APPROVAL FOR RELEASE
Unnumbered 1-page ltr dtd 2/8/90, WR Golliher to MM Heiskell (DOE-ORO), ;
Document: # ANALYTICAL RESULTS OF MITCHELL BRANCH
Title/Subject SOILS AND SEDIMENT SAMPLES COLLECTED UPSTREAM & DOWNSTREAM FROM THE K-1417, & 3enclosures
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K-25 Classification & Information Control Officer 2/8/93 Date

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MARTIN MARI

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February 8, 1990

FEB 12 1990

Marianne M. Heiskell
K-25 Site Manager
Department of Energy, Oak Ridge Operations
Post Office Box 2003
Oak Ridge, Tennessee 37831-7468

Dear Ms. Heiskell:

Analytical Results of Mitchell Branch Soils and Sediment Samples Collected Upstream and Downstream From the K-1417 Hazardous Waste Storage Unit

The tabulated analytical results of the Mitchell Branch soil and sediment analyses are enclosed (Enclosure 1) for submittal to Jackie Okoreeh-Baah of the Tennessee Department of Health and Environment (TDHE). This material was requested by TDHE during a conversation on November 15, 1989, with T. A. Bowers and G. E. Butterworth, III, of Martin Marietta Energy Systems, Inc.; G. W. Bodenstein of the Department of Energy, Oak Ridge Operations (DOE-ORO); and Ms. Okoreeh-Baah. These samples were taken in accordance with the "K-1417 Casting and Storage Yard Critique and Action Plan - ORGDP" submitted to DOE-ORO on December 6, 1989. The sampling locations are shown in Enclosure 2, and the laboratory data is being submitted as Enclosure 3. The extraction procedure (EP) toxicity results indicate that the metal constituents were not leachable, and the concentrations did not exceed or equal the Resource Conservation and Recovery Act concentrations for the characteristic for the EP toxicity. These preliminary results indicate that even if hazardous waste had been discharged into Mitchell Branch, the soils and sediments do not pose an EP toxicity hazard.

The total metal concentration at the sampling locations is not conclusive since some constituents are not consistent with results at other sampling locations, particularly with respect to lead, mercury, nickel, and cadmium. To determine whether the higher total metal concentration values are accurate, the Oak Ridge Gaseous Diffusion Plant will collect and analyze additional soil and sediment samples at these locations.

If you have questions or require additional information, please contact A. G. Hodgson at extension 4-9527.

Sincerely,

M L Jones
for W. R. Golliher, Manager
Oak Ridge Gaseous Diffusion Plant

WRG:AGHodgson:scb

Enclosures 3

cc: V. Adams (DOE)
G. D. Conner
J. R. Merriman
C. H. Peterson
H. D. Whitehead, Jr.
L. F. Willis
File - MLJ/WRG

cc/enc: G. W. Bodenstein (DOE)
T. A. Bowers
G. E. Butterworth, III - RC
A. G. Hodgson
T. P. A. Perry
S. P. Riddle (DOE)
C. C. Wieland (DOE)

no NP-237
RTC-91

#532

ENCLOSURE 1

ANALYTICAL RESULTS OF MITCHELL BRANCH SOILS AND SEDIMENT SAMPLES COLLECTED UPSTREAM AND DOWNSTREAM FROM THE K-1417 HAZARDOUS WASTE STORAGE UNIT

DWG. NO. K/G-90-244 (U)

	K-1417-1		K-1417-2		K-1417-3		K-1417-4		K-1417-5	
	EP[a]	TOTAL[b]	EP	TOTAL	EP	TOTAL	EP	TOTAL	EP	TOTAL
BARIUM	0.31	49	0.18	100	0.13	52	0.12	75	0.19	130
CADMIUM	<0.003	4.7	<0.003	ND	<0.003	3.2	<0.003	3.2	<0.003	3.5
CHROMIUM	<0.01	29	<0.01	30	<0.01	27	<0.01	32	<0.01	30
NICKEL	0.08	45	0.077	220	<0.05	26	<0.05	30	<0.05	35
SILVER	<0.01	ND[c]	<0.01	ND	<0.01	ND	<0.01	ND	<0.01	ND
ARSENIC	<0.005	—[d]	<0.005	—	<0.005	—	<0.005	—	<0.005	—
LEAD	0.27	ND	0.035	ND	0.033	43	0.016	ND	0.010	41
SELENIUM	<0.005	—	<0.005	—	<0.005	—	<0.005	—	<0.005	—
MERCURY	<0.0002	1.8	<0.0002	<1.0	<0.0002	<1.0	<0.0002	<1.0	<0.0002	<1.0

a EXTRACTION PROCEDURE (EP) TOXICITY IN mg/L (ppm)
b TOTAL METAL IN µg/g (ppm)
c ND NON DETECTABLE
d — NOT ANALYZED

ANALYTICAL RESULTS OF MITCHELL BRANCH SOILS AND SEDIMENT SAMPLES COLLECTED UPSTREAM AND DOWNSTREAM FROM THE K-1417 HAZARDOUS WASTE STORAGE UNIT

DWG. NO. K/G-90-245 (U)

	K-1417-6		K-1417-7		K-1417-8		DOWNSTREAM K-1417-9		BACKGROUND K-1417-10	
	EP	TOTAL	EP	TOTAL	EP	TOTAL	EP	TOTAL	EP	TOTAL
BARIUM	0.14	130	<0.1	150	0.69	120	0.11	70	0.15	160
CADMIUM	<0.003	210	<0.03	3.6	0.004	ND	<0.003	4.9	<0.003	4.1
CHROMIUM	<0.01	37	<0.01	58	<0.01	37	<0.01	47	<0.01	37
NICKEL	<0.05	40	<0.05	110	0.18	48	<0.05	50	<0.05	62
SILVER	<0.01	ND	<0.1	ND	<0.01	ND	<0.01	ND	<0.01	ND
ARSENIC	<0.005	—	<0.005	—	<0.005	—	<0.005	—	<0.005	—
LEAD	0.01	57	0.045	ND	0.013	ND	0.004	53	<0.004	ND
SELENIUM	<0.005	—	<0.005	—	<0.005	—	<0.005	—	<0.005	—
MERCURY	<0.0002	<1.0	<0.0002	<0.95	<0.0002	<1.0	<0.0002	<1.0	<0.0002	<0.95

[a] EXTRACTION PROCEDURE (EP) TOXICITY IN mg/L (ppm)
[b] TOTAL METAL IN µg/g (ppm)
[c] ND NON DETECTABLE
[d] — NOT ANALYZED

ANALYTICAL RESULTS OF MITCHELL BRANCH SOILS AND SEDIMENT SAMPLES COLLECTED UPSTREAM AND DOWNSTREAM FROM THE K-1417 HAZARDOUS WASTE STORAGE UNIT

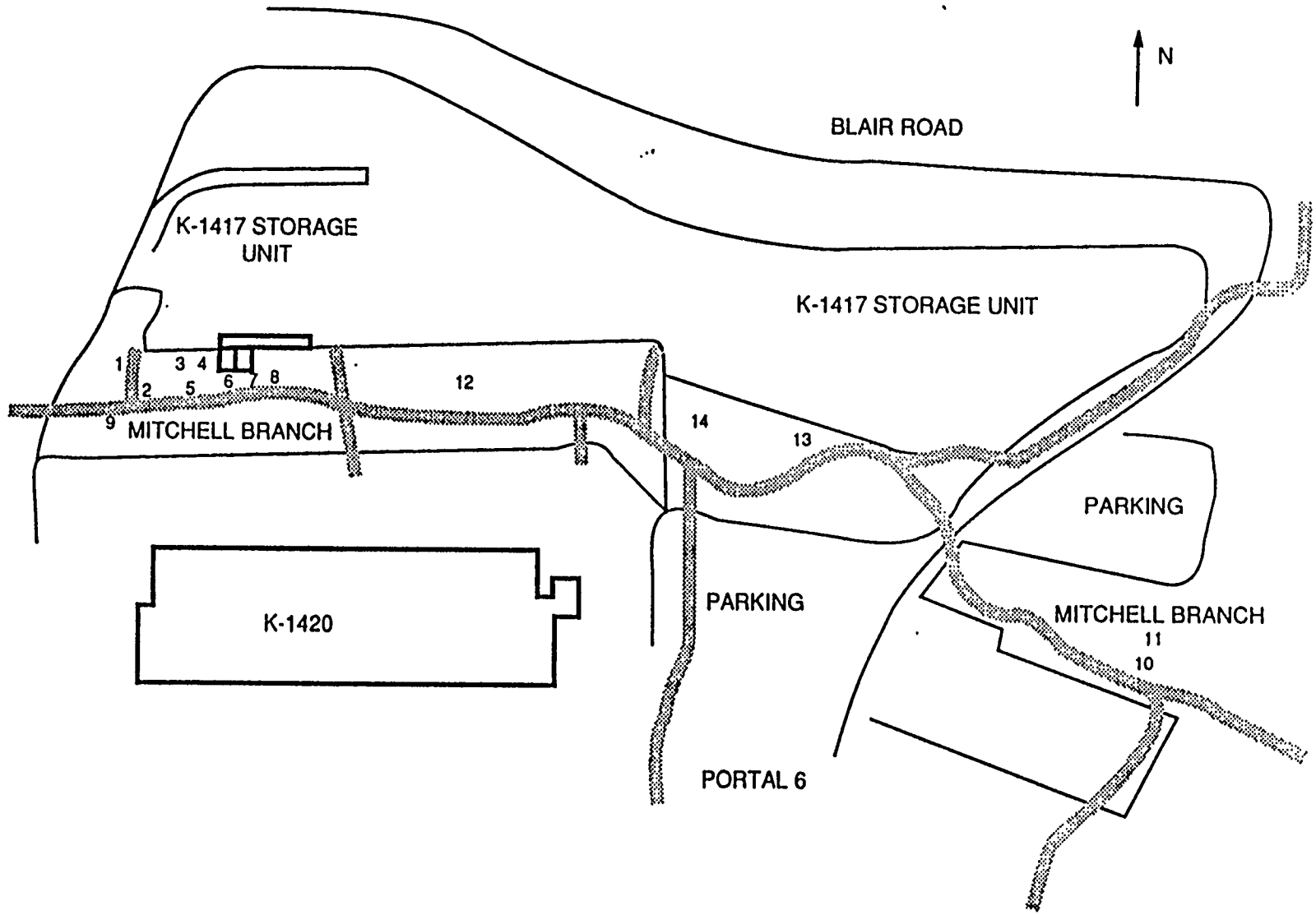
DWG. NO. K/G-90-246 (U)

	BACKGROUND K-1417-11		K-1417-12		K-1417-13		K-1417-14	
	EP	TOTAL	EP	TOTAL	EP	TOTAL	EP	TOTAL
BARIUM	0.36	79	0.22	80	<1.0	50	0.15	56
CADMIUM	<0.0033	3.5	0.004	ND	<0.03	3.1	<0.003	1.7
CHROMIUM	<0.01	27	<0.01	40	<0.1	21	<0.01	31
NICKEL	<0.05	210	<0.05	50	0.71	190	<0.05	53
SILVER	<0.01	ND	<0.01	ND	<0.1	ND	<0.01	ND
ARSENIC	<0.005	—	<0.005	—	<0.005	—	<0.005	—
LEAD	0.012	ND	0.004	35	0.047	79	0.0054	54
SELENIUM	<0.005	—	<0.005	—	<0.005	—	<0.005	—
MERCURY	<0.0002	<1.0	<0.0002	<1.0	<0.0002	<1.0	<0.0002	<1.0

[a] EXTRACTION PROCEDURE (EP) TOXICITY IN mg/L (ppm)
[b] TOTAL METAL IN µg/g (ppm)
[c] ND NON DETECTABLE
[d] — NOT ANALYZED

ENCLOSURE 2

K-1417 SOIL AND SEDIMENT SAMPLE LOCATIONS



1 — STORM DRAIN 162 (SOIL)
2 — STORM DRAIN 162 (SOIL)
3 — OVERLAND DISCHARGE (SOIL)
4 — OVERLAND DISCHARGE (SOIL)
5 — OVERLAND DISCHARGE (SOIL)
6 — OVERLAND DISCHARGE (SOIL)
7 — OVERLAND DISCHARGE (SOIL)
8 — OVERLAND DISCHARGE (SOIL)
9 — DOWNSTREAM (SEDIMENT)
10 — BACKGROUND (SEDIMENT)
11 — BACKGROUND (SOIL)
12 — OVERLAND DISCHARGE (SOIL)
13 — CULVERT DISCHARGE (SOIL)
14 — OVERLAND DISCHARGE (SOIL)

DWG. NO. K/G-89-1821 (U)

Map showing location of soil and sediment sample locations.

ENCLOSURE 3

Laboratory Data
Analytical Chemistry Department
Results of Analyses

Oak Ridge Gaseous Diffusion Plant
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 891121-004 Project: K119 T Customer Sample ID: K1417-1
Customer: G. BUTTERWORTH Requisition Number:
Date Sampled: 20-NOV-1989 Date Sample Received: 20-NOV-1989
Sampled By: US/WK Date Sample Completed: 9-DEC-1989
Material Description: SOIL

Activ. Number	Procedure No.	Analysis	Result	Units	Analyst	QA File Number	Date Completed
080103	EPA-3050 (7.5)	Prep (ICP, 7.5)	C		LE COLLINS	10897-55	22-NOV-1989
090207	EPA-6010	Barium (EP-TOX)	0.31	mg/L	VF BELT	91127A	27-NOV-1989
	EPA-6010	Cadmium (EP-TOX)	<0.0030	mg/L	VF BELT	91127A	27-NOV-1989
	EPA-6010	Chromium (EP-TOX)	<0.010	mg/L	VF BELT	91127A	27-NOV-1989
	EPA-6010	Nickel (EP-TOX)	0.080	mg/L	VF BELT	91127A	27-NOV-1989
	EPA-6010	Silver (EP-TOX)	<0.010	mg/L	VF BELT	91127A	27-NOV-1989
102007	EPA-7060	Arsenic (EP-TOX)	<0.005	mg/L	TJ OATTS	91126A	26-NOV-1989
	EPA-7421	Lead (EP-TOX)	0.27	mg/L	NB HAROLD	91126B	26-NOV-1989
	EPA-7740	Selenium (EP-TOX)	<0.005	mg/L	NB HAROLD	91126C	26-NOV-1989
103003	EPA-245.5	Mercury	1.8	ug/g	MC ROSS	11431-101	22-NOV-1989
103007	EPA 7470	Mercury (EP-TOX)	<0.00020	mg/L	C. SCHAEFER	11431-104	26-NOV-1989
170303	TP-170303	EP-TOX Extraction	C		MG BRANSTETTE	X	22-NOV-1989
205109	TP-2051	Archive	R1494	K1004D519	CL MONROE	205109	9-DEC-1989

Spike Recovery Data

Analysis	Amount Spiked	Amount Recovered	Percent Recovered
ARSENIC (EP-TOX)	0.040	0.042	105.00
SELENIUM (EP-TOX)	0.040	0.039	97.50

Program Manager: CR Kirkpatrick
Date Approved: 11-DEC-1989

AnaLIS ID: 891121-004
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
orized By: N. P. Buddin, III

Customer Sample ID: K1417-1
Customer: G. BUTTERWORTH
Sample Matrix: SOIL
Requisition Number:
Date Sample Received:

28 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
reparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 23-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91123A

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	13000	7440-23-5	Sodium	320
7440-39-3	Barium	49	7440-24-6	Strontium	140
7440-41-7	Beryllium	0.20	7440-29-1	Thorium	130U
7440-42-8	Boron	20	7440-32-6	Titanium	99
7440-43-9	Cadmium	4.7	7440-62-2	Vanadium	21
7440-70-2	Calcium	150000	7440-66-6	Zinc	120
7440-47-3	Chromium	28	7440-67-7	Zirconium	4.4
7440-48-4	Cobalt	6.4			
7440-50-8	Copper	27			
7439-89-6	Iron	15000			
7439-92-1	Lead	32U			
7439-93-2	Lithium	19			
7439-95-4	Magnesium	30000			
7[illegible]-96-5	Manganese	370			
7[illegible]-98-7	Molybdenum	6.3U			
7440-02-0	Nickel	45			
7440-03-1	Niobium	4.4U			
7723-14-0	Phosphorus	220			
7440-09-7	Potassium	1700			
7440-21-3	Silicon	470			
7440-22-4	Silver	3.8U			

ata Reporting Qualifiers:

- Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.
- Analyte was found in the reagent blank as well as the sample.
- Indicates an estimated value.
- Not detected.
- Aldol condensation product.
- Secondary dilution.
- Exceeds initial calibration range.

AnaLIS ID: 891121-005
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
Authorized By: N. P. Buddin, III

Customer Sample ID: K1417-2
Customer: G. BUTTERWORTH
Sample Matrix: SOIL
Requisition Number:
Date Sample Received:

29 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
Preparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 23-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91123A

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	22000	7440-23-5	Sodium	280
7440-39-3	Barium	100	7440-24-6	Strontium	20
7440-41-7	Beryllium	1.2	7440-29-1	Thorium	200U
7440-42-8	Boron	9.1	7440-32-6	Titanium	150
7440-43-9	Cadmium	2.9U	7440-62-2	Vanadium	34
7440-70-2	Calcium	9200	7440-66-6	Zinc	140
7440-47-3	Chromium	30	7440-67-7	Zirconium	7.3
7440-48-4	Cobalt	12			
7440-50-8	Copper	82			
7439-89-6	Iron	27000			
7439-92-1	Lead	49U			
7439-93-2	Lithium	25			
7439-95-4	Magnesium	3400			
7439-96-5	Manganese	700			
7439-98-7	Molybdenum	9.8U			
7440-02-0	Nickel	220			
7440-03-1	Niobium	6.8U			
7723-14-0	Phosphorus	280			
7440-09-7	Potassium	2400			
7440-21-3	Silicon	820			
7440-22-4	Silver	5.9U			

Data Reporting Qualifiers:

U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.
B - Analyte was found in the reagent blank as well as the sample.
J - Indicates an estimated value.
ND - Not detected.
A - Aldol condensation product.
D - Secondary dilution.
E - Exceeds initial calibration range.

Oak Ridge Gaseous Diffusion Plant
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 891121-006 Project: K119 T Customer Sample ID: K1417-3
Customer: G. BUTTERWORTH Requisition Number:
Date Sampled: 20-NOV-1989 Date Sample Received: 20-NOV-1989
Sampled By: WS/MK Date Sample Completed: 9-DEC-1989
Material Description: SOIL

Activ. Number	Procedure No.	Analysis	Result	Units	Analyst	QA File Number	Date Completed
080103	EPA-3050 (7.5)	Prep (ICP, 7.5)	C		LE COLLINS	10897-55	22-NOV-1989
090207	EPA-6010	Barium (EP-TOX)	0.13	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Cadmium (EP-TOX)	<0.0030	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Chromium (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Nickel (EP-TOX)	<0.050	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Silver (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
102007	EPA-7060	Arsenic (EP-TOX)	<0.005	mg/L	NB HAROLD	91126A	26-NOV-1989
	EPA-7421	Lead (EP-TOX)	0.033	mg/L	NB HAROLD	91126B	26-NOV-1989
	EPA-7740	Selenium (EP-TOX)	<0.005	mg/L	NB HAROLD	91126C	26-NOV-1989
103003	EPA-245.5	Mercury	<1.0	ug/g	MC ROSS	11431-101	22-NOV-1989
103007	EPA 7470	Mercury (EP-TOX)	<0.00020	mg/L	C. SCHAEFER	11431-104	26-NOV-1989
170303	TP-170303	EP-TOX Extraction	C		MG BRANSTETTE	X	22-NOV-1989
205109	TP-2051	Archive	R14S4	K1004D519	CL MONROE	205109	9-DEC-1989

Program Manager: CR Kirkpatrick
Date Approved: 11-DEC-1989

ANALYSIS DATA REPORT

AnaLIS ID: 891121-006
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
Authorized By: N. P. Buddin, III

Customer Sample ID: K1417-3
Customer: G. BUTTERWORTH
Sample Matrix: SOIL
Requisition Number:
Date Sample Received:

29 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
Preparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 23-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91123A

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	15000	7440-23-5	Sodium	100
7440-39-3	Barium	52	7440-24-6	Strontium	9.6
7440-41-7	Beryllium	0.97	7440-29-1	Thorium	140U
7440-42-8	Boron	27	7440-32-6	Titanium	140
7440-43-9	Cadmium	3.2	7440-62-2	Vanadium	37
7440-70-2	Calcium	5700	7440-66-6	Zinc	59
7440-47-3	Chromium	27	7440-67-7	Zirconium	9.3
7440-48-4	Cobalt	13			
7440-50-8	Copper	25			
7439-89-6	Iron	31000			
7439-92-1	Lead	43			
7439-93-2	Lithium	13			
7439-95-4	Magnesium	2700			
7439-96-5	Manganese	690			
7439-98-7	Molybdenum	6.8U			
7440-02-0	Nickel	26			
7440-03-1	Niobium	7.3			
7723-14-0	Phosphorus	470			
7440-09-7	Potassium	1400			
7440-21-3	Silicon	900			
7440-22-4	Silver	4.1U			

Data Reporting Qualifiers:

U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.
B - Analyte was found in the reagent blank as well as the sample.
J - Indicates an estimated value.
ND - Not detected.
A - Aldol condensation product.
D - Secondary dilution.
E - Exceeds initial calibration range.

Oak Ridge Gaseous Diffusion Plant
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 891121-007 Project: K118 T Customer Sample ID: K1417-4
Customer: G. BUTTERWORTH Requisition Number:
Date Sampled: 20-NOV-1989 Date Sample Received: 20-NOV-1989
Sampled By: WS/NK Date Sample Completed: 9-DEC-1989
Material Description: SOIL

Activ. Number	Procedure No.	Analysis	Result	Units	Analyst	QA File Number	Date Completed
080103	EPA-3050 (7.5)	Prep (ICP, 7.5)	C		LE COLLINS	10897-55	22-NOV-1989
090207	EPA-6010	Barium (EP-TOX)	0.12	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Cadmium (EP-TOX)	<0.0030	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Chromium (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Nickel (EP-TOX)	<0.050	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Silver (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
102007	EPA-7060	Arsenic (EP-TOX)	<0.005	mg/L	NB HAROLD	91126A	26-NOV-1989
	EPA-7421	Lead (EP-TOX)	0.016	mg/L	NB HAROLD	91126B	26-NOV-1989
	EPA-7740	Selenium (EP-TOX)	<0.005	mg/L	NB HAROLD	91126C	26-NOV-1989
103003	EPA-245.5	Mercury	<1.0	ug/g	MC ROSS	11431-101	22-NOV-1989
103007	EPA 7470	Mercury (EP-TOX)	<0.00020	mg/L	C. SCHAEFER	11431-104	26-NOV-1989
170303	TP-170303	EP-TOX Extraction	C		MG BRANSTETTE	X	22-NOV-1989
205109	TP-2051	Archive	R14S4	K1004D519	CL MONROE	205109	9-DEC-1989

Program Manager: CR Kirkpatrick
Date Approved: 11-DEC-1989

AnaLIS ID: 891121-007
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
Authorized By: N. P. Buddin, III

Customer Sample ID: K1417-4
Customer: G. RUTTERWORTH
Sample Matrix: SOIL
Requisition Number:
Date Sample Received:

29 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
Preparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 23-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91123A

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	22000	7440-23-5	Sodium	150
7440-39-3	Barium	75	7440-24-6	Strontium	17
7440-41-7	Beryllium	1.1	7440-29-1	Thorium	160U
7440-42-8	Boron	16	7440-32-6	Titanium	170
7440-43-9	Cadmium	3.2	7440-62-2	Vanadium	41
7440-70-2	Calcium	12000	7440-66-6	Zinc	73
7440-47-3	Chromium	32	7440-67-7	Zirconium	10
7440-48-4	Cobalt	14			
7440-50-8	Copper	26			
7439-89-6	Iron	33000			
7439-92-1	Lead	40U			
7439-93-2	Lithium	20			
7439-95-4	Magnesium	3300			
7439-96-5	Manganese	1000			
7439-98-7	Molybdenum	8.1U			
7440-02-0	Nickel	30			
7440-03-1	Niobium	5.6U			
7723-14-0	Phosphorus	200			
7440-09-7	Potassium	2100			
7440-21-3	Silicon	810			
7440-22-4	Silver	4.8U			

Data Reporting Qualifiers:

U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.
B - Analyte was found in the reagent blank as well as the sample.
J - Indicates an estimated value.
ND - Not detected.
A - Aldol condensation product.
D - Secondary dilution.
E - Exceeds initial calibration range.

Oak Ridge Gaseous Diffusion Plant
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 891121-008 Project: K118 T Customer Sample ID: K1417-5
Customer: G. BUTTERWORTH Requisition Number:
Date Sampled: 20-NOV-1989 Date Sample Received: 20-NOV-1989
Sampled By: WS/NK Date Sample Completed: 9-DEC-1989
Material Description: SOIL

Activ. Number	Procedure No.	Analysis	Result	Units	Analyst	QA File Number	Date Completed
080103	EPA-3050 (7.5)	Prep (ICP, 7.5)	C		LE COLLINS	10897-55	22-NOV-1989
090207	EPA-6010	Barium (EP-TOX)	0.19	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Cadmium (EP-TOX)	<0.0030	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Chromium (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Nickel (EP-TOX)	<0.050	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Silver (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
102007	EPA-7060	Arsenic (EP-TOX)	<0.005	mg/L	NB HAROLD	91126A	26-NOV-1989
	EPA-7421	Lead (EP-TOX)	0.010	mg/L	NB HAROLD	91126B	26-NOV-1989
	EPA-7740	Selenium (EP-TOX)	<0.005	mg/L	NB HAROLD	91126C	26-NOV-1989
103003	EPA-245.5	Mercury	<1.0	ug/g	MC ROSS	11431-101	22-NOV-1989
103007	EPA 7470	Mercury (EP-TOX)	<0.00020	mg/L	C. SCHAEFER	11431-104	26-NOV-1989
170303	TP-170303	EP-TOX Extraction	C		MG BRANSTETTE	X	22-NOV-1989
5109	TP-2051	Archive	R1494	K1004D519	CL MONROE	205109	9-DEC-1989

Program Manager: CR Kirkpatrick
Date Approved: 11-DEC-1989

AnaLIS ID: 891121-008
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
Authorized By: N. P. Buddin, III

Customer Sample ID: K1417-S
Customer: G. BUTTERWORTH
Sample Matrix: SOIL
Requisition Number:
Date Sample Received:

22 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
Preparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 23-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91123A

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	21000	7440-23-5	Sodium	180
7440-39-3	Barium	130	7440-24-6	Strontium	9.2
7440-41-7	Beryllium	1.5	7440-29-1	Thorium	160U
7440-42-8	Boron	17	7440-32-6	Titanium	140
7440-43-9	Cadmium	3.5	7440-62-2	Vanadium	45
7440-70-2	Calcium	3500	7440-66-6	Zinc	83
7440-47-3	Chromium	30	7440-67-7	Zirconium	13
7440-48-4	Cobalt	23			
7440-50-8	Copper	32			
7439-89-6	Iron	40000			
7439-92-1	Lead	41			
7439-93-2	Lithium	19			
7439-95-4	Magnesium	2100			
7439-96-5	Manganese	1800			
7439-98-7	Molybdenum	8.1U			
7440-02-0	Nickel	35			
7440-03-1	Niobium	5.7U			
7723-14-0	Phosphorus	200			
7440-09-7	Potassium	2400			
7440-21-3	Silicon	660			
7440-22-4	Silver	4.9U			

Data Reporting Qualifiers:

U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.
B - Analyte was found in the reagent blank as well as the sample.
J - Indicates an estimated value.
ND - Not detected.
A - Aldol condensation product.
D - Secondary dilution.
E - Exceeds initial calibration range.

Oak Ridge Gaseous Diffusion Plant
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 891121-009 Project: K118 T Customer Sample ID: K1417-6
Customer: G. BUTTERWORTH Requisition Number:
Date Sampled: 20-NOV-1989 Date Sample Received: 20-NOV-1989
Sampled By: HS/NK Date Sample Completed: 9-DEC-1989
Material Description: SOIL

Activ. Number	Procedure No.	Analysis	Result	Units	Analyst	QA File Number	Date Completed
080103	EPA-3050 (7.5)	Prep (ICP, 7.5)	C		LE COLLINS	10897-55	22-NOV-1989
090207	EPA-6010	Barium (EP-TOX)	0.14	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Cadmium (EP-TOX)	<0.0030	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Chromium (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Nickel (EP-TOX)	<0.050	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Silver (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
102007	EPA-7060	Arsenic (EP-TOX)	<0.005	mg/L	NB HAROLD	91126A	26-NOV-1989
	EPA-7421	Lead (EP-TOX)	0.010	mg/L	NB HAROLD	91126B	26-NOV-1989
	EPA-7740	Selenium (EP-TOX)	<0.005	mg/L	NB HAROLD	91126C	26-NOV-1989
103003	EPA-245.5	Mercury	<1.0	ug/g	MC ROSS	11431-101	22-NOV-1989
103007	EPA 7470	Mercury (EP-TOX)	<0.00020	mg/L	C. SCHAEFER	11431-104	26-NOV-1989
170303	TP-170303	EP-TOX Extraction	C		MG BRANSTETTE	X	22-NOV-1989
_05109	TP-2051	Archive	R1484	K1004D519	CL MONROE	205109	9-DEC-1989

Program Manager: CR Kirkpatrick
Date Approved: 11-DEC-1989

AnaLIS ID: 891121-009
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
Authorized By: N. P. Buddin, III

Customer Sample ID: K1417-6
Customer: G. BUTTERWORTH
Sample Matrix: SOIL
Requisition Number:
Date Sample Received:

28 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
Preparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 23-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91123A

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	20000	7440-23-5	Sodium	200
7440-39-3	Barium	130	7440-24-6	Strontium	16
7440-41-7	Beryllium	1.4	7440-29-1	Thorium	130U
7440-42-8	Boron	2.5U	7440-32-6	Titanium	160
7440-43-9	Cadmium	210	7440-62-2	Vanadium	43
7440-70-2	Calcium	11000	7440-66-6	Zinc	93
7440-47-3	Chromium	37	7440-67-7	Zirconium	8.2
7440-48-4	Cobalt	28			
7440-50-8	Copper	34			
7439-89-6	Iron	45000			
7439-92-1	Lead	57			
7439-93-2	Lithium	17			
7439-95-4	Magnesium	2400			
7439-96-5	Manganese	1600			
7439-98-7	Molybdenum	6.3U			
7440-02-0	Nickel	40			
7440-03-1	Niobium	4.4U			
7723-14-0	Phosphorus	170			
7440-09-7	Potassium	2100			
7440-21-3	Silicon	590			
7440-22-4	Silver	3.8U			

Data Reporting Qualifiers:

U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.
B - Analyte was found in the reagent blank as well as the sample.
J - Indicates an estimated value.
ND - Not detected.
A - Aldol condensation product.
D - Secondary dilution.
E - Exceeds initial calibration range.

Oak Ridge Gaseous Diffusion Plant
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 891121-010 Project: K118 T Customer Sample ID: K1417-7
Customer: G. BUTTERWORTH Requisition Number:
Date Sampled: 20-NOV-1989 Date Sample Received: 20-NOV-1989
Sampled By: WS/NK Date Sample Completed: 9-DEC-1989
Material Description: SOIL

Activ. Number	Procedure No.	Analysis	Result	Units	Analyst	QA File Number	Date Completed
080103	EPA-3050 (7.5)	Prep (ICP, 7.5)	C		LE COLLINS	10897-55	22-NOV-1989
090208	EPA-6010	Barium (EP-TOX)	<1.0	mg/L	VF BELT	91127B	27-NOV-1989
	EPA-6010	Cadmium (EP-TOX)	<0.030	mg/L	VF BELT	91127B	27-NOV-1989
	EPA-6010	Chromium (EP-TOX)	<0.10	mg/L	VF BELT	91127B	27-NOV-1989
	EPA-6010	Nickel (EP-TOX)	<0.50	mg/L	VF BELT	91127B	27-NOV-1989
	EPA-6010	Silver (EP-TOX)	<0.10	mg/L	VF BELT	91127B	27-NOV-1989
102007	EPA-7060	Arsenic (EP-TOX)	<0.005	mg/L	NB HAROLD	91126A	26-NOV-1989
	EPA-7421	Lead (EP-TOX)	0.045	mg/L	NB HAROLD	91126B	26-NOV-1989
	EPA-7740	Selenium (EP-TOX)	<0.005	mg/L	NB HAROLD	91126C	26-NOV-1989
103003	EPA-245.5	Mercury	<0.95	ug/g	MC ROSS	11431-101	22-NOV-1989
103007	EPA 7470	Mercury (EP-TOX)	<0.00020	mg/L	C. SCHAEFER	11431-104	26-NOV-1989
170303	TP-170303	EP-TOX Extraction	C		MG BRANSTETTE	X	22-NOV-1989
205109	TP-2051	Archive	R14S4	K1004D519	CL MONROE	205109	9-DEC-1989

Program Manager: CR Kirkpatrick
Date Approved: 11-DEC-1989

AnaLIS ID: 891121-010
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
Authorized By: N. P. Buddin: III

Customer Sample ID: K1417-7
Customer: G. BUTTERWORTH
Sample Matrix: SOIL
Requisition Number:
Date Sample Received:

29 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
Preparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 23-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91123A

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	32000	7440-23-5	Sodium	120
7440-39-3	Barium	150	7440-24-6	Strontium	58
7440-41-7	Beryllium	2.3	7440-29-1	Thorium	180U
7440-42-8	Boron	13	7440-32-6	Titanium	440
7440-43-9	Cadmium	3.6	7440-62-2	Vanadium	55
7440-70-2	Calcium	43000	7440-66-6	Zinc	210
7440-47-3	Chromium	58	7440-67-7	Zirconium	25
7440-48-4	Cobalt	22			
7440-50-8	Copper	39			
7439-89-6	Iron	34000			
7439-92-1	Lead	45U			
7439-93-2	Lithium	28			
7439-95-4	Magnesium	4000			
7439-96-5	Manganese	1200			
7439-98-7	Molybdenum	9.0U			
7440-02-0	Nickel	110			
7440-03-1	Niobium	6.3U			
7723-14-0	Phosphorus	620			
7440-09-7	Potassium	2900			
7440-21-3	Silicon	740			
7440-22-4	Silver	5.4U			

Data Reporting Qualifiers:

U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.
B - Analyte was found in the reagent blank as well as the sample.
J - Indicates an estimated value.
ND - Not detected.
A - Aldol condensation product.
D - Secondary dilution.
E - Exceeds initial calibration range.

Oak Ridge Gaseous Diffusion Plant
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 891121-011 Project: K119 T Customer Sample ID: K1417-8
Customer: G. BUTTERWORTH Requisition Number:
Date Sampled: 20-NOV-1989 Date Sample Received: 20-NOV-1989
Sampled By: WS/NK Date Sample Completed: 9-DEC-1989
Material Description: SOIL

Activ. Number	Procedure No.	Analysis	Result	Units	Analyst	QA File Number	Date Completed
080103	EPA-3050 (7.5)	Prep (ICP, 7.5)	C		LE COLLINS	10897-55	22-NOV-1989
090207	EPA-6010	Barium (EP-TOX)	0.69	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Cadmium (EP-TOX)	0.0043	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Chromium (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Nickel (EP-TOX)	0.18	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Silver (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
102007	EPA-7060	Arsenic (EP-TOX)	<0.005	mg/L	NB HAROLD	91126A	26-NOV-1989
	EPA-7421	Lead (EP-TOX)	0.013	mg/L	NB HAROLD	91126B	26-NOV-1989
	EPA-7740	Selenium (EP-TOX)	<0.005	mg/L	NB HAROLD	91126C	26-NOV-1989
103003	EPA-245.5	Mercury	<1.0	ug/g	MC ROSS	11431-101	22-NOV-1989
103007	EPA 7470	Mercury (EP-TOX)	<0.00020	mg/L	C. SCHAEFER	11431-104	26-NOV-1989
170303	TP-170303	EP-TOX Extraction	C		MG BRANSTETTE	X	22-NOV-1989
205109	TP-2051	Archive	R1484	K1004D519	CL MONROE	205109	9-DEC-1989

Program Manager: CR Kirkpatrick
Date Approved: 11-DEC-1989

Analis ID: 891121-011
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
Authorized By: N. P. Buddin, III

Customer Sample ID: M1417-8
Customer: G. BUTTERWORTH
Sample Matrix: SOIL
Requisition Number:
Date Sample Received:

28 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
Preparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 23-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91123A

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	22000	7440-23-5	Sodium	120
7440-39-3	Barium	120	7440-24-6	Strontium	21
7440-41-7	Beryllium	1.5	7440-29-1	Thorium	140U
7440-42-8	Boron	4.0	7440-32-6	Titanium	170
7440-43-9	Cadmium	2.1U	7440-62-2	Vanadium	43
7440-70-2	Calcium	12000	7440-66-6	Zinc	100
7440-47-3	Chromium	37	7440-67-7	Zirconium	14
7440-48-4	Cobalt	18			
7440-50-8	Copper	25			
7439-89-6	Iron	39000			
7439-92-1	Lead	35U			
7439-93-2	Lithium	20			
7439-95-4	Magnesium	2800			
7439-96-5	Manganese	1300			
7439-98-7	Molybdenum	7.0U			
7440-02-0	Nickel	48			
7440-03-1	Niobium	5.6			
7723-14-0	Phosphorus	360			
7440-09-7	Potassium	2300			
7440-21-3	Silicon	600			
7440-22-4	Silver	4.2U			

Data Reporting Qualifiers:

U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.
B - Analyte was found in the reagent blank as well as the sample.
J - Indicates an estimated value.
ND - Not detected.
A - Aldol condensation product.
D - Secondary dilution.
E - Exceeds initial calibration range.

Oak Ridge Gaseous Diffusion Plant
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 891121-012 Project: K118 T Customer Sample ID: K1417-9
Customer: G. BUTTERWORTH Requisition Number:
Date Sampled: 20-NOV-1989 Date Sample Received: 20-NOV-1989
Sampled By: WS/NK Date Sample Completed: 9-DEC-1989
Material Description: SOIL

Activ. Number	Procedure No.	Analysis	Result	Units	Analyst	QA File Number	Date Completed
080103	EPA-3050 (7.5)	Prep (ICP, 7.5)	C		LE COLLINS	10897-55	22-NOV-1989
090207	EPA-6010	Barium (EP-TOX)	0.11	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Cadmium (EP-TOX)	<0.0030	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Chromium (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Nickel (EP-TOX)	<0.050	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Silver (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
102007	EPA-7060	Arsenic (EP-TOX)	<0.005	mg/L	NB HAROLD	91126A	26-NOV-1989
	EPA-7421	Lead (EP-TOX)	<0.004	mg/L	NB HAROLD	91126B	26-NOV-1989
	EPA-7740	Selenium (EP-TOX)	<0.005	mg/L	NB HAROLD	91126C	26-NOV-1989
103003	EPA-245.5	Mercury	<1.0	ug/g	MC ROSS	11431-101	22-NOV-1989
103007	EPA 7470	Mercury (EP-TOX)	<0.00020	mg/L	C. SCHAEFER	11431-104	26-NOV-1989
170303	TP-170303	EP-TOX Extraction	C		MG BRANSTETTE	X	22-NOV-1989
205109	TP-2051	Archive	R14S4	K1004D519	CL MONROE	205109	9-DEC-1989

Spike Recovery Data

Analysis	Amount Spiked	Amount Recovered	Percent Recovered
MERCURY (EP-TOX)	0.10	0.10	104.78

Program Manager: CR Kirkpatrick
Date Approved: 11-DEC-1989

AnaLIS ID: 891121-012
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
Authorized By: N. P. Buddin, III

Customer Sample ID: K1417-9
Customer: G. BUTTERWORTH
Sample Matrix: SOIL
Requisition Number:
Date Sample Received:

28 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
Preparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 23-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91123A

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	25000	7440-23-5	Sodium	120
7440-39-3	Barium	70	7440-24-6	Strontium	41
7440-41-7	Beryllium	0.88	7440-29-1	Thorium	140U
7440-42-8	Boron	2.8U	7440-32-6	Titanium	140
7440-43-9	Cadmium	4.8	7440-62-2	Vanadium	53
7440-70-2	Calcium	30000	7440-66-6	Zinc	81
7440-47-3	Chromium	47	7440-67-7	Zirconium	10
7440-48-4	Cobalt	14			
7440-50-8	Copper	41			
7439-89-6	Iron	39000			
7439-92-1	Lead	53			
7439-93-2	Lithium	32			
7439-95-4	Magnesium	5100			
7439-96-5	Manganese	1200			
7439-98-7	Molybdenum	7.0U			
7440-02-0	Nickel	50			
7440-03-1	Niobium	5.3			
7723-14-0	Phosphorus	350			
7440-09-7	Potassium	2000			
7440-21-3	Silicon	640			
7440-22-4	Silver	4.2U			

Data Reporting Qualifiers:

U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.
B - Analyte was found in the reagent blank as well as the sample.
J - Indicates an estimated value.
ND - Not detected.
A - Aldol condensation product.
D - Secondary dilution.
E - Exceeds initial calibration range.

Oak Ridge Gaseous Diffusion Plant
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 891121-013 Project: K118 T
Customer: G. BUTTERWORTH
Date Sampled: 20-NOV-1989
Sampled By: WS/MK
Material Description: SOIL

Customer Sample ID: K1417-10
Requisition Number:
Date Sample Received: 20-NOV-1989
Date Sample Completed: 9-DEC-1989

Activ. Number	Procedure No.	Analysis	Result	Units	Analyst	QA File Number	Date Completed
080103	EPA-3050 (7.5)	Prep (ICP, 7.5)	C		LE COLLINS	10897-55	22-NOV-1989
090207	EPA-6010	Barium (EP-TOX)	0.15	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Cadmium (EP-TOX)	<0.0030	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Chromium (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Nickel (EP-TOX)	<0.050	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Silver (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
102007	EPA-7060	Arsenic (EP-TOX)	<0.005	mg/L	NB HAROLD	91126A	26-NOV-1989
	EPA-7421	Lead (EP-TOX)	<0.004	mg/L	NB HAROLD	91126B	26-NOV-1989
	EPA-7740	Selenium (EP-TOX)	<0.005	mg/L	NB HAROLD	91126C	26-NOV-1989
103003	EPA-245.5	Mercury	<0.95	ug/g	MC ROSS	11431-101	22-NOV-1989
103007	EPA 7470	Mercury (EP-TOX)	<0.00020	mg/L	C. SCHAEFER	11431-104	26-NOV-1989
170303	TP-170303	EP-TOX Extraction	C		MG BRANSTETTE	X	22-NOV-1989
205109	TP-2051	Archive	R1454	K10040519	CL MONROE	205109	9-DEC-1989

Program Manager: CR Kirkpatrick
Date Approved: 11-DEC-1989

AnaLIS ID: 891121-013
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
Authorized By: N. P. Budding III

Customer Sample ID: K1417-10
Customer: G. BUTTERWORTH
Sample Matrix: SOIL
Requisition Number:
Date Sample Received:

29 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
Preparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 23-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91123A

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	16000	7440-23-5	Sodium	190
7440-39-3	Barium	160	7440-24-6	Strontium	75
7440-41-7	Beryllium	0.92	7440-29-1	Thorium	150U
7440-42-8	Boron	12	7440-32-6	Titanium	160
7440-43-9	Cadmium	4.1	7440-62-2	Vanadium	24
7440-70-2	Calcium	63000	7440-66-6	Zinc	130
7440-47-3	Chromium	27	7440-67-7	Zirconium	3.8
7440-48-4	Cobalt	16			
7440-50-8	Copper	25			
7439-89-6	Iron	30000			
7439-92-1	Lead	36U			
7439-93-2	Lithium	22			
7439-95-4	Magnesium	20000			
7439-96-5	Manganese	1700			
7439-98-7	Molybdenum	7.3U			
7440-02-0	Nickel	62			
7440-03-1	Niobium	10			
7723-14-0	Phosphorus	150U			
7440-09-7	Potassium	2600			
7440-21-3	Silicon	510			
7440-22-4	Silver	4.4U			

Data Reporting Qualifiers:

U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.
B - Analyte was found in the reagent blank as well as the sample.
J - Indicates an estimated value.
ND - Not detected.
A - Aldol condensation product.
D - Secondary dilution.
E - Exceeds initial calibration range.

Oak Ridge Gaseous Diffusion Plant
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 891121-014 Project: K118 T Customer Sample ID: K1417-11
Customer: G. BUTTERWORTH Requisition Number:
Date Sampled: 20-NOV-1989 Date Sample Received: 20-NOV-1989
Sampled By: WS/NK Date Sample Completed: 9-DEC-1989
Material Description: SOIL

Activ. Number	Procedure No.	Analysis	Result	Units	Analyst	QA File Number	Date Completed
080103	EPA-3050 (7.5)	Prep (ICP, 7.5)	C		LE COLLINS	10897-55	22-NOV-1989
090207	EPA-6010	Barium (EP-TOX)	0.36	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Cadmium (EP-TOX)	0.0033	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Chromium (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Nickel (EP-TOX)	<0.050	mg/L	VF BELT	91127Z	27-NOV-1989
	EPA-6010	Silver (EP-TOX)	<0.010	mg/L	VF BELT	91127Z	27-NOV-1989
102007	EPA-7060	Arsenic (EP-TOX)	<0.005	mg/L	NB HAROLD	91126A	26-NOV-1989
	EPA-7421	Lead (EP-TOX)	0.012	mg/L	NB HAROLD	91126B	26-NOV-1989
	EPA-7740	Selenium (EP-TOX)	<0.005	mg/L	NB HAROLD	91126C	26-NOV-1989
103003	EPA-245.5	Mercury	<1.0	ug/g	MC ROSS	11431-101	22-NOV-1989
103007	EPA 7470	Mercury (EP-TOX)	<0.00020	mg/L	C. SCHAEFER	11431-104	26-NOV-1989
170303	TP-170303	EP-TOX Extraction	C		MG BRANSTETTE	X	22-NOV-1989
205109	TP-2051	Archive	R14S4	K1004D519	CL MONROE	205109	9-DEC-1989

Program Manager: CR Kirkpatrick
Date Approved: 11-DEC-1989

AnaLIS ID: 891121-014
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
Authorized By: N. P. Buddin, III

Customer Sample ID: K1417-11
Customer: G. BUTTERWORTH
Sample Matrix: SOIL
Requisition Number:
Date Sample Received:

28 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
Preparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 23-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91123A

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	12000	7440-23-5	Sodium	170
7440-39-3	Barium	79	7440-24-6	Strontium	85
7440-41-7	Beryllium	0.42	7440-29-1	Thorium	130U
7440-42-8	Boron	4.4	7440-32-6	Titanium	140
7440-43-9	Cadmium	3.5	7440-62-2	Vanadium	21
7440-70-2	Calcium	73000	7440-66-6	Zinc	56
7440-47-3	Chromium	27	7440-67-7	Zirconium	3.9
7440-48-4	Cobalt	11			
7440-50-8	Copper	79			
7439-89-6	Iron	22000			
7439-92-1	Lead	33U			
7439-93-2	Lithium	13			
7439-95-4	Magnesium	5900			
7439-96-5	Manganese	530			
7439-98-7	Molybdenum	6.7U			
7440-02-0	Nickel	210			
7440-03-1	Niobium	8.2			
7723-14-0	Phosphorus	390			
7440-09-7	Potassium	2100			
7440-21-3	Silicon	510			
7440-22-4	Silver	4.0U			

Data Reporting Qualifiers:

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B - Analyte was found in the reagent blank as well as the sample.
J - Indicates an estimated value.
ND - Not detected.
A - Aldol condensation product.
D - Secondary dilution.
E - Exceeds initial calibration range.

AnaLIS ID: 891122-041
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
Authorized By: N. P. Buddin, III

Customer Sample ID: K1417-12
Customer: G. BUTTERWORTH
Sample Matrix: SOIL
Requisition Number: 00947
Date Sample Received:

28 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
Preparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 27-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91127B

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	20000	7440-23-5	Sodium	91
7440-39-3	Barium	80	7440-24-6	Strontium	14
7440-41-7	Beryllium	0.92	7440-29-1	Thorium	120U
7440-42-8	Boron	2.4U	7440-32-6	Titanium	160
7440-43-9	Cadmium	1.8U	7440-62-2	Vanadium	43
7440-70-2	Calcium	6700	7440-66-6	Zinc	72
7440-47-3	Chromium	40	7440-67-7	Zirconium	11
7440-48-4	Cobalt	13			
7440-50-8	Copper	27			
7439-89-6	Iron	32000			
7439-92-1	Lead	35			
7439-93-2	Lithium	14			
7439-95-4	Magnesium	2800			
7439-96-5	Manganese	970			
7439-98-7	Molybdenum	6.1U			
7440-02-0	Nickel	50			
7440-03-1	Niobium	4.3U			
7723-14-0	Phosphorus	580			
7440-09-7	Potassium	1900			
7440-21-3	Silicon	400			
7440-22-4	Silver	3.7U			

Data Reporting Qualifiers:

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J - Indicates an estimated value.
ND - Not detected.
A - Aldol condensation product.
D - Secondary dilution.
E - Exceeds initial calibration range.

Del Rios Gasoline Production Plant
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 891122-041 Project: K118 T Customer Sample ID: K1417-12
Customer: G. BUTTERWORTH Requisition Number: 00947
Date Sampled: 21-NOV-1989 Date Sample Received: 22-NOV-1989
Sampled By: NWK Date Sample Completed:
Material Description: SOIL

Activ. Number	Procedure No.	Analysis	Result	Units	Analyst	QA File Number	Date Completed
		Archive	--------				
080103	EPA-3050 (7.5)	Prep (ICP, 7.5)	C		LE COLLINS	10897-56	27-NOV-1989
090207	EPA-6010	Barium (EP-TOX)	0.22	mg/L	VF BELT	91127B	27-NOV-1989
	EPA-6010	Cadmium (EP-TOX)	0.0040	mg/L	VF BELT	91127B	27-NOV-1989
	EPA-6010	Chromium (EP-TOX)	<0.010	mg/L	VF BELT	91127B	27-NOV-1989
	EPA-6010	Nickel (EP-TOX)	<0.050	mg/L	VF BELT	91127B	27-NOV-1989
	EPA-6010	Silver (EP-TOX)	<0.010	mg/L	VF BELT	91127B	27-NOV-1989
102007	EPA-7060	Arsenic (EP-TOX)	<0.005	mg/L	NB HAROLD	91127N	28-NOV-1989
	EPA-7421	Lead (EP-TOX)	<0.004	mg/L	NB HAROLD	91127O	28-NOV-1989
	EPA-7740	Selenium (EP-TOX)	<0.005	mg/L	NB HAROLD	91127P	28-NOV-1989
103003	EPA 245.5	Mercury	<1.0	ug/g	C. SCHAEFER	11431-104	26-NOV-1989
103007	EPA 7470	Mercury (EP-TOX)	<0.00020	mg/L	C. SCHAEFER	11431-106	27-NOV-1989
303	TP-170303	EP-TOX Extraction	C		MG BRANSTETTE	X	23-NOV-1989

Spike Recovery Data

Analysis	Amount Spiked	Amount Recovered	Percent Recovered
ARSENIC (EP-TOX)	0.040	0.039	97.50
LEAD (EP-TOX)	0.040	0.041	102.50
SELENIUM (EP-TOX)	0.040	0.045	112.50
ALUMINUM (EP-TOX)	200	198.	98.86
CADMIUM	25.0	25.9	103.40
CADMIUM (EP-TOX)	200	199.	98.90
CHROMIUM	25.0	25.0	100.08
CHROMIUM (EP-TOX)	200	202.	100.91
COPPER	25.0	25.8	103.28
COPPER (EP-TOX)	200	203.	101.32
MANGANESE	25.0	47.	188.00
IRON (EP-TOX)	200	195.	97.32
ZINC	25.0	27.1	108.40
LEAD (EP-TOX)	200	195.	97.62
MANGANESE (EP-TOX)	200	198.	98.83
NICKEL (EP-TOX)	200	198.	99.02
ZINC (EP-TOX)	200	192.	95.90

Program Manager: CR Kirkpatrick
Date Approved:

Analis ID: 891122-042
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
Authorized By: N. P. Budding III

Customer Sample ID: K1417-13
Customer: G. BUTTERWORTH
Sample Matrix: SOIL
Requisition Number: 00947
Date Sample Received:

28 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
Preparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 27-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91127B

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	14000	7440-23-5	Sodium	160
7440-39-3	Barium	50	7440-24-6	Strontium	150
7440-41-7	Beryllium	0.72	7440-29-1	Thorium	160U
7440-42-8	Boron	3.2U	7440-32-6	Titanium	130
7440-43-9	Cadmium	3.1	7440-62-2	Vanadium	35
7440-70-2	Calcium	140000	7440-66-6	Zinc	120
7440-47-3	Chromium	21	7440-67-7	Zirconium	9.0
7440-48-4	Cobalt	8.2			
7440-50-8	Copper	59			
7439-89-6	Iron	22000			
7439-92-1	Lead	79			
7439-93-2	Lithium	13			
7439-95-4	Magnesium	14000			
7439-96-5	Manganese	480			
7439-98-7	Molybdenum	8.0U			
7440-02-0	Nickel	190			
7440-03-1	Niobium	5.6U			
7723-14-0	Phosphorus	160U			
7440-09-7	Potassium	1100			
7440-21-3	Silicon	480			
7440-22-4	Silver	4.8U			

Data Reporting Qualifiers:

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B - Analyte was found in the reagent blank as well as the sample.
J - Indicates an estimated value.
ND - Not detected.
A - Aldol condensation product.
D - Secondary dilution.
E - Exceeds initial calibration range.

Oak Ridge Gaseous Diffusion Plant
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 891122-042 Project: K118 T Customer Sample ID: K1417-13
Customer: G. BUTTERWORTH Requisition Number: 00947
Date Sampled: 21-NOV-1989 Date Sample Received: 22-NOV-1989
Sampled By: WWK Date Sample Completed:
Material Description: SOIL

Activ. Number	Procedure No.	Analysis	Result	Units	Analyst	QA File Number	Date Completed
		Archive	--------				
080103	EPA-3050 (7.5)	Prep (ICP, 7.5)	C		LE COLLINS	10897-56	27-NOV-1989
090207	EPA-6010	Barium (EP-TOX)	<1.0	mg/L	EA HESTER	91210C	10-DEC-1989
	EPA-6010	Cadmium (EP-TOX)	<0.030	mg/L	EA HESTER	91210C	10-DEC-1989
	EPA-6010	Chromium (EP-TOX)	<0.10	mg/L	EA HESTER	91210C	10-DEC-1989
	EPA-6010	Nickel (EP-TOX)	0.71	mg/L	EA HESTER	91210C	10-DEC-1989
	EPA-6010	Silver (EP-TOX)	<0.10	mg/L	EA HESTER	91210C	10-DEC-1989
102007	EPA-7060	Arsenic (EP-TOX)	<0.005	mg/L	NB HAROLD	91127N	28-NOV-1989
	EPA-7421	Lead (EP-TOX)	0.047	mg/L	NB HAROLD	91127O	28-NOV-1989
	EPA-7740	Selenium (EP-TOX)	<0.005	mg/L	NB HAROLD	91127P	28-NOV-1989
103003	EPA 245.5	Mercury	<1.0	ug/g	C. SCHAEFER	11431-104	26-NOV-1989
103007	EPA 7470	Mercury (EP-TOX)	<0.00020	mg/L	C. SCHAEFER	11431-106	27-NOV-1989
0303	TP-170303	EP-TOX Extraction	C		MG BRANSTETTE	X	23-NOV-1989

***** Comments from the Wet Chemistry Laboratory *****

THE EP-TOX EXTRACTION ON THIS SAMPLE USED 500 MLs OF ACID TO ADJUST THE pH TO 5.1; THEREFORE THE FINAL VOLUME WAS 2100 MLs, RATHER THAN 2000 WHICH IS 20 TIMES ITS WEIGHT. THE FIRST 6hrs. THE SAMPLE ONLY USED 10 MLs OF ACID.

Program Manager: CR Kirkpatrick
Date Approved:

Analysis ID: 891122-043
Laboratory: Inductively Coupled Plasma Laboratory
File ID:
Instrument ID:
Authorized By: N. P. Budding III

Customer Sample ID: K1417-14
Customer: G. RUTTERWORTH
Sample Matrix: SOIL
Requisition Number: 00947
Date Sample Received:

28 Element Scan by ICP Spectrometry - Y-12

Date Extracted/Prepared:
Preparation Procedure Number: EPA-3050
Percent Moisture:
Percent Moisture (decanted):
Associated Blank:

Date Analyzed: 27-NOV-1989
Analysis Procedure Number: EPA-6010
Dilution Factor:
Analyst: VF BELT
QA File Number: 91127B

CAS		ug/g	CAS		ug/g
7429-90-5	Aluminum	19000	7440-23-5	Sodium	150
7440-39-3	Barium	56	7440-24-6	Strontium	8.5
7440-41-7	Beryllium	0.67	7440-29-1	Thorium	110U
7440-42-8	Boron	2.2U	7440-32-6	Titanium	130
7440-43-9	Cadmium	1.7	7440-62-2	Vanadium	54
7440-70-2	Calcium	5200	7440-66-6	Zinc	150
7440-47-3	Chromium	31	7440-67-7	Zirconium	13
7440-48-4	Cobalt	12			
7440-50-8	Copper	29			
7439-89-6	Iron	34000			
7439-92-1	Lead	54			
7439-93-2	Lithium	15			
7439-95-4	Magnesium	2100			
7439-96-5	Manganese	930			
7439-98-7	Molybdenum	5.6U			
7440-02-0	Nickel	53			
7440-03-1	Niobium	3.9U			
7723-14-0	Phosphorus	300			
7440-09-7	Potassium	1200			
7440-21-3	Silicon	370			
7440-22-4	Silver	3.3U			

Data Reporting Qualifiers:

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B - Analyte was found in the reagent blank as well as the sample.
J - Indicates an estimated value.
ND - Not detected.
A - Aldol condensation product.
D - Secondary dilution.
E - Exceeds initial calibration range.

Oak Ridge Gaseous Diffusion Plant
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 891122-043 Project: K118 Customer Sample ID: K1417-14
Customer: G. PUTTERWORTH Requisition Number: 00947
Date Sampled: 21-NOV-1989 Date Sample Received: 22-NOV-1989
Sampled By: NUK Date Sample Completed:
Material Description: SOIL

Activ. Number	Procedure No.	Analysis	Result	Units	Analyst	QA File Number	Date Completed
		Archive	--------				
080103	EPA-3050 (7.5)	Prep (ICP, 7.5)	C		LE COLLINS	10897-56	27-NOV-1989
090207	EPA-6010	Barium (EP-TOX)	0.15	mg/L	VF BELT	91127B	27-NOV-1989
	EPA-6010	Cadmium (EP-TOX)	<0.0030	mg/L	VF BELT	91127B	27-NOV-1989
	EPA-6010	Chromium (EP-TOX)	<0.010	mg/L	VF BELT	91127B	27-NOV-1989
	EPA-6010	Nickel (EP-TOX)	<0.050	mg/L	VF BELT	91127B	27-NOV-1989
	EPA-6010	Silver (EP-TOX)	<0.010	mg/L	VF BELT	91127B	27-NOV-1989
102007	EPA-7060	Arsenic (EP-TOX)	<0.005	mg/L	NB HAROLD	91127N	28-NOV-1989
	EPA-7421	Lead (EP-TOX)	0.0054	mg/L	NB HAROLD	91127O	28-NOV-1989
	EPA-7740	Selenium (EP-TOX)	<0.005	mg/L	NB HAROLD	91127P	28-NOV-1989
103003	EPA 245.5	Mercury	<1.0	ug/g	C. SCHAEFER	11431-104	26-NOV-1989
103007	EPA 7470	Mercury (EP-TOX)	<0.00020	mg/L	C. SCHAEFER	11431-106	27-NOV-1989
0303	TP-170303	EP-TOX Extraction	C		MG BRANSTETTE	X	23-NOV-1989

Spike Recovery Data

Analysis	Amount Spiked	Amount Recovered	Percent Recovered
MERCURY	0.10	0.11	108.50
MERCURY (EP-TOX)	0.10	0.081	81.32

Program Manager: CR Kirkpatrick
Date Approved:

MARTIN MARIETTA

MARTIN MARIETTA ENERGY SYSTEMS, INC.

CHAIN OF CUSTODY RECORD

ACD/COC NO.: 00945

ANALYTICAL CHEMISTRY DEPARTMENT

PROJECT NUMBER: K118T

PROJECT NAME: K14~~1F~~ MM K-1417 N.J. Bew 12-13-89

SAMPLERS: (SIGNATURE) Norman W. Kegley

CUSTOMER NUMBER	ACD NUMBER	SAMPLING DATE	SAMPLING TIME	SAMPLE TYPE	NO. OF CONTAINERS	REMARKS
K14~~1F~~-1 MM	K-1417-1	11-20-89		Soil	1	
-2					1	
-3					1	
-4					1	
-5					1	
-6					1	
-7					1	
-8					1	
-9				Sediment Background	1	
-10				Sediment Background	1	
-11				Soil	1	

RELINQUISHED BY: (Signature)	Date	Time	RECEIVED BY: (Signature)	Date	Time	RELINQUISHED BY: (Signature)	Date	Time	RECEIVED BY: (Signature)
Norman W. Kegley	11-20-89	1640	L. K. Barkley	11-20-89	1640				
RELINQUISHED BY: (Signature)	Date	Time	RECEIVED BY: (Signature)	Date	Time	RELINQUISHED BY: (Signature)	Date	Time	RECEIVED BY: (Signature)

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MARTIN MARIETTA

MARTIN MARIETTA ENERGY SYSTEMS, INC.

CHAIN OF CUSTODY RECORD

ANALYTICAL CHEMISTRY DEPARTMENT

ACD/COC NO.: 00947

PROJECT NUMBER: K 1187

PROJECT NAME: K 1414

SAMPLERS: (SIGNATURE) William W. Kegley

CUSTOMER NUMBER	ACD NUMBER	SAMPLING DATE	SAMPLING TIME	SAMPLE TYPE	NO. OF. CONTAINERS								REMARKS
K 1414-12		11-31-89		Soil	1								891122-041
-13					1								-042
-14					1								-043

RELINQUISHED BY: (Signature)	Date	Time	RECEIVED BY: (Signature)	Date	Time	RELINQUISHED BY: (Signature)	Date	Time	RECEIVED BY: (Signature)
William W. Kegley	11-31-89	1505	[illegible]	11/22/89	1005				
RELINQUISHED BY: (Signature)	Date	Time	RECEIVED BY: (Signature)	Date	Time	RELINQUISHED BY: (Signature)	Date	Time	RECEIVED BY. (Signature)

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AS Quist, 2/2/93

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Document number UNNUMBERED/100353 Pages 35

Document title ANALYTICAL RESULTS OF MITCHELL BRANCH SOILS AND SEDIMENT SAMPLES COLLECTED UPSTREAM AND DOWNSTREAM FROM THE K-1417 HAZARDOUS WASTE STORAGE UNIT

Author(s) (indicate other divisions or organizations, if applicable) WR GOLLIHER

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- ☐ Progress Report
- ☐ Informal R&D Report
- ☐ Abstract
- ☐ Drawing
- ☐ Administrative
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