VB/I70 Phase III Sample Results
11/5/2002

Last Name	Property Number[1]	Address Number	Street Prefix	Street	Sample Date	Sample Number	Pb Result (mg/Kg)	As Result (mg/Kg)	Pb EPC (mg/Kg)	As EPC (mg/Kg)
West	NA[2] (4226)	1331	E.	33rd	8/8/02	3-90024-R	223	7	NA	NA
						3-90024-D	211	14		
Edwards	3169	4645		Fillmore	8/1/02	3-90004-R	149	22	146.7	22
						3-90005-R	123	14		
						3-90006-R	168	20		
Daoud	583	3227		Gaylord	8/1/02	3-90007-R	279	241	256.3	241
						3-90008-R	234	120		
						3-90009-R	251	119		
						3-90009-D	256	141		
Parson	857	3545		York	8/8/02	3-90018-R	197	31	191.3	31
						3-90019-R	196	25		
						3-90020-R	181	24		
Hineser	2319	4300		Race	8/2/02	3-90011-R	311	24	319.3	24
						3-90012-R	272	13		
						3-90013-R	375	23		
Aghazarian	1414	3220		Madison	8/2/02	3-90014-R	103	15	103	15
						3-90015-R	109	9		
						3-90016-R	87	15		
						3-90016-D	97	15		
Simons	NA[3] (4141)	3356		Franklin	8/8/02	3-90021-R	84	14	100.7	25
						3-90022-R	85	17		
						3-90023-R	133	25		
Romero	837	3601		York	8/1/02	3-90001-R	217	193	257	340
						3-90002-R	330	340		
						3-90003-R	224	253		

Notes: NA - Not Applicable
[1] Property numbers obtained from Mailing List database (MailingList_.mdb, "tblmailres" table, "intID" field)
[2] Property number not listed. Number listed in parentheses from MailingList_.mdb, "non residential" table, "IP ID" field.
[3] Property number not listed. Number listed in parentheses from MailingList_.mdb, "non residential" table, "IP ID" field.

SDMS Document ID
2007120

MFG, INC.
DATA EVALUATION CHECKLIST

MFG Project No.: **010107x**

Lab: **University of Colorado – Boulder, Colorado**

Lab Sample Numbers: **Not identified**

Matrix/Analytical Methods: **Soil / Metals by WDXRF**

Field Sample Ids: **3-90001-R, 3-90002-R, 3-90003-R, 3-90004-R, 3-90005-R, 3-90006-R, 3-90007-R, 3-90008-R, 3-90009-R, 3-90009-D, 3-90011-R, 3-90012-R, 3-90013-R, 3-90014-R, 3-90015-R, 3-90016-R, 3-90016-D, 3-90018-R, 3-90019-R, 3-90020-R, 3-90021-R, 3-90022-R, 3-90023-R, 3-90024-R, 3-90024-D (Collected between 08/01/02 and 08/08/02)**

		YES	NO
1. Is a Work Plan, SAP, or QAPP available?		Y	
2. Chain of Custody Records:			
Are the COCs present?		Y	
Copies of the COCs were reviewed.			
Are the COCs complete and signed off?		Y	
Were the samples received at or below 4 ± 2°C?	NA		
Information not provided.			
Were all samples on the COCs analyzed?		Y	
Equipment blanks not reported in this samples set.			
Were any problems noted?			N
3. Was a project narrative available from the laboratory?		Y	
Were any problems noted?			N
4. Were all holding times met?		Y	
5. Was the frequency stated in the Work Plan or SAP for field duplicates, equipment rinsate, and trip blanks met?		Y	
6. Were all equipment rinsate blank, trip blank, and method blank results ND?			N
Analytes of interest were not detected at concentrations above the MDL in the equipment rinsate blanks. Lab prep blank results were > MDL. Some field sample results are considered non-detected due to As prep blank results greater than the MDL. Refer to the comments section of this checklist.			
7. Were all matrices, units, and detection limits reported correctly?		Y	
Though not specifically stated, the sample results were reported on a dry weight basis.			

		YES	NO
8. Were all surrogate recoveries within control limits?	NA		
9. Were all LCS spike recoveries within control limits? **LCS recoveries ranged from 89% to 109%. Lab control limits were not reported.**		Y	
10. Were all MS spike recoveries and RPDs within control limits? **Matrix spikes were not reported.**	NA		
11. Were all analytical duplicate RPDs within control limits? **Analytical duplicate RPDs ranged from 1.5% to 17%. Lab control limits were not reported.**		Y	
12. Were all field duplicate RPDs within control limits? **Field duplicate RPDs ranged from 5.5% to 11%.**		Y	
13. Was the project completeness goal met?		Y	

Comments:

Sample Collection and Transfer
Twenty-two soil samples, three field duplicates and three equipment rinsates were collected between August 1 and 8, 2002 and sent to the University of Colorado in Boulder, Colorado for metals analyses. All samples listed on the COC were analyzed; however, the equipment rinsate blanks are not included in this report for soil samples. The sample temperature upon receipt was not reported. All samples were analyzed within the recommended holding time for each method. Sample results are reported on a dry weight basis.

Accuracy
The accuracy of the data was evaluated based on the extraction efficiencies and method blank results.

Extraction efficiencies are based on lab control sample (LCS) recoveries. The laboratory did not report any LCS recoveries as outside the laboratory control limits. Matrix spikes were not reported for the soil samples.

The analytes of interest were not detected in any field blanks at concentrations greater than the method detection limit (MDL). Arsenic was detected in the laboratory blank at a concentration greater than the MDL. The field samples with results greater than five times the blank concentration are considered non-detected due to possible laboratory contamination: 3-900040-R, 3-90005-R, 3-90006-R, 3-90011-R, 3-90012-R, 3-90013-R, 3-90014-R, 3-90015-R, 3-90016-R, 3-90016-D, 3-90018-R, 3-90019-R, 3-90020-R, 3-90021-R, 3-90022-R, 3-90023-R, 3-90024-R AND 3-90024-D.

Precision
The precision was evaluated based on the relative percent difference (RPD) evaluation of the laboratory replicates and the field duplicates. The laboratory did not report any laboratory replicate RPDs as outside laboratory control limits. The field duplicate RPDs were within the project control limits.

Completeness

Analytical results were reported for all soil samples submitted for analysis. The arsenic results for some samples were qualified as non-detected due to laboratory blank contamination. The data is considered usable with the qualifications stated above.

Reviewer: Cathy Shugarts
Date: 11/01/02

LABORATORY RESULTS AND QA/QC DATA

FOR

Vasquez Boulevard & I 70

PHASE III

PREPARED FOR

USEPA REGION VIII and MFG Consulting.

October 19, 2002

1.0 INTRODUCTION

A set of solid soil samples were delivered to LEGS (Laboratory for Environmental and Geological Studies) during the month of August, 2002 by representatives of MFG. Sample homogeneity and representativeness cannot be evaluated by this laboratory and is the responsibility of MFG. All soil samples were analyzed for Pb, and As at the <2 mm size fraction.

1.1 Objective

The goal of this investigation is to obtain necessary data to evaluate the distribution of heavy metals in the selected region of North Denver, Colorado. The Work Plan was designed to achieve this objective by providing high quality data and QA/QC control.

2.0 SAMPLE PREPARATION

Prior to all samples being sent to our laboratory no sample preparation was conducted by MFG representatives. Those procedures conducted by LEGS are outlined below.

2.1 Sample Drying

Air drying was necessary to reduce the soil moisture content to a low level to facilitate subsequent splitting and grinding of the samples. All samples were air dried for a minimum of 8 hours at a

temperature of 28°C. Each sample was placed on a labeled, clean, unused paper plate along with its field label. All plates were covered with a clean paper towel and placed on a drying shelf in a secured area.

2.2 Sample Splitting

Sample splitting was designed to create a comparable sub-sample for WDSXRF analysis. Each sample was divided into equal segments, alternate segments were removed for further sample preparation, while the remaining material was returned to the original sample container.

2.3 Sample Sieving

The SOP required one split be made for WDSXRF analysis; at the <2 mm size fraction. All coarser material was properly disposed of.

2.4 Sample Grinding

Grinding was designed to homogenize the sub-sample and reduce the particle size to approximately 350 mesh. Samples were ground using an automated, agate, motor and pestle. Sample grinding times were maintained at 30 minutes for all samples. After grinding all of the material was transferred to a clean sheet of computer paper and

then to a labeled poly vials.

Between samples each container was carefully cleaned with a nylon brush and Type I water. A sample preparation blank was prepared at a 1 in 25 frequency to monitor any contamination during sample preparation.

3.0 X-RAY FLUORESCENCE ANALYSIS QA/QC

X-ray fluorescence (XRF) analysis was conducted with a Philips spectrometer following the operating procedures specified in the SOP (LEGS, 1993). The Philips utilizes synthetic crystals of known d-spacing and flow-proportional counters to focus and count characteristic x-rays emitted from a sample that has been excited by a Rh x-ray tube.

3.1 XRF Calibration

The XRF instrument was calibrated for the analytes; Pb and As using inter-laboratory and NIST SRM standards. Simple linear regression models were used to relate analyte concentration to analyte ratio value (intensity/reference intensity) As and Pb. Calibration curve "r-squared" values range from 0.95-0.99 (see Table 1.2).

3.2 Analytical Technique

XRF analysis were conducted in batches of 12 samples. Each batch contained 9-10 prepared unknown samples, and/or 3 QA/QC samples. The QA/QC samples consisted of a preparation blank and a SRM standards or calibration check. Acquisition conditions (SOP, LEGS,1993) were optimized to achieve the lowest possible detection limits.

3.2.1 Detection Limits

XRF detection limits can be determined using a number of acceptable procedures. As defined by the workplan IDL and PQL values for lead and arsenic are provided in Table 1.2.

3.2.2 Procedure Blanks

Procedure blanks were prepared every twenty field samples following identical conditions using commercial silica sand. The blank was used to document any contamination that may have occurred during sample preparation. Results of blank analysis are given in Table 1.1.

All blank concentrations fell within SOP requirements.

3.2.3 RPD Validations

RPD checks for both precision (duplicates) and accuracy (NIST Standard) were to be run every 10 samples, ranging from 2-6% for arsenic and 6-11% for lead. Average RPD's on duplicate analysis, range from 2-17% for arsenic and 1-2% for lead, all fall within the SOP limits, Table 1.1.

4.0 FINAL EDSXRF RESULTS

All analyte results from field samples and duplicates are provided in Tables 1.1 as well as on magnetic media. For arsenic (As), 42% of the samples fall below the LOQ (2 times MDL) limits. For lead (Pb), none of the samples fall below of the LOQ limit.

APPENDIX I

Field Log Book

CHAIN-OF-CUSTODY

MFG, Inc.

CHAIN-OF-CUSTODY RECORD AND REQUEST FOR ANALYSIS

COC No. 42765

Arcata Office	✓Boulder Office	Irvine Office	Osburn Office	San Francisco Office	Seattle Office
1165 G Street Suite E	4900 Pearl East Circle	17770 Cartwright Road	PO Box 30	71 Stevenson Street	19203 36th Avenue W
Arcata, CA 95521-5817	Suite 300W	Suite 500	Wallace, ID	Suite 1450	Suite 101
Tel (707) 826-8430	Boulder, CO 80301-6118	Irvine, CA 92614-5850	83873-0030	San Francisco, CA 94105-2941	Lynnwood, WA 98036-5707
Fax (707) 826-8437	Tel (303) 447-1823	Tel (949) 253-2951	Tel. (208) 556-6811	Tel (415) 495-7110	Tel (425) 921-4000
	Fax (303) 447-1836	Fax (949) 253-2954	Fax. (208) 556-7271	Fax (415) 495-7107	Fax. (425) 921-4040

PROJECT NO: 010107x-6 PROJECT NAME: VB/170 PAGE: 1 OF: ____

SAMPLER (Signature): Dave Colvin PROJECT MANAGER: Andy Koutermous DATE: 8/2/02

METHOD OF SHIPMENT: Hand deliver CARRIER/WAYBILL NO: ____ DESTINATION: UC Boulder GeoLab

SAMPLES													ANALYSIS REQUEST								
	Sample			Preservation						Containers			Constituents/Method					Handling			Remarks
Field Sample Identification	DATE	TIME	Matrix*	HCl	HNO_3	H_2SO_4	COLD		FILTRATION*	VOLUME (ml/oz)	TYPE*	NO.	Pb/As-WDXRF					HOLD	RUSH	STANDARD	
3-90001-R	8/2/02		SO								P	1	✓							✓	*Includes sample prep
3-90002-R																					
3-90003-R																					
3-90004-R																					
3-90005-R																					
3-90006-R																					
3-90007-R																					
3-90008-R																					
3-90009-R																					
3-90009-D																					

TOTAL NUMBER OF CONTAINERS 10

LABORATORY COMMENTS/CONDITION OF SAMPLES

Cooler Temp:

RELINQUISHED BY:					RECIEVED BY:		
SIGNATURE	PRINTED NAME	COMPANY	DATE	TIME	SIGNATURE	PRINTED NAME	COMPANY
Dave C. Colvin	Dave Colvin	MFG	8/5/02	1552	[illegible]	Fred Luiszer	C.U.B.
							LABOHATORY

*(1) Matrix AQ aqueous NA nonaqueous SO soil SL sludge P petroleum A air OT other Containers P plastic G glass T tether B brass OT other Filtration F filtered U unfiltered

DISTRIBUTION: PINK Field Copy YELLOW Laboratory Copy WHITE Return to Originator

MFG, Inc.

CHAIN-OF-CUSTODY RECORD AND REQUEST FOR ANALYSIS

COC No. 42766

Arcata Office
1165 G Street, Suite E
Arcata, CA 95521-5817
Tel (707) 826-8430
Fax (707) 826-8437

✓ Boulder Office
4900 Pearl East Circle
Suite 300W
Boulder, CO 80301-6118
Tel (303) 447-1823
Fax (303) 447-1836

Irvine Office
17770 Cartwright Road
Suite 500
Irvine, CA 92614-5850
Tel (949) 253-2951
Fax (949) 253-2954

Osburn Office
PO Box 30
Wallace, ID
83873-0030
Tel (208) 556-6811
Fax (208) 556-7271

San Francisco Office
71 Stevenson Street
Suite 1450
San Francisco, CA 94105-2941
Tel (415) 495-7110
Fax (415) 495-7107

Seattle Office
19203 36th Avenue W
Suite 101
Lynnwood, WA 98036-5707
Tel (425) 921-4000
Fax (425) 921-4040

PROJECT NO: 016107x-6 PROJECT NAME: VB/170 PAGE: 2 OF: ____

SAMPLER (Signature): Dave Colvin PROJECT MANAGER: Andy Koulermous DATE: 8/2/02

METHOD OF SHIPMENT: Hand deliver CARRIER/WAYBILL NO: ____ DESTINATION: UC Boulder Geo Lab

SAMPLES													ANALYSIS REQUEST								
	Sample			Preservation						Containers			Constituents/Method					Handling			Remarks
Field Sample Identification	DATE	TIME	Matrix*	HCl	HNO_3	H_2SO_4	COLD		FILTRATION*	VOLUME (ml/oz)	TYPE*	NO.	Pb/As-WDXRF	Pb/As-ICP/MS				HOLD	RUSH	STANDARD	
3-90011-R	8/2/02		SO								P	1	✓							✓	include Sample prep
3-90012-R																					
3-90013-R																					
3-90014-R																					
3-90015-R																					
3-90016-R																					
3-90016-D																					
3-90010-E	8/1/02		AQ		✓		✓					1		✓							
3-90017-E	8/2/02				✓		✓					1		✓							
																					~~Space not used DC~~
				TOTAL NUMBER OF CONTAINERS								9	LABORATORY COMMENTS/CONDITION OF SAMPLES								Cooler Temp:

RELINQUISHED BY:					RECIEVED BY:		
SIGNATURE	PRINTED NAME	COMPANY	DATE	TIME	SIGNATURE	PRINTED NAME	COMPANY
[signature]	Dave Colvin	MFG, Inc.	8/5/02	1552	[signature]	Fred Luiszer	C.U.B.
							LABORATORY

*KEY Matrix AQ - aqueous NA - nonaqueous SO - soil SL - sludge P - petroleum A - air OT - other Containers P - plastic G - glass T - teflon B - brass OT - other Filtration F - filtered U - unfiltered

DISTRIBUTION: PINK Field Copy YELLOW Laboratory Copy WHITE Return to Originator

MFG, Inc.

CHAIN-OF-CUSTODY RECORD AND REQUEST FOR ANALYSIS

COC No. 42767

Arcata Office: 1165 G Street, Suite E, Arcata, CA 95521-5817, Tel (707) 826-8430, Fax (707) 826-8437

✓ Boulder Office: 4900 Pearl East Circle, Suite 300W, Boulder, CO 80301-6118, Tel (303) 447-1823, Fax (303) 447-1836

Irvine Office: 17770 Cartwright Road, Suite 500, Irvine, CA 92614-5850, Tel (949) 253-2951, Fax (949) 253-2954

Osburn Office: PO Box 30, Wallace, ID 83873-0030, Tel. (208) 556-6811, Fax (208) 556-7271

San Francisco Office: 71 Stevenson Street, Suite 1450, San Francisco, CA 94105-2941, Tel (415) 495-7110, Fax (415) 495-7107

Seattle Office: 19203 36th Avenue W, Suite 101, Lynnwood, WA 98036-5707, Tel: (425) 921-4000, Fax: (425) 921-4040

PROJECT NO: 010107x-7 PROJECT NAME: VB/170 Phase III PAGE: 1 OF: 1

SAMPLER (Signature): David C. Colvin PROJECT MANAGER: Andy Koutermous DATE: 8/8/02

METHOD OF SHIPMENT: Hand Deliver CARRIER/WAYBILL NO: — DESTINATION: UCB

SAMPLES													ANALYSIS REQUEST								
	Sample			Preservation						Containers			Constituents/Method					Handling			Remarks
Field Sample Identification	DATE	TIME	Matrix*	HCl	HNO_3	H_2SO_4	COLD		FILTRATION*	VOLUME (ml/oz)	TYPE*	NO.	Pb/As-WQARF	Pb/As-ICPMS				HOLD	RUSH	STANDARD	
3-90018-R	8/8/02		SO									1	✓							✓	Incl. Sample prep
~~3-90018~~ DC 3-90019-R																					
3-90020-R																					
3-90021-R																					
3-90022-R																					
3-90023-R																					
3-90024-R																					
3-90024-D			✓										✓								✓
3-90025-E		1410	AQ		✓		✓							✓							

TOTAL NUMBER OF CONTAINERS 9

LABORATORY COMMENTS/CONDITION OF SAMPLES

Cooler Temp:

RELINQUISHED BY:					RECIEVED BY:		
SIGNATURE	PRINTED NAME	COMPANY	DATE	TIME	SIGNATURE	PRINTED NAME	COMPANY
David C. Colvin	Dave Colvin	MFG, Inc.	8/13/02	1411	[illegible]	[illegible]	C.U. Boulder
							LABORATORY

*KEY: Matrix AQ - aqueous NA - nonaqueous SO - soil SL - sludge P - petroleum A - air OT - other Containers P - plastic G - glass T - teflon B - brass OT - other Filtration F - filtered U - unfiltered

DISTRIBUTION: PINK Field Copy YELLOW Laboratory Copy WHITE Return to Originator

Table 1.1 VBI-70 Final WDSXRF Results.

	Date Analyzed	As mg/kg	Pb mg/kg
3-90009-R	9/19/2002	119	251
3-90009-D	9/19/2002	141	256
3-90020-R	9/19/2002	24	181
3-90001-R	9/19/2002	193	217
3-90012-R	9/19/2002	13	272
3-90014-R	9/19/2002	15	103
3-90016-D	9/19/2002	15	97
3-90019-R	9/19/2002	25	196
3-90022-R	9/19/2002	17	85
QA/QC			
NIST 2710	9/19/2002	667	5065
Certified Values		626	5532
RPD		6	9
NIST 2711	9/19/2002	108	1089
Certified Values		105	1162
RPD		2	6
Blank-1	9/19/2002	11	8

Table 1.1 VBI-70 Final WDSXRF Results.

	Date Analyzed	As mg/kg	Pb mg/kg
3-90023-R	9/20/2002	25	133
3-90007-R	9/20/2002	241	279
3-90011-R	9/20/2002	24	311
3-90018-R	9/20/2002	31	197
3-90013-R	9/20/2002	23	375
3-90021-R	9/20/2002	14	84
3-90003-R	9/20/2002	253	224
3-90016-R	9/20/2002	15	87
3-90002-R	9/20/2002	340	330
QA/QC			
NIST 2710	9/20/2002	663	4936
Certified Values		626	5532
RPD		6	11
NIST 2711	9/20/2002	114	1069
Certified Values		105	1162
RPD		8	8

Table 1.1 VBI-70 Final WDSXRF Results.

	Date Analyzed	As mg/kg	Pb mg/kg
3-90005-R	9/23/2002	14	123
3-90006-R	9/23/2002	20	168
3-90008-R	9/23/2002	120	234
3-90024-R	9/23/2002	7	223
3-90015-R	9/23/2002	9	109
3-90004-R	9/23/2002	22	149
3-90024-D	9/23/2002	14	211
QA/QC			
3-90016-R-Dup	9/23/2002	15	86
3-90016-R	9/20/2002	15	87
RPD		2	1
3-90002-R-Dup	9/23/2002	303	335
3-90002-R	9/20/2002	340	330
RPD		11	2
NIST 2710	9/23/2002	663	5017
Certified Values		626	5532
RPD		6	10
NIST 2711	9/23/2002	98	1091
Certified Values		105	1162
RPD		7	6

Table 1.2 **WDSXRF Detection Limits and Calibration Curves**

As

	4
	9
	9
	3
	-1
	11
	3
Standard Deviation	4.3
IDL(2*SD)	8.6
PQL(10*SD)	43.1
Calibration Curve	Y=1623.4x^2 + 2072.1x + 0 R2= 0.9988

Pb

	176
	177
	173
	167
	171
	165
	172
Standard Deviation	4.4
IDL(2*SD)	8.8
PQL(10*SD)	43.9
Calibration Curve	Y=115.11x^2 + 1707.1x +0 R2 = 0.9999

VB170 Field Sample Preparation Logbook Sheet

Sample ID	Prep Batch Number	Confirmation Sample	Drying						Sieving			Notes
			Date/Time Drying Begun	Initial Weight	Date/Time Drying Estimated to be Complete	Weight	Date/Time Drying Complete	Final Weight	Date Sieved	Particle Size Fraction		
										Bulk (<2mm)	~~Fine (<250 µm)~~	
3-9003-R			8-14-2	276.6			8-15-2	275.2	8-15-2	148.0		
3-9006-R				301.4				298.4		191.0		
3-9004-R				278.2				278.0		179.6		
3-90016-D				227.8				225.6		54.9		
3-90016-R				268.8				263.4		76.7		
3-90005-R				277.0				249.3		196.2		
3-90002-R				228.4				207.8		127.2		
3-90001-R				251.2				223.5		158.1		
3-90021-R				452.6			8-16-2	425.4		244.1		
3-90020-R				394.5				315.2		240.6		
3-90007-R				390.0				358.8		220.1		
3-90009-R				239.3				210.3		144.5		
3-90011-R				372.9				313.2		274.4		
3-90008-R				375.0				360.0		177.6		
3-90012-R				289.0			9/4/02	274.5	9/4/02	267.1		
3-90013-R				420.2				369.7		401.3		
3-90009-R				161.7				147.1		122.6		
3-90015-R				384.5				358.4		165.9		
3-90014-R				535.6				489.5		261.1		
3-90018-R				437.1				382.1		318.5		
3-90019-R				422.5				385.4		333.4		

VBI70 Field Sample Preparation Logbook Sheet

Sample ID	Prep Batch Number	Confirmation Sample	Drying						Sieving			Notes
			Date/Time Drying Begun	Initial Weight	Date/Time Drying Estimated to be Complete	Weight	Date/Time Drying Complete	Final Weight	Date Sieved	Particle Size Fraction		
										Bulk (<2mm)	Fine (<250 µm)	
3-90024-R				409.1			9/4/02	401.7	9/4/02	93.1		
3-90022-R				426.1			9/4/02	409.9	↓	318.2		
3-90023-R				282.7			↓	258.1	↓	202.6		
3-90024-D				60.3			↓	56.5	↓	41.4		
			8-14-2									