15 minutes. If discomfort continues seek medical attention
INHALATION Remove to fresh air. If discomfort continues, seek medical attention
INGESTION If discomfort continues seek medical attention

SECTION 6 - REACTIVITY INFORMATION

STABILITY	Stable
INCOMPATIBILITY	Strong oxidants e.g. sodium hypochlorite, alkalis and acids
HAZARDOUS POLYMERIZATION	Will not occur
CONDITIONS TO AVOID	Keep from getting damp or wet until ready to use
THERMAL DECOMPOSITION PRODUCTS	In the event of combustion CO, CO ₂ , NO _x may be formed Do not breathe smoke or fumes. Wear suitable protective equipment

SECTION 7 - PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION	Not required under normal use conditions. If significant dusting occurs wear NIOSH approved dust respirator
VENTILATION	If significant dusting occurs local exhaust ventilation is recommended
OTHER PROTECTION	No special precautions. Avoid eye and skin contact and inhalation of dust

SECTION 8 - SPILL AND DISPOSAL

SPILL CONTROL AND RECOVERY

SOLID SPILLS	Sweep up and place in reclaim or disposal container. Wear protective equipment specified in Section 7
---------------------	---

DISPOSAL	Radsorb is not a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. It does not have characteristics of Subpart C and it is not listed under Subpart D. Radsorb is a non-hazardous solid waste and can be disposed of by incineration or in a sanitary landfill in accordance with local, state and federal regulations.
-----------------	--

SECTION 9 - TRANSPORTATION INFORMATION

DOT SHIPPING NAME/HAZARD CODE	Radsorb is not regulated during transportation
--------------------------------------	--

RADSORB MSDS continued

SECTION 10 - REGULATORY INFORMATION

TOSCA	Radsorb does not contain ingredients (at a level of 1% or greater) on the List of Toxic Chemicals
FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT 40 CFR 401.15	Radsorb does not contain ingredients specifically listed
CLEAN AIR ACT, 40 CFR 60 SECTION 111 40 CFR 61, SECTION 112 Act	Radsorb does not contain ingredients covered by the Clean Air Act
CALIFORNIA PROPOSITION 65	Radsorb does not contain chemicals on the current Proposition 65 list
MICHIGAN CRITICAL MATERIALS	Radsorb does not contain ingredients listed on the Michigan Critical Materials Register

SECTION 11 - USER'S RESPONSIBILITY

This Radsorb material safety data sheet provides health and safety information. Radsorb is to be used in applications consistent with our product literature. Individuals handling Radsorb should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to ensure safe workplace operations. Please consult your ESI sales representative for further information.

SECTION 12 - STORAGE

STORAGE	Keep material in a dry location and sealed to minimize water absorption before use
---------	--

RADIOACTIVE WASTE VARIANCE REQUEST

RWVR No. 96-04

Hopi Salomon Initiator Name	NA Employee Number	T893B Building	Accelerated Actions Department	6627/5129 Phone/Page	9/13/96 Date
---------------------------------------	------------------------------	--------------------------	--	--------------------------------	------------------------

Description of Variance (include specific requirements for which variance is being requested)

Package granulated activated carbon (gac) which has been used on the T3/T4 project and is now spent. The waste contains D coded organics, some F-listed components (from Ryan's Pit remediation) and small amounts ($\approx 60 \mu\text{Ci/g}$) U^{238} . We request that the waste be able to be packaged in 4'x4'x7' wooden waste crates for which we need a variance from ~~W-11-01~~ ¹⁰ W0-1101 (which requires white 55 gal drums).

Justification for Variance (describe why variance is being requested and any action to be taken)

Per. Joe Motter, (RWRS) Doug Parker (Dyncorp Traffic), Ken Lenarick (Dyncorp traffic) these 4'x4'x7' waste crates are appropriate shipping containers for spent GAC. Also, these containers take up less space when being stored, and are more appropriate than drums for bulk storage.

Scope of Variance (describe the extent to which the variance is applicable - i.e. time frame, affected drum numbers).

The spent GAC has already been loaded, but will not be sealed up until this variance is approved. The waste is currently in the following waste crates: P02172, P02173, P02174, P02175, P0212, P0213, P0214, P0215, P0216, P02243, P02245, and the following drums. D87118, D87113, D87117, D87119, D87121, D87122, D87126, D87128, D87130, D87132. The waste crates will be evaluated for VOA emissions after they are sealed in accordance with 40 CFR 60 Appendix A, Method 21, "Determination of Volatile Organic Compound leaks". This waste is expected to be incinerated at INEL WERF or Oak Ridge incinerator.

After completion of Section 1, submit form to Radioactive Waste Programs, Building T130C.

Section 1 (To be completed by the Initiator)

Variance Disposition (circle one)

Approve Reject

Approvals

[Signature]
Radioactive Waste Programs

[Signature]
Waste Certification Programs

Section 2

Comments

Place copy of this variance with W/RT documentation for all affected containers/packages Jgt

Survey of Waste Crates 9-23-96 ~ 13^{MD5} 1530 Peggy
Schueckengast, Health+Safety Supervisor, T3/T4 Project
Instrument - Photo ionization detector equipped
with an 117 eV lamp, which will detect
all suspect VOCs. It is calibrated with
100ppm isobutylene. It detects down to 0.1 ppm
Response factors for the compounds of concern
range from 1/10 to 2x ^(or 10 to 0.5) the reading.
Instrument range is 0.1 - 2000 ppm
Sample probe = 1/4" internal diameter.
Instrument response time is less than 30
seconds (approximately 10 seconds)

Instrument was calibrated this morning
by Wade Russell, RTG. On a 100ppm
isobutylene standard, the instrument read
104 ppm.

Survey performed in accordance with
40 CFR, Part 60, App A, Method 21

Waste Crates	Reading
PO2172	0 ppm above background at
PO2173	all wood joints
PO2175	↓
PO2174	
4x4x7 Waste Crates - sealed, banded containing spent GAC with high VOC levels	

9-24-96 Fred Kerchner monitored the following crates on
9-24-96. The same instrument was used, and was
calibrated as detailed above

PO 2245

PO 2243

PO 2176

MD. Schueckengast