Field Sampling Plan for Expanded Assessment at the Dona Park Neighborhood Site, Up River Road and Dona Drive, Corpus Christi, Nueces County, TX

Prepared for **Texas Commission on Environmental Quality**

May 12, 2011

Contract No.
582-10-91051
Work Order No.
248-0013

Daniel B. Stephens & Associates, Inc.

4030 W. Braker Lane, Suite 325, Austin, Texas 78759

Daniel B. Stephens & Associates, Inc.

Dona Park Neighborhood Field Sampling Plan for the Expanded Assessment

Approval Sheet

As noted by my signature below, I have reviewed the field sampling plan, the Superfund Program Quality Assurance Project Plan (QAPP) Document No. 200919.7, and the applicable contract specifications for this project. I affirm that I understand my responsibility and my authority for implementing these specifications and requirements during this sampling event.

Name (Printed)	Signature	Date
Beronica Lee-Brand Project Manager Daniel B. Stephens & Associates, Inc		May 12, 2011
Douglas W. Reaber Project QA Officer & Technical Lead Daniel B. Stephens & Associates, Inc.		May 12, 2011
John Dupont General Manager DHL Analytical, Inc.		May 12, 2011
Bret Kendrick Project Representative United States Environmental Protection Agency		May 20, 2011
Ann Strahl TCEQ QA Specialist Texas Commission on Environmental Quality		May 19, 2011
Omar Valdez Project Manager Texas Commission on Environmental Quality		May 19, 2011
Craig Watts Field Sampling Leader Texas Commission on Environmental Quality		May 19, 2011

Daniel B. Stephens & Associates, Inc.

Contractor Acknowledgement

I am responsible for the activities specified in the applicable Work Order conducted under this Field Sampling Plan (FSP). I have reviewed this FSP and the *TCEQ Quality Assurance Project Plan* (QAPP) (Document No. 200919.7). I understand this FSP and the QAPP together constitute the Sampling and Analysis Plan (SAP) for the site, and I understand that the terms of the current Assessment Investigation and Remedial Services Contract (AIRS) apply. I understand the project objectives and acknowledge receipt of the SAP.

Veronica Lee-Brand	Daniel B. Stephens & Associates	May 12, 2011
DBS&A Project Manager	Company Name	Date
	Daniel B. Stephens & Associates	May 12, 2011
Contractor Quality Assurance Specialist	Company Name	Date

Laboratory Acknowledgement

I am responsible for the laboratory activities specified in the applicable Work Order conducted under this Field Sampling Plan (FSP). I have reviewed this FSP and the *TCEQ Quality Assurance Project Plan* (QAPP) (Document No. 200919.7). I understand this FSP and the QAPP together constitute the Sampling and Analysis Plan (SAP) for the site, and I understand that the terms of the current Assessment Investigation and Remedial Services Contract (AIRS) apply. I understand the project objectives and acknowledge receipt of the SAP.

	DHL Analytical, Inc.	May 12, 2011
Laboratory Manager	Company Name	Date

Table of Contents

Section ..... Page

1. Introduction 8
   1.1 Purpose 9
   1.2 Project Organization 10
      1.2.1 DBS&A Project Manager: Beronica Lee-Brand 10
      1.2.2 DBS&A Project QA Officer and Technical Lead: Doug Reaber 10
      1.2.3 DBS&A Health and Safety Officer: Bill Casadevall 11
      1.2.4 TCEQ Project Manager: Omar Valdez 11
      1.2.5 TCEQ Project Quality Assurance Specialist: Steven Childress/ Ann Strahl 11
      1.2.6 TCEQ Field Sampling Leader: Craig Watts 11

2. Site and Project Summary 15
   2.1 Site Description 15
   2.2 Previous Investigations 15
   2.3 Chemicals of Concern (COCs) 16
   2.4 Summary of the Conceptual Site Model 18
   2.5 Schedule of Activities 19
      2.5.1 Health and Safety 19
   2.6 Special Training and Certification 20
      2.6.1 Health and Safety Training 20
      2.6.2 XRF Certification 21

3. Data Quality Objectives and Analytical Requirements 22
   3.1 Data Quality Objectives 22
   3.2 Laboratory Methods 24
      3.2.1 Laboratory Level of Required Performance (LORP) 24
   3.3 Field Portable X-Ray Fluorescence Analysis (XRF) 24
      3.3.1 XRF Level of Required Performance (LORP) 24

4. Sampling Plan Design 26
   4.1 Sample Locations 27
   4.2 Sample Collection and Compositing 31
   4.3 Sample Identification 32
   4.4 Sample Analyses 32
   4.5 Laboratory Field Quality Control Samples 33
   4.6 XRF Sample Analysis 33
   4.7 XRF Quality Control Procedures 34

5. Sample Handling 36
   5.1 Sample Containers, Sample Preservation, and Holding Time 36
   5.2 Chain-of-Custody Procedures 36

6. Property Access 38

7. Additional Field Activities 39
7.1 Sample Collection Documentation 39
7.2 Decontamination 40
7.3 Investigation Derived Waste 40
7.4 Site Restoration 41
7.5 Health and Safety Plan 41
7.6 Deviations, Modifications, and/or Departures from the FSP or QAPP 41

8. Exceptions, Additions, and Changes to the TCEQ QAPP 42

References 44

List of Figures

Figure **Page**

Figure 1. Project Organization Chart 13

Figure 2. Site Location 14

Figure 3. Lots Analyzed by Methods 7471B and 6200 28

Figure 4. Lots Analyzed by Method 6200 and 6020A 30

List of Tables

Table **Page**

Table 1: SW-846 Method 6200 for Soil 17

Table 2: SW-846 Method 6020A for Soil – Metals 18

Table 3: SW-846 Method 7471B for Soil – Mercury 18

Table 4. Data Quality Objectives 23

Table 5. Sample Collection and Analysis Quantities 26

Table 6. Lots North of Gale Street 27

Table 7. Lots South of Gale Street 29

Table 8. Field Quality Control Samples 33

Table 9. Summary of QC Procedures for Field Portable XRF by Method 6200 35

Table 10. Containers, Sample Volumes, Preservation Techniques, and Holding Times 36

Table 11. TCEQ Standard Operating Procedures (SOPs) Checklist 43

List of Appendices

Appendix

A TCEQ Superfund Program Standard Operating Procedures (SOPs)

B Pilot Study Letter Report

C XRF Certification Documentation

D EPA Method 6200

E DHL NELAP Certification and Fields of Accreditation

F Sample Collection Procedures

G XRF SOP

H Sample Tracking Log

1. Introduction

At the direction of the Texas Commission on Environmental Quality (TCEQ), Daniel B. Stephens & Associates, Inc. (DBS&A) has prepared this Field Sampling Plan (FSP) for the Expanded Assessment at Dona Park Neighborhood (neighborhood) in Corpus Christi, Nueces County, Texas. This Expanded Assessment will include residences that were not evaluated during the 2010 Pilot Study Phase of the Dona Park Neighborhood Assessment (DPNA). The neighborhood is located due south of the former American Smelting and Refining Company (ASARCO) zinc smelter, in Corpus Christi, Nueces County, Texas (the facility). Since 1994, a number of investigations and soil removal activities have been performed in this neighborhood. Due to the proximity of the neighborhood to the former zinc smelter, both residents and Citizens for Environmental Justice (CFEJ) have raised concerns over the adequacy of previous investigations and soil removal activities implemented to assess and mitigate risks associated with the operation of the smelter. Based on the work performed to date, lead, cadmium, mercury, and zinc are the contaminants of concern.

The Sampling and Analysis Plan (SAP) for this Expanded Assessment consists of this site-specific FSP, applicable *TCEQ Standard Operating Procedures* (TCEQ SOPs) included in this FSP (Appendix A), and the *TCEQ Quality Assurance Project Plan* (QAPP) (Document No. 200919.7, TCEQ 2010), as revised or amended by Section 8 of this FSP. This project will use a National Environmental Laboratory Accreditation Program (NELAP) laboratory accredited under the Texas Laboratory Accreditation Program for the analysis of all samples. The laboratory will be in compliance with the National Environmental Laboratory Accreditation Conference (NELAC) standards and certified for the methods, matrices, and analytes specific to this sampling event.

DBS&A will implement the tasks described in this FSP on behalf of the TCEQ under the current Assessment Investigation and Remedial Services Contract (AIRS).

This FSP presents the requirements and procedures for conducting field operations and other data collection efforts. This FSP has been prepared to ensure that the data quality objectives for the field and laboratory are satisfied, the field sampling methods are implemented in an

appropriate manner, and the data collected are scientifically valid and defensible. This field event will use the Health and Safety Plan (HASP) (DBS&A, 2010) that was prepared for the 2010 Pilot Study to insure the safety of all field personnel during field implementation of this FSP. The FSP draws on knowledge gained during the performance of the Pilot Study at the site and includes a significant amount of discussion and procedures that was included in the FSP that was prepared for the Pilot Study (TCEQ, 2010a). Specifically, information gained regarding the proper composite sample size and resultant correlation between fixed laboratory data and field X-Ray Fluorescence (XRF) measurements is provided as Appendix B of this FSP.

This FSP is required reading for all DBS&A staff, subcontractors, and TCEQ staff participating in the work effort. This FSP will be in the possession of the field teams collecting the samples. All involved contractors, subcontractors, and TCEQ staff will have access to this FSP and are required to comply with the procedures documented herein.

To ensure that the current approved version of this FSP is being used, the DBS&A Project Manager (PM) and TCEQ PM will be responsible for distributing the approved FSP and any revisions and/or addenda to the personnel involved in the project in their respective organizations and to subcontractors.

1.1 Purpose

This FSP describes the methods and objectives of the Expanded Assessment which will collect composite soil samples from each Study Unit (i.e. front or back yard) and analyze them using a field portable x-ray fluorescence (XRF) spectrometer in conjunction with confirmation laboratory analysis to determine the concentrations of Target Chemicals of Concern (COCs) in residential soils. The objectives of the Expanded Assessment are:

- determine the concentrations of the target chemicals of concern (COCs) in each Study Unit,
- compare concentrations of the COCs to established site XRF action levels for cadmium, lead, and zinc developed during the Pilot Study,

- compare concentrations of mercury to Texas Risk Reduction Program (TRRP) Tier 1 total soil combined 0.5 acre source Protective Concentration Limits (PCLs) for surface soils, and

- identify Study Units with concentrations of COCs exceeding the applicable action levels or PCL.

1.2 Project Organization

The project organization chart is shown in Figure 1 and the roles and responsibilities of the project team are described in the following subsections.

1.2.1 DBS&A Project Manager: Beronica Lee-Brand

The DBS&A PM will be the primary point of contact between DBS&A and the TCEQ. The DBS&A PM will be responsible for work execution and overall project performance, cost tracking, coordination of invoicing, and other project management issues. The PM will secure signatures from the subcontracted laboratory documenting that the laboratory has reviewed the analytical specifications of the SAP and can meet the analytical project objectives; perform and review work (including work performed by subcontracted laboratories and all other subcontractors) to ensure the work meets the requirements of the contract, work order and SAP; and oversee and communicate with subcontractors. In addition, the DBS&A PM will be responsible for the review and final preparation of plans and reports and for the submittal of documents to the TCEQ.

1.2.2 DBS&A Project QA Officer and Technical Lead: Doug Reaber

The DBS&A Project QA Officer and Technical Lead will provide overall data management and QA for the project including: coordinating data quality objective (DQO) development, document review, document control, input of sample data into verification sampling reports, and other document quality control activities. The DBS&A Project QA Officer will directly support the DBS&A PM and will support preparation of the FSP. The DBS&A Project QA Officer will also verify compliance with requirements of the QAPP.

1.2.3 DBS&A Health and Safety Officer: Bill Casadevall

The DBS&A Health and Safety Officer (HSO) will be responsible for adherence by DBS&A personnel to DBS&A's site-specific health and safety plan (HASP). The DBS&A HSO will verify project compliance with all applicable local, state, and federal laws and regulations regarding worker health and safety. The DBS&A HSO will provide periodic health and safety monitoring and conduct site safety audits as requested.

1.2.4 TCEQ Project Manager: Omar Valdez

The TCEQ PM is Omar Valdez who has oversight responsibility for all aspects of the project including: direction of DBS&A, technical review of work products, issues affecting data quality, and all contractual aspects of the project. All communication between DBS&A and the TCEQ should be made through the TCEQ PM, except as directed otherwise by the TCEQ PM. Additionally, the TCEQ PM is responsible for communication and coordination with the public, other governmental entities, and interested parties, as necessary.

1.2.5 TCEQ Project Quality Assurance Specialist: Steven Childress/ Ann Strahl

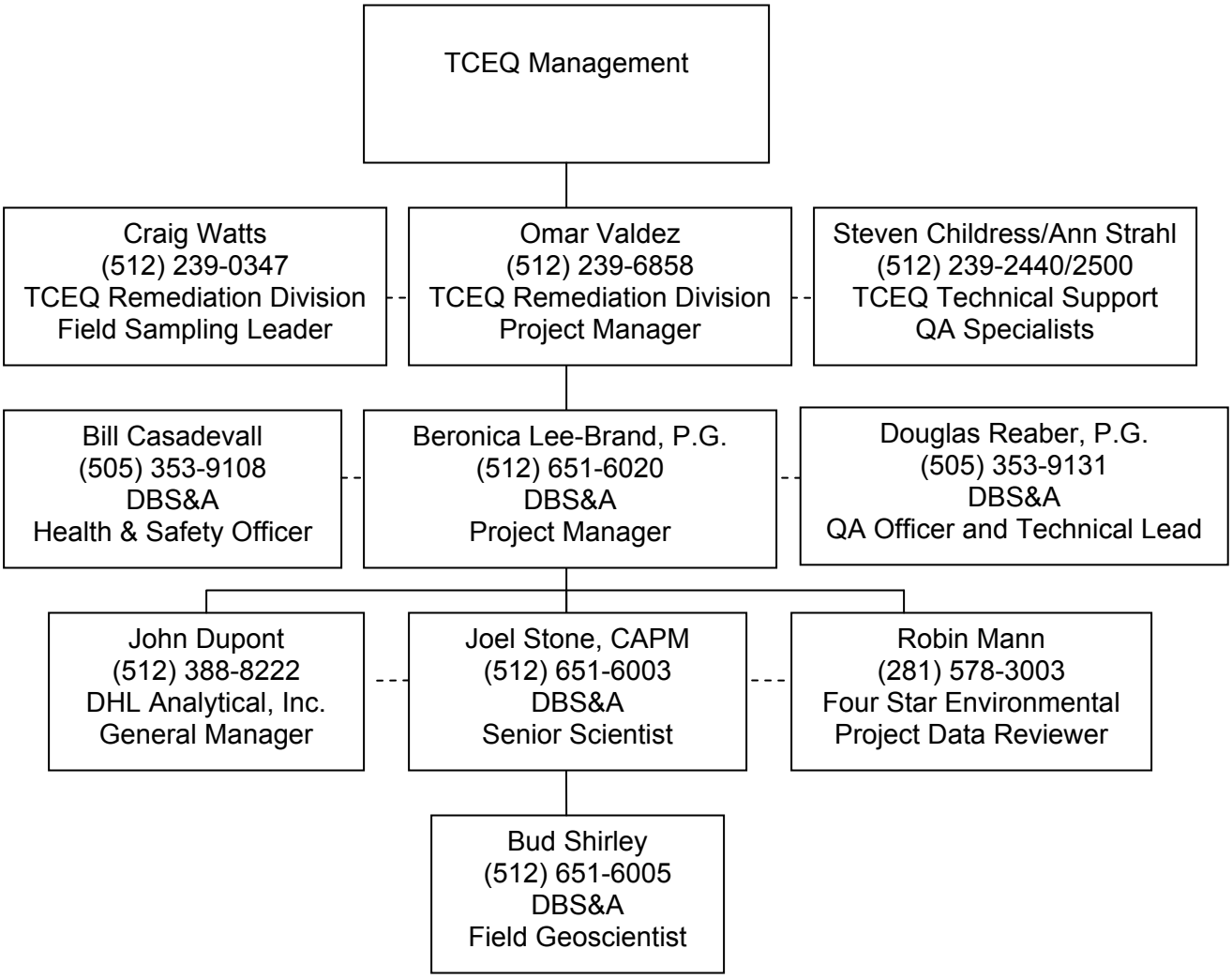
The TCEQ Project QA Specialist serves the TCEQ PM as a technical resource on analytical chemistry and quality assurance/quality control (QA/QC) issues. The responsibilities of the TCEQ Superfund Project QA Specialist are addressed in the QAPP and in the TCEQ Quality Management Plan. The TCEQ Project QA Specialist will be available to assist the TCEQ PM in the resolution of any problems.

1.2.6 TCEQ Field Sampling Leader: Craig Watts

The TCEQ Field Sampling Leader is Craig Watts who is responsible for communicating and coordinating with residents whose yards are being sampled, documenting field activities in the TCEQ field log book, determining and documenting sample locations, overseeing all aspects of DBS&A field work, taking photographs, collecting Global Positioning System (GPS) points, and conducting other activities described in this FSP. Additionally, the Field Sampling Leader is

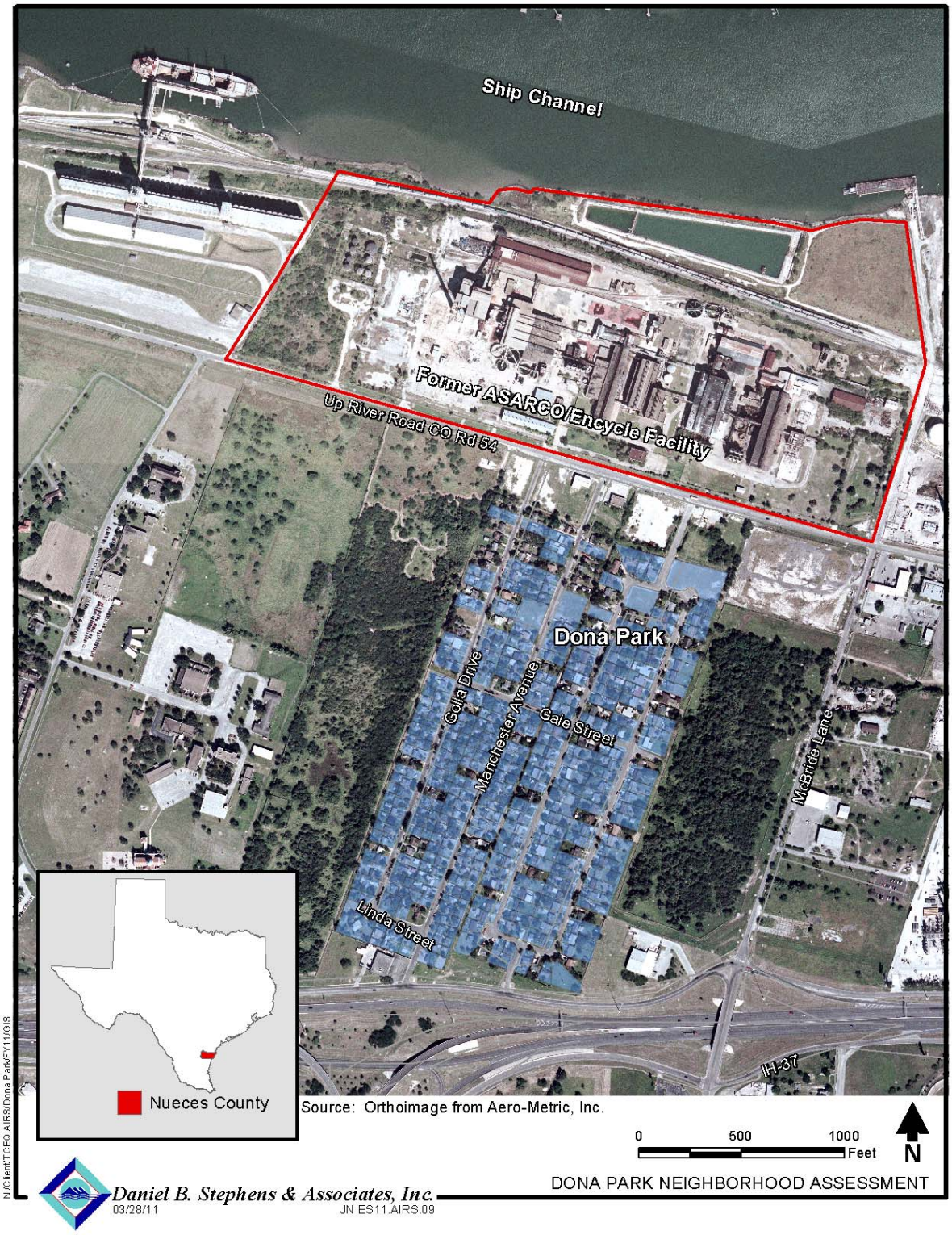
responsible for ensuring overall adherence to the applicable contract, work order, and SAP and communicating project status and progress to the TCEQ PM from the field.

Figure 1. Project Organization Chart



Daniel B. Stephens & Associates, Inc.

Figure 2. Site Location



2. Site and Project Summary

2.1 Site Description

The Dona Park Neighborhood Site (the Site) is immediately south of the former ASARCO/Encycle facility and includes 230 residences and 7 vacant lots and is located north of Interstate 37 and south of Up River Road along Manchester Avenue, Golla Drive, Dona Drive, and Vernon Drive (Figure 2). The residential properties (lots) comprising the Site are divided into front yards and back yards, each of which will be described as a Study Unit. The closest Study Unit to the ASARCO smelter stack (the stack) is located approximately 950 feet south of the stack.

2.2 Previous Investigations

The Site has been the subject of a number of investigations and soil removal actions since 1994. Despite the multiple assessments and removal actions performed in Dona Park in the past, community concerns over the adequacy of previous investigations and soil removal activities persisted, prompting the DPNA. A Pilot Study of 58 residential lots and 1 vacant lot, most of which were selected by the community was conducted in November and early December 2010. The objectives of the Pilot Study were to identify Study Units (i.e., front yards and back yards) with concentrations of COCs exceeding the applicable action levels, or PCLs, to test the accuracy and reliability of a field XRF as a viable tool for future assessment activities and to determine the adequate sample size and the appropriate sampling depth to ensure samples were representative of site conditions. The Pilot Study consisted of two phases of field sampling activities, Phase I and Phase II (TCEQ, 2010a).

Phase I of the Pilot Study focused on identifying the optimal depth interval for Phase II sample collection. Phase I focused on lots with the highest historical lead or cadmium concentrations and which were never remediated. Surface soil samples were collected at six one inch depth intervals from 0 to 6 inches below ground surface (bgs). Phase I results determined that lead and cadmium concentrations were highest in the 0 to 1 inch interval and that concentrations

generally decreased with depth; therefore, it was determined the 0-1 inch interval was the optimal depth for sampling.

Phase II field activities of the Pilot Study focused on identifying the optimal sample pattern and number of samples needed from a Study Unit to determine the representative metal concentrations in the Study Unit. In addition, field measurements collected with a field portable XRF spectrometer were compared to laboratory analysis results to establish a correlation between the two methods. A statistically significant correlation between XRF and laboratory results was identified for ex-situ composite samples indicating that XRF was suitable for measuring Site COCs and could be used as a remedial action decision tool. It was also determined that a 10 point random sample pattern produces representative data and that soil moisture did not have a significant effect on ex-situ XRF measurements. The letter report discussing the Phase II results including the correlation plots is provided in Appendix B of this FSP. Site-specific XRF field action levels have been established for the Expanded Assessment for lead, zinc, and cadmium; these levels are presented in Section 2.3 and discussed further in Section 3.

2.3 Chemicals of Concern (COCs)

Based on previous investigations and process knowledge of the facility, lead, cadmium, mercury, and zinc are the target COCs for the Pilot Study. Table 1 lists the analytes that will be analyzed during the Expanded Assessment using EPA Method 6200 for XRF. Tables 2 and 3 list the analytes that will be analyzed by EPA laboratory analytical Methods 6020A and 7471B, respectively. Data Quality Objectives (DQOs) and sample analyses are discussed in Section 3. The COCs known or suspected to be associated with current or former activities at the site are Target COCs and are indicated with an “X” in the tables.

The Texas Risk Reduction Program (TRRP) Rule, Title 30 Texas Administrative Code (TAC) Chapter 350, establishes protective concentration levels (PCLs) for numerous chemicals, including lead, cadmium, zinc, and mercury. These PCLs are derived through risk assessment procedures and will be used as the Action Levels for determining if further evaluation of a Study Unit is warranted. The TRRP residential 0.5 acre Tier 1 total soil combined ($^{Tot}Soil_{Comb}$) PCLs for

lead, cadmium, zinc, and mercury are 500 mg/kg, 52, mg/kg, 9,900 mg/kg, and 3.6 mg/kg, respectively. After examination of the Pilot Study results, more conservative XRF action levels analysis have been established for lead (480 mg/kg) and zinc (7000 mg/kg). A more conservative Action Level of 50 mg/kg for cadmium was previously established by TCEQ toxicologists during previous assessments. The TRRP Tier 1 $^{Tot}Soil_{Comb}$ PCL of 3.6 mg/kg is the Action Level for mercury. All mercury samples will be analyzed at a laboratory since the XRF detection limit for mercury, 10 parts per million (ppm), is higher than the Action Level for mercury. The limit of detection describes the ability of the XRF analyzer to positively affirm the absence or presence of analyte(s) in a sample and is expressed as 1.5 times the reported measurement error. In lieu of an analyte concentration reported, the symbol “<LOD” is displayed and an error value provided.

Table 1: SW-846 Method 6200 for Soil

Target COC	Analyte	CAS No.	XRF LOD (ppm)	Dona Park XRF Action Levels (ppm)
☒	Lead (inorganic)	7439-92-1	20	**480**
☒	Cadmium	7440-43-9	25	**50**
☒	Zinc	7440-66-6	50	**7000**

LOD = Level of Detection

Table 2: SW-846 Method 6020A for Soil – Metals

Target COC	Analyte	CAS No.	**Dona Park Action Levels (mg/kg)**	TRRP Residential PCL 0.5 Acre Source $^{Tot}Soil_{Comb}$ (mg/kg)	Lab MQL (mg/kg)	Is Lab MQL ≤ LORP? (Y/N)
☐	Aluminum	7429-90-5	**65000**	65000	12.5	Y
☐	Antimony	7440-36-0	**15**	15	1	Y
☐	Arsenic	7440-38-2	**24**	24	1	Y
☐	Barium	7440-39-3	**8000**	8000	2	Y
☐	Beryllium	7440-41-7	**38**	38	0.3	Y
☒	Cadmium	7440-43-9	**50**	52	0.3	Y
☐	Chromium	7440-47-3	**33000**	33000	2	Y
☐	Cobalt	7440-48-4	**21**	21	2	Y
☐	Copper	7440-50-8	**550**	550	2	Y
☒	Lead	7439-92-1	**500**	500	0.3	Y
☐	Manganese	7439-96-5	**3700**	3700	2	Y
☐	Nickel	7440-2-0	**840**	840	2	Y
☐	Selenium	7782-49-2	**310**	310	0.5	Y
☐	Silver	7440-22-4	**96**	96	0.2	Y
☐	Thallium	7791-12-0	**6.3**	6.3	1	Y
☒	Zinc	7440-66-6	**9900**	9900	2.5	Y

QAPP = Quality Assurance Project Plan for the Superfund Program: Document Number (200919.7)
TRRP PCL = Texas Risk Reduction Program Protective Concentration Limit (last revised March 31, 2010)
MQL = Method quantitation limit
LORP = Level of required performance (denoted by bold font)

Table 3: SW-846 Method 7471B for Soil – Mercury

Target COC	Analyte	CAS No.	TRRP Residential PCL 0.5 Acre Source $^{Tot}Soil_{Comb}$ (mg/kg)	Lab MQL (mg/kg)	Is Lab MQL ≤ LORP? (Y/N)
☒	Mercury	7439-97-6	**3.6**	0.04	Y

QAPP = Quality Assurance Project Plan for the Superfund Program: Document Number (200919.7)
TRRP PCL = Texas Risk Reduction Program Protective Concentration Limit (last revised March 31, 2010)
MQL = Method quantitation limit
LORP = Level of required performance (denoted by bold font)

2.4 Summary of the Conceptual Site Model

The stack used during the ASARCO smelter operation is considered the source of possible elevated concentrations of lead, cadmium, mercury, and zinc in soils via aerial transport and deposition onto residential soils. Sample data, recently collected from wastes inside the stack, have confirmed that the stack is the source of the COCs observed in residential yards.

Soils located near roadways can exhibit higher concentrations of lead due to the extensive use of leaded gasoline prior to 1975. Additionally, lead paint used on older homes is known to flake off and potentially contribute to the lead concentrations in nearby soils. For these reasons, collection of soil samples from areas near roadways and driveways, house drip-lines, and other potential sources of lead paint or automobile emissions will be avoided to the extent practical during this Expanded Assessment.

The Pilot Study demonstrated that lead, cadmium, zinc, and mercury concentrations are highest within the top few inches of soil. The human health risk models (TDH, 1996) used to determine protective limits assume that human exposure generally occurs at the surface where soils are more readily contacted than at depth. Therefore, the discrete sampling depth of 0 to 1 inch interval at which this sampling event will be executed is both representative and conservative.

2.5 Schedule of Activities

The Expanded Assessment will consist of a field sample collection event and an in-office XRF analysis of the samples collected. DBS&A and TCEQ personnel will mobilize to the Dona Park Site the week of May 23, 2011 to implement the field activities. This event will focus on sample collection at 230 residential lots (consisting of 2 Study Units each, i.e., front yards and back yards) and 7 vacant lots (consisting of 1 Study Unit each). It is expected that the sample collection event will take approximately 3 weeks to complete. Sample preparation for the XRF analysis will start a week after sample collection begins and XRF analysis will begin at the completion of the sample collection. The in-office XRF analysis is expected to last 1 week.

2.5.1 Health and Safety

2.5.1.1 Field

Each day during the field sampling event, the Health and Safety Officer (HSO) will conduct a safety briefing which will review the following:

- potential hazards;
- routes of egress from potentially contaminated areas and the site in general;

- routes to the hospital;
- telephone numbers for TCEQ managers, local emergency workers, and other local contacts; and
- emergency assignments and procedures.

Following the safety briefing, DBS&A and the TCEQ will discuss the following in preparation for the day's activities:

- team roles, responsibilities, and assignments;
- sample locations and sampling procedures;
- decontamination procedures;
- QA/QC activities; and
- the schedule for the day.

2.5.1.2 Offsite XRF Sample Analysis

DBS&A will adhere to the XRF safety requirements during sample analysis.

2.6 Special Training and Certification

2.6.1 Health and Safety Training

All personnel will have current records of having received the necessary training required by the Occupational Safety and Health Administration (OSHA) for workers at potentially hazardous waste sites [29 CFR 1910.120(e)], including 40 hours of formal instruction, and a minimum of 3 days of field experience under the supervision of a trained and experienced worker. Personnel will also have current records of the completion of the subsequent 8-hour OSHA refresher training course. All site personnel must be properly trained in their assigned duties, including standard safety procedures. All site personnel and visitors entering the work zone will be familiar with the contents of the site HASP and will sign the acceptance form included in the HASP.

2.6.2 XRF Certification

Only DBS&A personnel who are certified in XRF operation and who have completed the Radiation Safety Course provided by Niton will operate the XRF units for this project. Certificates of Niton-trained DBS&A personnel are provided in Appendix C.

3. Data Quality Objectives and Analytical Requirements

The Expanded Assessment analyses will include data obtained through laboratory analyses and field portable XRF unit measurements. In accordance with the standard practice of the TCEQ, the most recent updated versions of EPA methods from SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods will be used for mercury and confirmation sample analyses. Requirements for the laboratory analytical methods are briefly described in the QAPP and the site-specific exceptions, additions, or changes to the requirements of the QAPP are described in Section 8 of this FSP.

The test method for the field portable XRF that will be used to analyze lead, cadmium, and zinc concentrations in soils is EPA Method 6200 which is provided in Appendix D. Requirements for the XRF are described in the method.

A principle objective of the Expanded Assessment is to correctly determine if concentrations of lead, cadmium, zinc, and mercury in each Study Unit (front or back yard) are above or below the Action Levels described in Tables 1 through 3 of Section 2. Study Units with concentrations exceeding the Action Levels of one or more COC will require remedial activities or additional assessment; as this sampling approach has been determined to be both representative and accurate in the Pilot Study, Study Units with concentrations for all COCs below the Action Levels will require no further evaluation.

3.1 Data Quality Objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements that translate non-technical project goals into technical project-specific decision goals (Table 4). The sampling design and approach, developed with community input, is the appropriate data collection scheme that generates the data required for the Expanded Assessment and the data to use in determining whether remedial action is required.

Table 4. Data Quality Objectives

Step 1: State the Problem
• Surface soils at the DPNA Site are possibly affected with elevated concentrations of lead (Pb), cadmium (Cd), zinc (Zn), and mercury (Hg) as a result of historic smelter operations.
Step 2: Identify the Goals of the Study
• Complete an Expanded Assessment for Study Units (SUs) (defined as the front or back yards of each un-sampled house) that were not assessed during the DPNA Pilot Study. • Sample 155 SUs north of Gale Street to determine if mercury concentrations in the surface soils of residences closest to the former ASARCO zinc smelter exceed Action Levels. • Sample 468 SUs within the DPNA site to determine if Pb, Cd, and Zn concentrations in the surface soils exceed Action Levels.
Step 3: Identify Information Inputs
• 10-point composite surface soil samples will be collected from SUs north of Gale Street and analyzed for Hg by EPA Method 7471B. • 10-point composite surface soil samples will be collected from SUs that were not sampled during the Pilot Study and analyzed for lead, cadmium, and zinc using EPA Method 6200 for XRF. • 10% of the XRF samples will be designated as confirmation samples and will be analyzed by EPA Method 6020A.
Step 4: Define Study Boundaries
• The DPNA Site is defined as the area south of Up River Road, north of Interstate 37, developed along Manchester Avenue to the west and Vernon Drive to the east (Figure 1). The neighborhood is located between undeveloped properties (easements).
Step 5: Develop the Analytic Approach
• If COC concentrations in surface soil samples are above the designated Action Levels, a removal action may be proposed as a remedy. Additional assessment may be required.
Step 6: Specify Performance or Acceptance Criteria
• Soil sample analytical results analyzed for Hg will be compared to the Action Level of 3.6 mg/kg which is the TRRP Tier 1 $^{Tot}Soil_{Com}$ PCL for a 0.5-acre source. • Soil sample XRF results for Pb, Cd, and Zn will be compared to site-specific Action Levels of 480, 50, and 7000 mg/kg, respectively. • Soil samples with measured Cd concentrations in excess of 25 ppm will be submitted to a fixed laboratory for verification. • Quality control (QC) samples will be collected during the sampling in accordance with the specifications listed and the frequency specified in the *Quality Assurance Project Plan for the Superfund Program Document No. 7 (TCEQ 2010).* • Mercury analytical results will be compared to the laboratory levels of required performance for EPA Method 7471B.
Step 7: Develop the Detailed Plan for Obtaining Data
• All field and on-site XRF activities will be performed in accordance with TCEQ SOPs and project SOPs. • 10-point composite samples will be collected from each SU that was not previously evaluated • Soil samples from north of Gale Street will be submitted to a fixed laboratory for Hg as well as analyzed for Pb, Cd, and Zn via XRF. • Soil samples south of Gale Street will be analyzed for Pb, Cd, and Zn via XRF.

3.2 Laboratory Methods

Lead, cadmium, and zinc will be analyzed using EPA SW-846 6020A for metals in soil by inductively coupled plasma-mass spectrometry. Mercury will be analyzed using SW-846 Method 7471B for mercury in soil by cold-vapor atomic absorption. DHL Analytical Inc. (DHL), a recognized TCEQ National Environmental Laboratory Accreditation Program (NELAP) laboratory will be utilized for all laboratory sample analyses. The DHL NELAP certificate and fields of accreditation are provided in Appendix E.

3.2.1 Laboratory Level of Required Performance (LORP)

The Level of Required Performance (LORP) is the concentration around which the laboratory shall demonstrate the method can quantify analytical responses. The laboratory method quantitation limit (MQL) will be less than the LORP or the laboratory will advise DBS&A that the laboratory cannot meet the LORP. The selected laboratory for this project has shown through previous work at the DPNA Site that the MQLs for both Method 6020A and 7471B can be met and has confirmed the MQLs do not exceed the LORPs for lead, cadmium, zinc and mercury.

3.3 Field Portable X-Ray Fluorescence Analysis (XRF)

Composite soil samples collected under this FSP will be analyzed by SW-846 Method 6200 in conjunction with confirmatory laboratory analytical methods. Method 6200 is provided in Appendix D. Method 6200 is provided as a guide but a project-specific standard operating procedure (SOP) has been developed for the DPNA Site which includes sample collection, sample preparation, sample analysis and quality control performance procedures.

3.3.1 XRF Level of Required Performance (LORP)

The field portable XRF will be utilized to analyze metal concentrations of lead, cadmium, and zinc in soils. The XRF limit of detection describes the ability of the XRF analyzer to positively affirm the absence or presence of analyte(s) in a sample and is expressed as 1.5 times the reported measurement error. In lieu of an analyte concentration reported for nondetected

results, the symbol “<LOD” is displayed and an error value provided. The lower limits of detection using this method were proven sufficient during the Pilot Study; the cadmium limit of detection was determined to be around 15 ppm. During this Expanded Assessment, cadmium concentrations measured by the XRF at 25 ppm or lower will automatically be sent for laboratory analysis due to the narrow range between the cadmium Action Level and the XRF limit of detection. An evaluation of the correlation between the field analytical results and the confirmatory laboratory analytical results will be conducted following the receipt of all data.

4. Sampling Plan Design

The Expanded Assessment will include sampling of 468 Study Units (230 residential lots and 8 vacant lots) and two phases of work including a field sample collection event and an in-office XRF analysis utilizing Method 6200 and laboratory confirmation samples with Method 6020A (Figure 3). The assessment will also include additional laboratory analysis for mercury, using Method 7471B, on the Study Units located North of Gale Street (Figure 4). Table 5 provides an overview of the number of samples that will be collected and analyzed for this project. Quality assurance sample quantities are provided here as an estimate for planning purposes and will be discussed further in Section 4.4. Sample locations and sample analyses are discussed in the following subsection.

Table 5. Sample Collection and Analysis Quantities

Location	Primary Samples Collected for Method 6200 (Pb, Cd, and Zn)	Primary Samples Collected for Method 7471 (Hg)	Cadmium Samples with XRF Results > 25 ppm Method 6020A	XRF Confirmation Samples Method 6020A (Pb, Cd, and Zn)	Duplicates for Study Units North of Gale Method 7471B (Hg)	Duplicates for Method 6020A (Pb, Cd, and Zn)
Study Units on Residential Lots North of Gale	148	148	Estimated to be less than half of the total samples collected.	A minimum of 10% of XRF samples will be submitted for confirmation laboratory analysis by Method 6020A.	1 Per 10 Samples	1 Per 10 Samples
Study Units on Vacant Lots North of Gale	7	7				
Study Units on Residential Lots South of Gale	312	0				
Study Units on Vacant Lots South of Gale	1	0				
Estimated Totals	468	155	234*	47	15	24

Note: *Samples that are submitted to the laboratory for low level cadmium concentrations (<25 ppm) will be counted as part of the 10% lab confirmation samples.

4.1 Sample Locations

Each Study Unit (front yard, back yard, or vacant lot) sample will be a 10-point composite sample. The 10-point composite samples will be collected in a random pattern from the 0 to 1 inch depth interval. The random pattern will be flagged throughout a Study Unit to ensure good coverage and will be flagged prior to sampling. Tables 6 and 7 are comprehensive lists of the lots to be sampled under this FSP. Table 6 provides a list of the lot addresses north of Gale Street where samples will be collected and analyzed for mercury using laboratory analysis Method 7471B and for cadmium, lead, and zinc using XRF Method 6200 with confirmation laboratory analysis using Method 6020A (Figure 3). Table 7 provides a list of the lot addresses south of Gale Street where samples will be analyzed for cadmium, lead, and zinc using XRF Method 6200 with confirmation laboratory analysis using Method 6020A. Sample identification protocol is described in Section 5.0

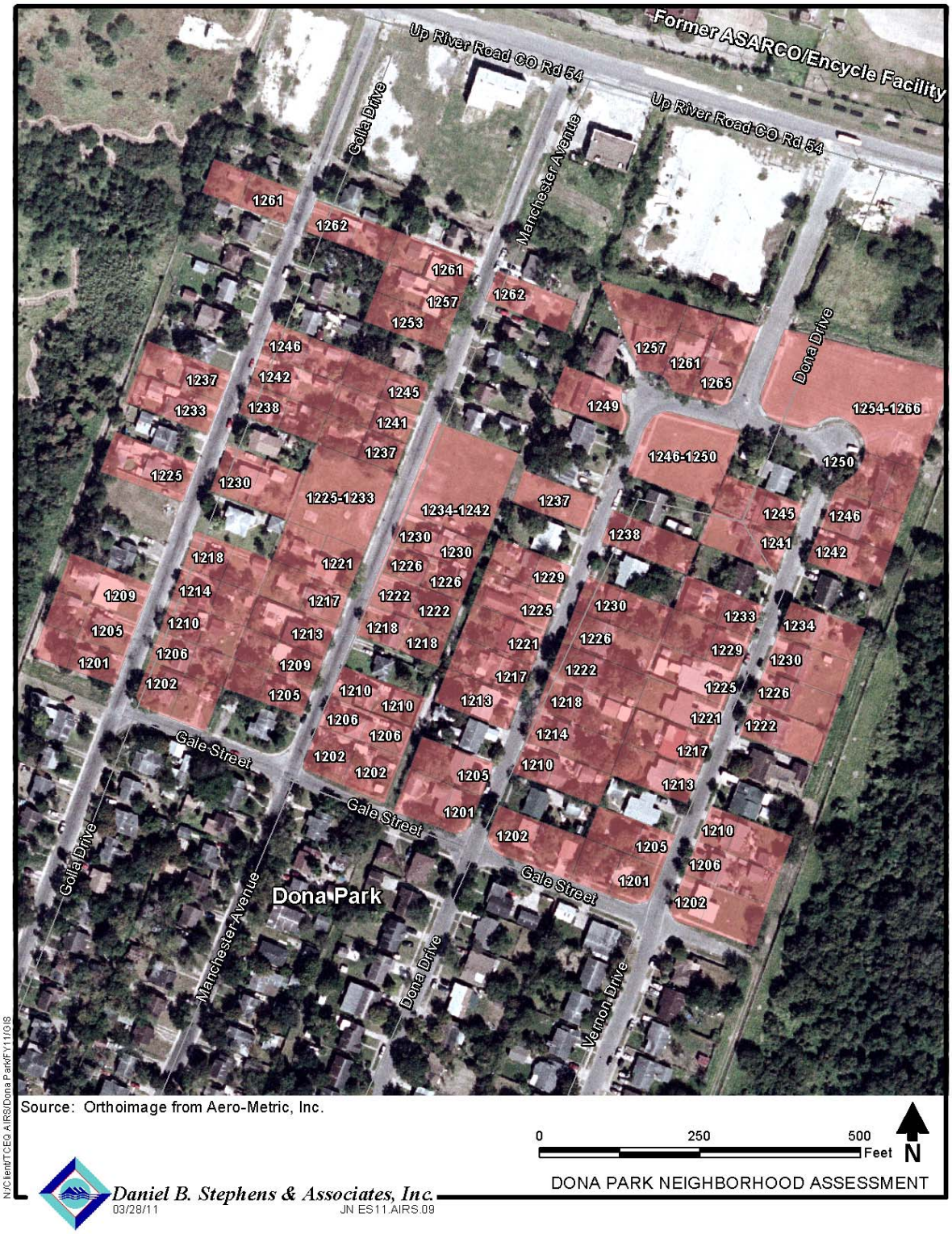
Table 6. Lots North of Gale Street

1201	Dona Dr	1265	Dona Dr	1206	Manchester Ave	1202	Vernon Dr
1202	Dona Dr	1201	Golla Dr	1209	Manchester Ave	1205	Vernon Dr
1205	Dona Dr	1202	Golla Dr	1210	Manchester Ave	1206	Vernon Dr
1210	Dona Dr	1205	Golla Dr	1213	Manchester Ave	1210	Vernon Dr
1213	Dona Dr**	1206	Golla Dr	1217	Manchester Ave	1213	Vernon Dr
1214	Dona Dr	1209	Golla Dr	1218	Manchester Ave	1217	Vernon Dr
1217	Dona Dr	1210	Golla Dr	1221	Manchester Ave	1221	Vernon Dr
1218	Dona Dr	1214	Golla Dr	1222	Manchester Ave	1222	Vernon Dr
1221	Dona Dr	1218	Golla Dr	1225-1233	Manchester Ave*	1225	Vernon Dr
1222	Dona Dr	1225	Golla Dr	1226	Manchester Ave	1226	Vernon Dr
1225	Dona Dr	1230	Golla Dr	1230	Manchester Ave	1229	Vernon Dr
1226	Dona Dr	1233	Golla Dr	1234-1242	Manchester Ave*	1230	Vernon Dr
1229	Dona Dr	1237	Golla Dr	1237	Manchester Ave	1233	Vernon Dr
1230	Dona Dr	1238	Golla Dr	1241	Manchester Ave	1234	Vernon Dr
1237	Dona Dr*	1242	Golla Dr	1245	Manchester Ave	1241	Vernon Dr
1238	Dona Dr	1246	Golla Dr	1253	Manchester Ave*	1242	Vernon Dr
1246-1250	Dona Dr*	1261	Golla Dr	1257	Manchester Ave	1245	Vernon Dr
1249	Dona Dr	1262	Golla Dr	1261	Manchester Ave	1246	Vernon Dr
1257	Dona Dr	1202	Manchester	1262	Manchester Ave	1250	Vernon Dr
1261	Dona Dr	1205	Manchester	1201	Vernon Dr	1254-1266	Vernon Dr*

Note: * Indicates vacant lot and ** indicates split lot.

Daniel B. Stephens & Associates, Inc.

Figure 3. Lots Analyzed by Methods 7471B and 6200



Source: Orthoimage from Aero-Metric, Inc.

0 250 500 Feet N

DONA PARK NEIGHBORHOOD ASSESSMENT

Daniel B. Stephens & Associates, Inc.
03/28/11 JN ES11.AIRS.09

N:\Client\TCEQ-AIRS\Dona Park\FY11\GIS

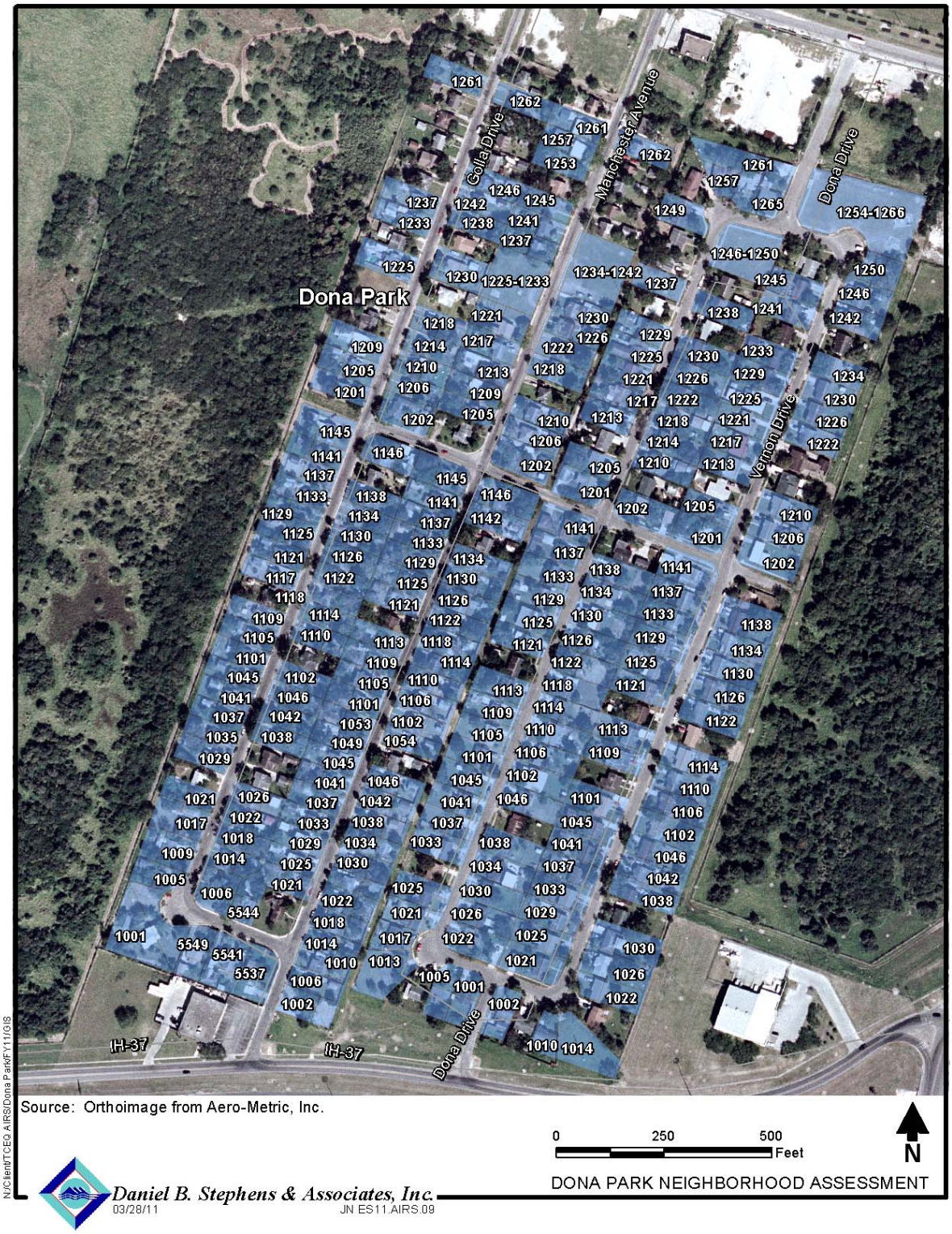
Table 7. Lots South of Gale Street

1001	Dona Dr	1001	Golla Dr	1002	Manchester Ave	1141	Manchester
1005	Dona Dr	1005	Golla Dr	1006	Manchester Ave	1142	Manchester
1013	Dona Dr	1006	Golla Dr	1010	Manchester Ave	1145	Manchester
1017	Dona Dr	1009	Golla Dr	1014	Manchester Ave	1146	Manchester
1021	Dona Dr	1014	Golla Dr	1018	Manchester Ave	1002	Vernon Dr
1022	Dona Dr	1017	Golla Dr	1021	Manchester Ave	1010	Vernon Dr
1025	Dona Dr	1018	Golla Dr	1022	Manchester Ave	1014	Vernon Dr
1026	Dona Dr	1021	Golla Dr	1025	Manchester Ave	1021	Vernon Dr
1030	Dona Dr	1022	Golla Dr	1026	Manchester Ave	1022	Vernon Dr
1033	Dona Dr	1026	Golla Dr	1029	Manchester Ave	1025	Vernon Dr
1034	Dona Dr	1029	Golla Dr	1030	Manchester Ave	1026	Vernon Dr
1037	Dona Dr	1035	Golla Dr	1033	Manchester Ave	1029	Vernon Dr
1038	Dona Dr	1037	Golla Dr	1034	Manchester Ave	1030	Vernon Dr
1041	Dona Dr	1038	Golla Dr	1037	Manchester Ave	1033	Vernon Dr
1045	Dona Dr	1041	Golla Dr	1038	Manchester Ave	1037	Vernon Dr
1046	Dona Dr	1042	Golla Dr	1041	Manchester Ave	1038	Vernon Dr
1101	Dona Dr	1045	Golla Dr	1042	Manchester Ave	1041	Vernon Dr
1102	Dona Dr	1046	Golla Dr	1045	Manchester Ave	1042	Vernon Dr
1105	Dona Dr	1101	Golla Dr	1046	Manchester Ave	1045	Vernon Dr
1106	Dona Dr	1102	Golla Dr	1049	Manchester Ave	1046	Vernon Dr
1109	Dona Dr	1105	Golla Dr	1053	Manchester Ave	1101	Vernon Dr
1110	Dona Dr	1109	Golla Dr	1054	Manchester Ave	1102	Vernon Dr
1113	Dona Dr	1110	Golla Dr	1101	Manchester Ave	1106	Vernon Dr
1114	Dona Dr	1114	Golla Dr	1102	Manchester Ave	1109	Vernon Dr
1118	Dona Dr	1117	Golla Dr	1105	Manchester Ave	1110	Vernon Dr
1121	Dona Dr	1118	Golla Dr	1106	Manchester Ave	1113	Vernon Dr
1122	Dona Dr	1121	Golla Dr	1109	Manchester Ave	1114	Vernon Dr
1125	Dona Dr	1122	Golla Dr	1110	Manchester Ave	1121	Vernon Dr
1126	Dona Dr	1125	Golla Dr	1113	Manchester Ave	1122	Vernon Dr
1129	Dona Dr	1126	Golla Dr	1114	Manchester Ave	1125	Vernon Dr
1130	Dona Dr	1129	Golla Dr	1118	Manchester Ave	1126	Vernon Dr
1133	Dona Dr	1130	Golla Dr	1121	Manchester Ave	1129	Vernon Dr
1134	Dona Dr	1133	Golla Dr	1122	Manchester Ave	1130	Vernon Dr
1137	Dona Dr	1134	Golla Dr	1125	Manchester Ave	1133	Vernon Dr
1138	Dona Dr	1137	Golla Dr	1126	Manchester Ave	1134	Vernon Dr
1141	Dona Dr	1138	Golla Dr	1129	Manchester Ave	1137	Vernon Dr
5537	Linda St	1141	Golla Dr	1130	Manchester Ave	1138	Vernon Dr
5541	Linda St	1145	Golla Dr	1133	Manchester Ave	1141	Vernon Dr
5544	Linda St	1146	Golla Dr	1134	Manchester Ave		
5549	Linda St	1149	Golla Dr*	1137	Manchester Ave		

Note: * Indicates vacant lot.

Daniel B. Stephens & Associates, Inc.

Figure 4. Lots Analyzed by Method 6200 and 6020A



4.2 Sample Collection and Compositing

All soil samples collected under this FSP will follow Appendix F: Sample Collection Procedures for bulk sample collection and compositing which includes bulk sample mixing and cone and quarter splitting.

All soil samples will be collected with decontaminated, non-dedicated sampling equipment and placed into certified clean sample jars or sample bags. Field sampling personnel will wear non-lubricated nitrile disposable gloves, or other suitable disposable gloves, during the handling of sampling equipment and during sampling. The disposable gloves will be changed and discarded between each Study Unit. Prior to sampling activities, sampling equipment will be handled and decontaminated in accordance with SOP 1.5 (Decontamination), as described in Section 7.2 of this FSP.

Samples collected from Study Units located north of Gale Street will be analyzed for mercury by Method 7471B in addition to metal analysis by XRF Method 6200 (with 10 percent confirmation samples by laboratory Method 6020A) (Table 5, Figure 3). For these Study Units, the composite sample will be homogenized and then split into two halves and each half will be placed into a properly labeled sample jar or bag as indicated in Sample Collection Procedures (Appendix F). One sample will be packed and shipped to the laboratory for analysis by Method 7471B. The second sample will be packed and placed in an iced cooler for delivery to the DBS&A Austin office for XRF analysis by Method 6200.

Samples collected from the Study Units south of Gale Street (Tables 5 and 6, Figure 4) will be packed and placed in an iced cooler for deliver to the Austin office for XRF analysis by Method 6200. Ten percent of these samples will be analyzed in the laboratory by Method 6020A to confirm the XRF measurements. Samples exhibiting cadmium concentrations of less than 25 ppm sent to the laboratory as described in Section 3.3.1, and these confirmation samples will be used to meet this ten percent laboratory confirmation requirement in Method 6200.

4.3 Sample Identification

A residential lot, consisting of two Study Units (i.e., front yard and back yard), that is sampled will be identified with a unique number specific to that lot. This identification method will ensure sample results specific to a residential lot will remain confidential when the results are shared with the public. Residents will only be provided the sample results specific to their lot(s). The unique sample number will begin at number 60 (continuation from Pilot Study Sample IDs 1 through 59) for the Expanded Assessment.

Field sample identification number (ID) nomenclature indicating sample type (i.e., ex-situ composite or ex-situ composite laboratory sample), residential lot, and Study Unit will be used to identify individual samples.

- **Ex-situ composite XRF measurement (In-Office XRF Analysis)** IDs will consist of the prefix "**ECX**" followed by the unique residential lot number, then a dash and a number indicating the XRF sample number, and ending with a dash and an "**F**" or "**B**" to indicate the Study Unit (i.e., front or back yard, respectively).

- **Ex-situ composite laboratory sample (Mercury and Laboratory Confirmation Analyses)** IDs will consist of the prefix "**ECL**" followed by the unique residential lot number and ending with a dash and an "**F**" or "**B**" to indicate the Study Unit (i.e., front or back yard, respectively).

All duplicate samples generated from this project will have a sample number randomly selected by the TCEQ PM or DBS&A PM. The identification of duplicate samples will not include any information that may reveal to the laboratory their identity as duplicates. Associated duplicate samples will be identified in the field logbook. Duplicate sample collection times will be a random increment of time after the collection time of the primary sample.

Equipment rinsate blanks will be identified as "ER" samples.

4.4 Sample Analyses

The laboratory analyses for each sample are listed in Tables 1, 2, and 3. Methods 6020A and 7471B are laboratory analyses. The XRF measurements for lead, cadmium, and zinc will be made as described in Appendix G: XRF SOP Section 1.4.1. All soil samples collected under this

FSP will follow Appendix F: Sample Collection Procedures for bulk sample collection and compositing which includes bulk sample mixing and cone and quarter splitting.

4.5 Laboratory Field Quality Control Samples

Field QC samples listed in Table 8 will be collected in accordance with SOP 6.5 (Collection of QA/QC Samples).

Table 8. Field Quality Control Samples

Type of QC Sample	Frequency of Collection
Matrix spike/matrix spike duplicate (MS/MSD)	One per 20 project samples. An MS/MSD analysis will be annotated on the chain of custody at a sample location suspected to be contaminated with low to medium levels of COCs. Do not use highly contaminated samples for the MS/MSD. Extra sample volume will not be required.
Equipment rinsate blank (ER)	One at the start of sample collection on the first day of the sampling event, and one at the end of each day.
Field Duplicate (FD)	One per 10 project samples. Collect the field duplicate at a sample location known or suspected to be contaminated with COCs, immediately after the sample is collected.
Temperature blank	One per cooler.

4.6 XRF Sample Analysis

XRF samples will be analyzed at DBS&A's office in Austin, Texas. For the XRF analyses, the project specific XRF SOP provided in Appendix G will be used. All soils will be composited and thoroughly mixed in the field as described in Section 4.2 and stored in a refrigerator at the DBS&A Austin office at a temperature of 4 ± 2°C until the time the XRF sample analysis begins.

In-office sample preparation will begin during the second week of field work and XRF analysis of the collected samples will begin immediately following the end of the field event. Sample preparation will consist of taking each composited soil sample collected in the field and preparing five 32-mm diameter sample cups for XRF analysis. The cups are assembled individually by placing a 2.5 inch diameter Mylar Film (6 microns thick) on top of a sample cup collar. Then the sample cup cylinder is pressed into the collar so that the film is pulled tightly between the collar and cylinder, creating an enclosure. Next, the sample cup is turned over with

the film down so that the sample material can be placed and tamped into the cup. A filter paper is placed on top of the material and tamped until the material reaches the cup line close to the top of the cup; then polystuffing is placed on top of the filter so that when the sample is inverted, the material is held firmly against the Mylar film. Last, the sample cap is placed on top of the polystuffing. Following cup assembly and filling, the cups for each Study Unit will be bagged together and sealed until time of analysis.

The XRF unit(s) will be preprogrammed with pull down menus for sample ID and analysis time entry. A portable test stand with hood will be used for the in-office XRF analyses. At the time of XRF analysis, the prepared sample cups will be placed onto the portable test stand and aligned with the XRF unit analysis window. The hood will then be closed and the analysis started.

Two XRF filters, the main range filter and the high range filter will be utilized. The main range filter will analyze for lead and zinc. The high range filter will analyze for cadmium. Each filter will be set to analyze for 60 seconds each. During XRF analysis of the composite samples, the values of error reported in the XRF window will be observed. Analysis time will be increased if the relative error of measurement (commonly two standard deviations and displayed as ± mg/kg) is greater than 20% (or 1/5) of the reported result unless the analyte concentrations are near the XRF limits of detection for that analyte.

At the end of the day, all generated data will be uploaded and saved to the DBS&A network drive.

4.7 XRF Quality Control Procedures

An XRF precision check and a calibration verification check will be conducted daily using standards provided with the instrument as well as project-specific decision level and varying level concentration standards. The QC procedures will be conducted at a reduced frequency than described in Appendix G: XRF SOP Table1 but will still provide a method of determining if any drift is occurring within the XRF unit. Table 9 on the following page provides a summary of the QC type, frequency of QC acceptance criteria, and corrective action.

Table 9. Summary of QC Procedures for Field Portable XRF by Method 6200

QC Check Sample	Minimum Frequency	QC Acceptance Criteria*	Required Corrective Action if QC Acceptance Criteria not Met
XRF precision check on decision level and 2X decision level concentration standards.**	At the beginning of each day, analyze the decision level concentration standard 7 times in replicate. Calculate the %RSD of the 7 replicates.	≤ 20% RSD [%RSD = (Std. Dev of 7 replicates/mean of 7 replicates) x 100]	1. Reanalyze the decision level concentration standard 7 times in replicate at an analysis time of 200 seconds. 2. Recalculate the %RSD.
Calibration verification check on decision level concentration standards.	At the beginning of each day, per 20 Study Units, and at the end of each day.	± 20% difference (%D) of concentration standard [%D = ((Cs - Cm)/Cm) x 100]	1. Reanalyze the calibration verification check sample using an analysis time of 22 seconds. 2. If QA acceptance criteria remain unmet, perform internal system check and reanalyze the batch of samples analyzed immediately prior to the unacceptable calibration verification check. 3. If QA acceptance criteria remain unmet, consult the instrument representative and adjust the y-intercept and slope of the instrument calibration curve to best fit the known concentration standards, and reanalyze the batch of samples analyzed immediately prior to the unacceptable calibration verification check.
Blank sample check.	At the beginning of each day, per 20 Study Units, and at the end of each day.	No target COC concentrations above the established detection limit.	1. Check measurement window and blank sample for soils and clean appropriately. 2. If QA acceptance criteria remain unmet, "zero out" the instrument by following the manufacturer's instructions.
XRF System Check	Anytime the unit is turned on.		1. If the unit shows a failure error, then perform a second System Check by clicking Recheck. 2. If the unit still does not show a "system ok", contact Thermo Scientific at 800-875-1578.

Notes: * If the QC Acceptance Criteria are not met, the corrective actions given in Section 9.0 of SW846-6200 will be followed.
**The precision check should be performed on decision level concentration standards with varying concentration ranges to assess the effect of concentration on method precision.

5. Sample Handling

DBS&A will also adhere to strict chain-of-custody procedures while collecting, preparing, transporting, and shipping all samples. A sample tracking log is provided in Appendix H, this log will be maintained in a secured office where sample preparation and XRF analysis will be conducted.

5.1 Sample Containers, Sample Preservation, and Holding Time

A summary of the requirements for containers, preservation techniques, sample volumes, and holding times for the sample analytes are presented in Table 10: Containers, Sample Volumes, Preservation Techniques, and Holding Times. All sample containers will have a minimum amount of head space present when capped. All samples will be cooled in an ice chest to a temperature 4°C (± 2°C).

Table 10. Containers, Sample Volumes, Preservation Techniques, and Holding Times

Matrix	Parameter	Required Volume	Container	Preservative	Holding Time
Soil	Metals (except Mercury)	4 ounces*	One 4-oz wide-mouth glass jar with Teflon®-lined cap*	Cool to 4°C (± 2°C)	180 Days
Soil	Mercury	4 ounces*	One 4-oz wide-mouth glass jar with Teflon®-lined cap*	Cool to 4°C (± 2°C)	28 Days

*4-ounce jars will be used in lieu of 8 ounce jars to reduce shipping and storage volumes

5.2 Chain-of-Custody Procedures

Handling, packing, and chain-of-custody procedures to track all samples collected and shipped to laboratory or transported to the DBS&A office will be conducted in accordance with TCEQ SOP 6.4 (Sample Handling and Control). Each sample container will be listed on the custody documentation and transported to the laboratory or DBS&A office will include a custody tape

seal that crosses the lid and side of the sample container and is signed and dated by the field sampling crew.

6. Property Access

It is the policy of the TCEQ that formal access agreements be obtained, if possible, documenting a landowner's permission for the TCEQ and its CONTRACTORS to investigate and sample their property. Form TCEQ-10452 will be used whenever possible to obtain access agreements between landowners and the TCEQ prior to the initiation of sample collection activities. In the event that the TCEQ is unable to secure a written access agreement from a property owner, verbal agreement for access will be obtained and documented in the field logbook. If the property is abandoned, or the owner cannot be determined or contacted, the TCEQ PM will determine further courses of action in conjunction with TCEQ management.

7. Additional Field Activities

7.1 Sample Collection Documentation

The TCEQ will determine all Study Unit sample locations and will photograph and document the random grid pattern in the TCEQ field logbook. DBS&A will enter information regarding sample collection in accordance with SOP 6.1 (Field Activity Documentation and Reporting). The following information will be recorded in the field logbook:

- date and time of sample collection;
- sample collection method;
- sample preservation;
- name of the person who collected the sample;
- sample identification number and depth measured from ground surface;
- field measurements made on the sample during collection;
- date and time of photograph with a description of the purpose of the photograph along with the name of the person who took the photograph and direction the person was facing when the photograph was taken;
- relevant observations such as soil color, obvious staining, and weather conditions; and
- deviations from the FSP, QAPP, or SOP.

In order to avoid mistakes, sample bottles may be temporarily labeled on the container surface prior to or immediately after sample collection. Sample bottles will be permanently labeled as soon as possible after collection. Sample labels will include:

- field sample ID,
- project name and number,
- sampling date and time,
- name of the sample collector,
- method of sample preservation, and
- laboratory analyses required.

TCEQ field staff will document all Study Units with a minimum of one photograph which depicts as many Sample Locations as possible in a single photo. The photo will be taken from the vicinity of the northwest Sample Location which will be designated as Sample Location 1. The photo will include permanent landmarks such as buildings, other structures, or old-growth trees.

7.2 Decontamination

Any equipment potentially coming into contact with contaminated media will be decontaminated according to SOP No. 1.5 (Decontamination). Plastic sheeting will be used to provide a clean working area for sample preparation and, to the extent possible, prevent contaminated soil from contacting sampling equipment. Smaller decontamination areas for personnel and portable equipment will be provided as necessary, in accordance with the HASP. All disposable Personal Protective Equipment (PPE) will be decontaminated such that it can be disposed of as Class 3 waste.

Dedicated sampling equipment will be used whenever it is available. Non-dedicated sampling equipment will be decontaminated prior to use and between each Study Unit in accordance with SOP No. 1.5 (Decontamination). An equipment rinsate sample will be collected as specified in Table 8. The TCEQ PM may modify the decontamination frequency as appropriate and will document any modification to the frequency in the field logbook.

7.3 Investigation Derived Waste

Investigation Derived Waste (IDW) will be handled in accordance with SOP No. 1.4 (Management of Investigation Derived Waste). DBS&A will be responsible for the collection and containerization of all IDW. IDW will be stored temporarily in appropriate containers such as U.S. Department of Transportation (DOT) approved steel 55-gallon drums or tanks. The containers will be transported to a staging area designated by the TCEQ in a manner to prevent spillage or evaporative loss.

DBS&A will label all IDW containers with the date of accumulation, description of the materials, the source of the materials, and the field sample numbers of the samples which will be used to classify them. A completed log of all IDW containers which are properly labeled will be included in the field logbook. DBS&A will label, characterize, transport, and dispose of all IDW generated during this field event consistent with issued TCEQ work orders and all applicable rules and regulations.

7.4 Site Restoration

The work site and sampling locations will be restored to their original condition in accordance with SOP 1.3 (Site Restoration). Efforts will be made to minimize impacts to work sites and sampling locations, particularly residential properties and those properties in or near sensitive environments.

7.5 Health and Safety Plan

All personnel involved in the sampling event will comply with the HASP applicable to the site. The designated DBS&A and/or TCEQ HSO will conduct a daily safety briefing prior to initiating field work each day to advise workers of site-specific physical and chemical hazards associated with executing the FSP. The topics for this safety meeting are discussed in the HASP and briefly outlined in Section 2.5.

7.6 Deviations, Modifications, and/or Departures from the FSP or QAPP

Each deviation, modification, and/or departure from this approved FSP or QAPP will be recorded, with a discussion of the rationale for each, in the field logbook.

8. Exceptions, Additions, and Changes to the TCEQ QAPP

Changes to QAPP Table B5.1.16-3: Summary of Calibration and QC Procedures for Method SW6020A Applicable Parameters: ICP/MS Metals: Table B5.1.16-3 specifies that a method detection limit (MDL) study be performed "Once per 12 month period." The following phrase will be added: "or perform Detectability Check Samples (DCS) on a quarterly basis throughout the year to verify the MDL." In addition, the acceptance criteria in these tables will be changed from "Detection limits shall be ≤ ½ the MQLs in Table B5.1.16-1." to "Detection limits shall be ≤ ½ the MQLs listed in Table 2 of the FSP." In addition, DHL Analytical will use RPD (relative percent difference) to assess the Serial Dilution for method 6020A instead of percent difference.

Addition to QAPP Element B.4.1 (Screening Methods): SW-846 Method 6200 will be utilized for the field portable x-ray fluorescence (XRF) analysis of soil samples. The XRF SOP to be utilized for this sampling event is provided in Appendix G; SW-846 Method 6200 is included in Appendix D.

Change to QAPP Table B2-1: A 4-ounce jar will be used in lieu of the 8-ounce jar. DBS&A has confirmed that 4-ounce jars will provide adequate sample volume for sample analysis and matrix spike/matrix spike duplicate analyses. The reduced sample volume will in turn reduce storage and shipping volumes.

Change to *SOP 10.5: Soil Sampling Using a Shelby Tube Sampler* procedures are amended: A slide hammer sampler will be used in lieu of drilling equipment as the shallow sampling depths do not require drilling. Also, procedures in the SOP relating to volatile organic compounds (VOCs) are not applicable to this Expanded Assessment.

Table 11. TCEQ Standard Operating Procedures (SOPs) Checklist

	SOP #	SOP Title		SOP #	SOP Title
☐	1.1	Initial Site Reconnaissance	☐	8.4	Surface Water Sampling Using a Pump
☐	1.2	(Site) Preparation and Control	☐	8.5	Surface Water Sampling Using a Bomb Sampler
☒	1.3	Site Restoration	☐	9.1	Sediment Sampling Using a Trowel
☒	1.4	Management of Investigative Derived Waste	☐	9.2	Sediment Sampling Using a Bucket Auger
☒	1.5	Decontamination	☐	9.3	Sediment Sampling Using a Dredge
☐	2.1	Land Survey	☐	9.4	Sediment Sampling Using a Push Core
☐	2.2	Water Use Survey	☐	10.1	Soil Sampling Using a Trowel
☐	2.3	Receptor Survey	☐	10.2	Soil Sampling Using a Split Barrel Sampler
☐	2.4	Utility Survey	☐	10.3	Soil Sampling Using a Hand Auger
☒	6.1	Field Activity Documentation and Reporting	☐	10.4	Soil Sampling Using Direct Push
☐	6.2	Homogenization of Soil Samples	☒	10.5	Soil Sampling Using a Shelby Tube Sampler
☐	6.3	Collection of VOC Samples	☐	11.1	Source Sampling of a Homogenous Liquid
☒	6.4	Sample Handling and Control	☐	11.2	Source Sampling of a Heterogeneous or Stratified Liquid
☒	6.5	Collection of QA/QC Samples	☐	11.3	Source Sampling of a Homogenous Solid
☐	7.1	Water Level/Sediment Measurement	☐	11.4	Source Sampling of a Heterogeneous or Stratified Solid
☐	7.2	Purging a Monitoring Well with a Bailer	☐	12.1	Asbestos Air Sampling
☐	7.3	Purging a Monitoring Well with a Pump	☐	12.2	Asbestos Solids Sampling
☐	7.4	Micro Purging a Monitoring Well	☐	14.1	Air Sampling and Monitoring Design
☐	7.5	Measurement of Field Parameters	☐	14.2	Air Sampling Using a High Volume Sampler
☐	7.6	Groundwater Sampling Using a Bailer	☐	14.3	Air Sampling Using a PM-10 Sampler
☐	7.7	Groundwater Sampling Using a Pump	☐	14.4	Air Sampling Using a PS-1 Sampler
☐	7.8	Groundwater Sampling Using a Low-flow Techniques	☐	14.5	Air Sampling Using a Summa Canister for VOC Sampling
☐	8.1	Surface Water Sampling Using the Direct Method	☐	14.6	Real-time Air Monitoring
☐	8.2	Surface Water Sampling Using a Kemmerer Bottle	☐	14.7	Collection of Meteorological Data
☐	8.3	Surface Water Sampling Using a Dip Sampler	☒	17.1	GPS Data Collection and Submission

References

Daniel B. Stephens & Associates (DBS&A). 2010. *Site Specific Health and Safety Plan Phase I Field Activities Dona Park Neighborhood Assessment Dona Drive and Up River Rd., Corpus Christi, Nueces County, TX 79925.* Prepared for the Texas Commission on Environmental Quality. October 13, 2010.

Texas Commission on Environmental Quality (TCEQ). 2010. *Quality assurance project plan for the Superfund Program*. Document Number 200919.7. Effective Date May 27, 2010.

TCEQ 2010a. *Field Sampling Plan For Pilot Study of the Dona Park Neighborhood, Corpus Christi, Nueces County, TX*. October 2010.

The Texas Department of Health (TDH), 1996. *Public Health Consultation: Dona Park Neighborhood City of Corpus Christi, Nueces County, TX.* December 4, 1996.

Appendix A

STANDARD OPERATING PROCEDURE NO. 1.3
SITE RESTORATION

1.0 METHOD SUMMARY

This standard operation procedure (SOP) describes the steps necessary for site restoration. Upon completion of field activities, the site should be repaired to its original condition when possible. All drums or waste containers should be staged in a designated staging area and all other waste should be removed. All borings should be backfilled.

2.0 EQUIPMENT/APPARATUS/REAGENTS

Varies depending on which of the following tasks are completed.

3.0 PROCEDURES

1. Minimize impacts to work sites and sampling locations, particularly those in or near sensitive environments, such as wetlands with the use of soil erosion fences or by diverting streams/brooks during work operations.
2. Fill boreholes and pits, re-vegetate or erect erosion fences as necessary, re-establish streams, brooks, etc, as applicable.
3. Remove all sampling, decontamination equipment, and other items introduced to the site upon completion of work.
4. Remove all drums, trash, and other waste upon completion of work at the site.
5. Transport decontamination and/or purge water and soil cuttings to the designated locations.

4.0 CAUTIONS AND INTERFERENCES

This section is not applicable to this SOP.

STANDARD OPERATING PROCEDURE NO. 1.4
MANAGEMENT OF
INVESTIGATIVE DERIVED WASTE

1.0 METHOD SUMMARY

This standard operating procedure (SOP) provides standard operating procedures for managing investigative derived waste (IDW) generated during field activities. Materials which may become IDW include:

- Personnel protective equipment (PPE) including disposable coveralls, gloves, booties, respirator canisters, splash suits, etc.
- Disposable equipment including plastic ground and equipment covers, aluminum foil, conduit pipe, composite liquid waste samplers (COLIWASAs), disposable bailers, rope or twine, Teflon® tubing, broken or unused sample containers, sample container boxes, tape, etc.
- Soil cuttings from drilling or hand augering.
- Excess soil sample material.
- Drilling mud or water used for water rotary drilling.
- Ground water obtained through well development or well purging.
- Cleaning fluids such as spent solvents and washwater.
- Packing and shipping materials.

2.0 EQUIPMENT/APPARATUS/REAGENTS

2.1 Equipment List

- 55-gallon drums
- Labels for drums
- Wrenches for securing drum lids
- Marking pens (for marking on labels and on drums)
- Lumber (for creating storage area)
- Plastic sheeting (for storage area)
- Plywood (for storage area flooring)
- 5-gallon buckets
- Manifests
- Drum log

3.0 PROCEDURES

Be sure to keep all hazardous waste separate from non-hazardous waste. Label each container properly and keep a log (Appendix A) of all the drums or containers, stating their identification number and contents. Drill cuttings from different holes can be put in the same drums provided they originate from similar areas of the site (e.g., upgradient, background borings, etc.).

3.1 Management of Non-Hazardous IDW

1. If necessary, compact the waste into a reusable container, such as a 55-gallon drum to reduce the volume of non-hazardous waste.
2. If the waste is generated from an active facility, seek permission from the operator of the facility to place the *non-hazardous* PPE, disposable equipment, and/or paper/cardboard wastes into the facility dumpsters. These materials may also be taken to a nearby permitted landfill. On larger studies, waste hauling services may be obtained and a dumpster located at the study site.

3. Dispose of *non-hazardous* IDW such as drill cuttings, purge or development water, decontamination washwater, drilling muds, etc. in a unit with an environmental permit such as a landfill or sanitary sewer. These materials must not be placed into dumpsters.

4. Seek permission to place these types of IDW into the facility treatment system if the facility is active.

3.2 Management of Hazardous IDW

1. Properly contain and label all suspected or identified hazardous wastes. Wastes should be stored in labeled 55-gallon drums at a segregated staging facility with a secondary containment structure.

2. Take care to keep non-hazardous materials segregated from hazardous waste contaminated materials.

3. Review appropriate sample results to determine waste characterization and perform any specific analysis required by the permitted disposal facility.

4. Hazardous wastes may be stored on site for a maximum of 90 days before they must be manifested and shipped to a permitted treatment or disposal facility.

5. Dispose of hazardous IDW as specified in the USEPA and TNRCC regulations. If appropriate, place these wastes in an active facility waste treatment system.

6. Anticipate generation of hazardous IDW, if possible, to permit arrangements for proper containerization, labeling, transportation, and disposal/treatment in accordance with USEPA and TNRCC regulations.

4.0 CAUTIONS AND INTERFERENCES

1. All liquid and soil/sediment IDW *must* be containerized and analyzed before disposal.

2. The collection handling, and proposed disposal method must be specified in the site work plan.

APPENDIX A

DRUMMED MATERIAL WORKSHEET

Project Name	**Project Number**
Site Address	**Project Manager**

Drum No.	Boring No.	Date	Contents	Sample ID	Lab Results	Disposition

STANDARD OPERATING PROCEDURE NO. 1.5
DECONTAMINATION

1.0 METHOD SUMMARY

This standard operating procedure (SOP) provides a description of the methods used for preventing, minimizing, or limiting cross-contamination of samples due to inappropriate or inadequate equipment decontamination and to provide general guidelines for developing decontamination procedures for sampling equipment to be used during hazardous waste operations. This SOP does not address personnel decontamination.

Removing or neutralizing contaminants from equipment minimizes the likelihood of sample cross contamination, reduces or eliminates transfer of contaminants to clean areas, and prevents the mixing of incompatible substances. Gross contamination can be removed by physical decontamination procedures. These abrasive and non-abrasive methods include the use of brushes, air and wet blasting, and high and low pressure water cleaning.

2.0 EQUIPMENT/APPARATUS/REAGENTS

- Non-phosphate detergent
- Tap water
- Distilled or deionized water
- Long and short handled brushes
- Bottle brushes
- Drop cloth/plastic sheeting
- Paper towels
- Plastic or galvanized tubs or buckets
- Pressurized sprayers
- Aluminum foil
- Ziploc® bags
- Trash bags
- Appropriate personal protective equipment (PPE)
- Face shield (for hard hat)
- High pressure washer (if necessary)
- Fuel for high pressure washer
- 55-gallon drums
- Plywood
- Sump pump
- Landscape timbers, 4 x 4's, or 2 x 4's

3.0 PROCEDURES

3.1 Decontamination

The prime contractor shall describe all decontamination of drilling equipment, well construction materials, sampling equipment, tools, etc in the project work plan. All samples and equipment leaving the contaminated area of a site must be decontaminated to remove any contamination that may have adhered to equipment. This includes casing, drill bits, auger flights, the portions of drill rigs that stand above boreholes, sampling devices, and instruments, such as slugs and sounders. In addition, the contractor shall take care to prevent the sample from coming into contact with potentially contaminating substances, such as tape, oil, engine exhaust, corroded surfaces, and dirt.

The following procedures shall be used to decontaminate large pieces of equipment, such as casings, auger flights, pipe and rods, and those portions of the drill rig that may stand directly over a boring or well location or that come into contact with casing, auger flights, pipe, or rods:

1. Prepare the decontamination zone in accordance with SOP 1.2.
2. Don appropriate PPE.
3. Deposit the contaminated equipment on the plastic drop cloth/sheet or in a container inside the CRZ.
4. Place large pieces of equipment (e.g., auger flights) on sawhorses.

5. Use a high-pressure washer and a low-phosphate soap (e.g, Alconox) to remove encrusted material from grossly contaminated equipment. If necessary, use a brush to scrub the equipment until all visible dirt, grime, grease, oil, loose paint, rust flakes, etc., have been removed.
6. Rinse all equipment with potable water.
7. Store the equipment on sawhorses or wrapped in clean plastic sheeting.
8. Decontamination water should be collected and transferred to a 55-gallon drum at the end of the day or whenever significant quantities of water have accumulated. Drums of investigative derived waste (IDW) should be managed in accordance with SOP 1.4.

The following procedures shall be used to decontaminate small pieces of sampling equipment such as split spoons, bailers, trowels/spoons and bowls:

1. Prepare the decontamination zone in accordance with SOP 1.2.
2. Don appropriate PPE.
3. Scrub the equipment with a solution of potable water and low-phosphate soap (e.g., Alconox).
4. If organic constituents are contaminants of concern, rinse the equipment with a pesticide-grade solvent, typically acetone. If acetone is a constituent of concern, substitute methanol as the rinse agent.
5. Rinse the equipment with copious quantities of distilled or deionized water.
6. Allow the equipment to air dry on a clean surface or rack elevated at least two feet above ground.
7. Wrap the sampling device in aluminum foil or place in Ziploc® bags prior to reuse.

At the completion of the decontamination activities, all fluids and solid waste should be containerized and managed in accordance with SOP 1.4.

If a particular contaminant fraction is not present at the site, the ten (10) step decontamination procedure specified above may be modified for site specificity. For example, the solvent rinse may be eliminated if organics are not of concern at a site. Modifications to the standard procedure should be documented in the site specific work plan or subsequent report.

4.0 CAUTIONS AND INTERFERENCES

1. The use of distilled/deionized water commonly available from commercial vendors is typically acceptable for decontamination of sampling equipment.
2. The use of an untreated potable water supply is not an acceptable substitute for tap water. Tap water may be used from any municipal or industrial water treatment system.
3. If solvents are utilized in decontamination they raise health and safety, and waste disposal concerns.
4. Damage can be incurred by solvent washing of complex and sophisticated sampling equipment.

STANDARD OPERATING PROCEDURE NO. 6.1
FIELD ACTIVITY DOCUMENTATION AND REPORTING

1.0 METHOD SUMMARY

This SOP provides requirements for documenting and reporting site activities. The objective of the documentation program is to accurately and completely describe all field activities, thereby demonstrating that all field activities are conducted in accordance with the project specific Field Sampling Plan or Field Work Plan and applicable Superfund Program Standard Operating Procedures (SOPs).

2.0 EQUIPMENT/APPARATUS/REAGENTS

Equipment typically required for documenting the progress of the project includes:

- Field logbook (all weather or water resistant)
- Field forms
- Camera
- Video recorder (if necessary)
- Permanent marking pens
- Ink pens (with waterproof, black ink)

The field logbook shall contain the following information at a minimum:

- Location, date and time of each activity
- Weather conditions (changes)
- Activity being performed
- Identity of the person(s) performing the activity
- The numerical value and units of any field measurements
- The identity of, and the calibration results for, each field instrument being used
- All information required to demonstrate that the work is conducted in accordance with applicable Sampling Plans, Work Plans and SOPs
- visitors to the site

Specific information which shall be included for each sample includes:

- Sample type and sampling method
- The identity of each sample and depth(s) from which it was collected
- The amount of each sample
- Sample description (e.g., color, odor, clarity)
- Identification of sampling devices
- Identification of conditions that might affect the representativeness of a sample (e.g., refueling operations, damaged well casings)
- All information required to demonstrate that the work is conducted in accordance with applicable Sampling Plans, Work Plans and SOPs

All information relating to installation and development of monitor wells, installation of temporary groundwater sampling points, well development, well purging, groundwater sample collection and all other sampling activities or field work shall be recorded in a field logbook or field form(s). When field forms are used the field logbook shall reference the data noted on field forms and the field forms shall be dated and signed by the author. The field logbook will be bound with consecutively numbered pages and will be suitable for submission as evidence in legal proceedings. Each entry in the field logbooks will be signed and dated by the author. All original data recorded in the field logbook and other field forms will be written using permanent, waterproof ink. Errors made in the field logbook will be corrected by the individual making the entry by crossing a line through the error, entering the correct information, and dating and initialing the correction. The field logbooks and field forms will become part of the project file, and should be kept in the project file at all times when not in the possession of the field team.

3.0 PHOTOGRAPHS

General guidelines (all types of photos):

- If possible, use a camera that has a time and/or date stamp. Record the date and time each photo was taken on the photo or with the photo file (as applicable) and in the field logbook.
- Do not use special lenses (i.e., wide-angle lenses) as they can distort the image
- A brief, accurate description of what the photograph shows, including the name of the site and location shall be recorded in the field logbook.
- Include the name of the photographer, and witness, as applicable.

When photographs are taken the record of each frame exposed/recorded is kept in the bound field logbook along with the information above required for each photograph. The field investigator shall then enter the required information on the prints, slides or CD (if digital photos) using the photographic record from the bound field logbook, to identify each photograph.

Conventional 35 mm Cameras

- Obtain negatives in one continuous, uncut sheet and include with the pictures.
- Arrange photos in album format and include the above information for each photo and submit with the field logbook.

Digital Cameras

- Submit a CD-R of the downloaded picture files in JPEG format (include the above information for each photo) and submit with the field logbook.
- Digital camera recording mode (dependent on camera's pixel resolution quality and picture quality mode) shall be set to achieve a minimum pixel resolution of 1600 x 1200 or higher.

4.0 OTHER FIELD FORMS

Other types of records which may be used in the field include:

- Drum inventory forms
- Well development/purging records
- Boring logs
- Well construction diagrams (as-builts)

5.0 CAUTIONS AND INTERFERENCES

This section is not applicable to this SOP.

STANDARD OPERATING PROCEDURE NO. 6.4
SAMPLE HANDLING AND CONTROL

1.0 METHOD SUMMARY

This SOP presents procedures for maintaining control of environmental samples following collection through shipment to the analytical laboratory. In addition, this SOP describes standard chain-of-custody protocols which should be followed to document the possession of samples from the time of collection until the laboratory report is submitted.

2.0 EQUIPMENT/APPARATUS/REAGENTS

Equipment needed for use in this SOP includes:

- Precleaned sample containers
- Preservatives (if not in containers)
- Sturdy cooler, in good repair
- Fiberglass strapping tape
- Duct tape
- Clear tape
- Bubble wrap or other packing material
- Ziploc-type bags
- Trash bags
- Ice
- Shipping labels
- Pens, markers, etc.

3.0 PROCEDURES

3.1 Sample Identification

The contractor should identify procedures for unique sample identification and the relation to field identification (i.e., how sample numbers are assigned). Samples shall be uniquely identified, labeled, and documented in the field at the time of collection. Samples collected for laboratory analysis are identified by using standard sample labels which are affixed to the sample containers. Most analytical laboratories will supply the necessary labels. The following information shall be included on the sample label at the time of collection using waterproof, non-erasable ink:

- Project number
- Field identification or sample station number
- Date and time of sample collection
- Designation of the sample as a grab or composite
- Whether the sample is preserved or unpreserved
- The types of analyses to be performed
- Any relevant comments (such as readily detectable or identifiable odor, color, or known hazardous properties)
- Signature or initials of the sampler(s)

3.2 Sample Packaging

Environmental samples should be packed prior to shipment using the following procedures:

1. Allow sufficient headspace (approximately 10 percent of the volume of the container) in all bottles (except volatile organic analysis (VOA) vials with a septum seal) to compensate for any pressure and temperature changes which may occur during shipment.
2. Ensure that the lids on all bottles are tight.
3. Select a sturdy cooler in good repair. Secure and tape the drain plug with fiberglass strapping tape or duct tape. Line the cooler with a heavy duty plastic garbage bag.

4. Place glass sample bottles into bubble wrap bags or wrap a layer of bubble wrap around glass containers. Many laboratories provide bubble wrap bags for sample shipment. Place two to three VOA vials in a single bag.

5. Place the bottles in the cooler with larger bottles on the bottom inside the garbage bag. Insert polyethylene bottles between glass bottles for cushion. Put VOA vials (in bubble wrap bags) on their side on top of the larger sample containers.

6. Ensure that a trip blank has been included as appropriate for VOA samples and that a temperature blank (if supplied) is included as outlined in SOP No. 6.3, and SOP No. 6.5.

7. Place ice that has been "double bagged" on top of and/or between the samples. Fill remaining void space in the cooler with bubble wrap. Ensure that a sufficient quantity of ice has been placed into the cooler to maintain VOC samples at 4°C. In summer months, it may be necessary to fill as much as 50 percent of the cooler volume with ice to properly cool warm samples.

8. Securely fasten the top of the garbage bag with tape.

9. Place the Chain-of-Custody record into a Ziploc-type bag and tape the bag to the inside of the cooler lid.

10. Close the cooler and securely tape (preferably with fiberglass strapping tape) the top of the cooler shut. Chain-of-custody seals (preferably two) should be affixed to the cooler with clear tape so that the cooler can not be opened without breaking the seals.

11. Place the shipping label in a sealed pouch on the lid of the cooler for shipment. A label containing the name and address of the shipper and the destination should be placed on the outside of each additional cooler included in the shipment.

3.3 Sample Shipping

Samples collected in the field shall be transported to the laboratory or field testing site as expeditiously as possible (within 24 hours of sampling) to avoid hold time exceedances and to ensure that samples remain properly preserved. Samples for VOC analysis must be maintained at a temperature of 4°C.

In general environmental samples include drinking water, most ground water and ambient surface water, soil, sediment, treated municipal and industrial wastewater effluent, biological specimens, or any samples not expected to be contaminated with high levels of hazardous materials. Samples collected from process wastewater streams, drums, bulk storage tanks, soil, sediment, or water samples from areas suspected of being highly contaminated may require shipment as dangerous goods. Regulations for packing marking, labeling, and shipping of dangerous goods by air transport are promulgated by the International Air Transport Authority (IATA), which is equivalent to United Nations International Civil Aviation Organization (UN/ICAO). It is the responsibility of the shipper to ensure that shipments are made in accordance with all applicable laws, including contents and labeling.

3.4 Sample Chain-of-Custody

Procedures to ensure the custody and integrity of the samples should begin at the time of sampling and continue through transport, sample receipt, preparation, analysis and storage, data generation and reporting, and sample disposal. Records concerning the custody and condition of the samples are maintained in field laboratory records.

The contractor shall maintain chain-of-custody records for all field and field QC samples. A sample is defined as being within a person's custody if any of the following conditions exist:

- It is in their possession,
- It is in their view,

- It was in their possession and they secured it in a locked area, or
- It is in a designated secured area.

All sample containers shall be sealed in a manner that shall prevent or provide detection of tampering if it occurs. In no case shall tape be used to seal sample containers. Samples shall not be packaged with activated carbon unless prior approval is obtained from TCEQ.

The following minimum information concerning the sample shall be documented on the TCEQ chain-of-custody form (Attachment 1):

- Unique sample identification
- Date and time of sample collection
- Source of sample (including name, location, and sample type)
- Designation of matrix spike/matrix spike duplicate (MS/MSD)
- Preservative used
- Analyses required
- Number of sample containers
- Pertinent field data (pH, temperature, elevated headspace results or contaminant concentrations)
- Serial numbers of custody seals and transportation cases (if used)
- Name(s) of person(s) collecting the samples
- Custody transfer signatures and dates and times of sample transfer from the field to transporters and to the laboratory or laboratories
- Transporter tracking number (if applicable) or courier receipts

4.0 CAUTIONS AND INTERFERENCES

This section is not applicable to this SOP.

CHAIN OF CUSTODY RECORD

Page ____ of ____

Project Name				Project No.				Analytical Parameters										
Project Location				Project Manager														
Sampler(s)																		
Sample		Type		Sample Identification	Matrix	Containers												
Date	Time	Comp.	Grab			No.	Type											Remarks

Signatures	Date	Time	Shipping Details	Special Instructions
Relinquished by:			Method of Shipment	
Received by:			Airbill No.	
Relinquished by:			Lab Address	
Received for Laboratory by:				

STANDARD OPERATING PROCEDURE NO. 6.5
COLLECTION OF QA/QC SAMPLES

1.0 METHOD SUMMARY

Quality assurance/quality control samples are collected to attempt to determine if sample bottle preparation, sample shipment, handling, and storage procedures had an impact on the sample integrity. Data validation is an integral part of the sampling program and consists of reviewing and assessing the quality of data and determining the usability of the data based on previously defined objectives.

2.0 EQUIPMENT/APPARATUS/REAGENTS

The following equipment is used for collection of QA/QC samples:

- Pre-cleaned sample containers (with preservatives, if required)
- Analyte-free water (distilled or deionized)
- Stainless steel sampling bowl
- Stainless steel sampling spoon
- Other equipment as prescribed for collecting soil or water samples

3.0 PROCEDURES

3.1 Collection Field QA/QC Samples

3.1.1 Equipment Blanks

Equipment blanks should be collected using the following procedures:

1. Properly decontaminate the sampling device. Equipment blanks are not collected on disposable equipment (e.g., disposable bailers).
2. Select the proper sample containers and an appropriate quantity of analyte-free water (deionized or distilled).
3. Complete the sample labels with the appropriate information.
4. Slowly pour the analyte-free water through or over the sampling device until the sample bottle is filled to the appropriate level.
5. Securely tighten the cap on the bottle.
6. Prepare the bottle for shipment in accordance with SOP 6.5 (Sampling Handling and Control).

3.1.2 Field Blanks

Field blanks should be collected downwind of possible VOC sources. The procedures for collecting field blanks are:

1. Select the proper sample containers (VOC vials) for collecting the sample and an appropriate quantity of analyte-free water.
2. Complete the sample labels with the appropriate information.
3. Pour the water into the vial just to overflowing so that there is a meniscus at the top of the vials.
4. Securely tighten the lid on the sample vials.
5. Prepare the sample for shipment in accordance with SOP 6.5 (Sampling Handling and Control).

3.1.3 Field Duplicate Samples

Duplicate samples should be collected simultaneously or in immediate succession, using identical recovery techniques, and treated in an identical manner during storage, transportation, and analysis. If possible, collect duplicate samples in areas known to be contaminated to assess the laboratory's ability to measure contamination.

1. Select the proper sample containers for collecting a sample and a duplicate sample.

2. Complete the sample labels with the appropriate information.
3. Collect the sample as required.
   a. Groundwater Samples
      i. Collect the sample in accordance with the appropriate sampling SOP.
      ii. Fill the sample bottle half full with the pump or bailer then fill the duplicate sample bottle half full. Fill the remainder of the sample bottle then the remainder of the duplicate sample bottle. If a bailer is used, attempt to fill equal quantities from each bailer load into the sample and duplicate bottles.
   b. Soil Samples
      i. Collect the sample in accordance with the appropriate sampling SOP but collect double the required sample volume.
      ii. Place the sample material into a stainless steel bowl and homogenize the sample with a stainless steel spoon. Do not homogenize samples for VOC analysis as the homogenization will cause a release of VOC constituents.
      iii. Quarter the sample bowl and set aside two of the sample quarters.
      iv. Homogenize the sample again.
      v. Fill the appropriate sample jars using the material from the bowl, placing equal portions of sample into the sample bottles.
4. Securely tighten the caps on the sample bottles.
5. Prepare the sample for shipment in accordance with SOP 6.5 (Sampling Handling and Control).

3.1.4 Field Replicate (Split) Samples

If possible, collect field replicate samples from areas known to be contaminated to assess the laboratory's ability to measure contamination.

1. Select the proper sample containers for collecting a sample and a replicate sample.
2. Complete the sample labels with the appropriate information.
3. Prepare the sample using the same methods described in Section 3.1.3.
4. Place the field replicate samples in a separate cooler for shipment to the second laboratory.

3.1.5 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Many laboratories can prepare the MS/MSD samples from the submitted sample volume. The sampler is only required to identify the sample for MS/MSD analysis on the chain of custody. If the sampler is required to collect MS/MSD samples, they should be collected as replicate samples but with three sets of samples (one original sample, one matrix spike sample, and one matrix spike duplicate).

3.1.6 Temperature Blank

Temperature blanks are typically prepared by the analytical laboratory and included in the shipment of sample coolers and containers. One temperature blank should be returned to the laboratory in each sample cooler.

3.1.7 Trip Blank

Trip blanks are usually prepared by the analytical laboratory using analyte-free water and included in the shipment of sample coolers and containers. Trip blanks should only be submitted with samples requiring VOC analysis. One trip blank should be included in each sample cooler containing samples for VOC analysis. The procedures for submitting a trip blank are:

- Prepare the coolers for shipment to the laboratory. If possible, pack all samples for VOC analysis in one cooler so that only one trip blank is required.
- Identify the trip blank on the chain-of-custody record. If the project will continue for several days, be sure to number trip blanks sequentially so that multiple trip blanks with the same identification number are not submitted to the laboratory.
- Ensure that VOC analysis (or benzene, toluene, ethylbenzene, and xylenes (BTEX) at Leaking Petroleum Storage Tank (LPST) sites) is the selected analysis for the trip blank.

4.0 CAUTIONS AND INTERFERENCES

The types of QA/QC samples and frequency for collection are typically outlined in the project Quality Assurance Project Plan (QAPP). It is important to identify the sample frequency prior to beginning the field effort. QA/QC samples should be selected to match the sampling program (i.e., it is not necessary to collect trip blanks for sites where only samples for metals analysis are being collected).

STANDARD OPERATING PROCEDURE NO. 10.5
SOIL SAMPLING USING A SHELBY TUBE SAMPLER

1.0 METHOD SUMMARY

Subsurface sampling attempts to remove soil below the ground surface in a relatively undisturbed state in order to quantify the extent of contamination at specific depths. Soil samples shall be collected based on odors, discoloration, organic vapor meter readings, predetermined depth, and any other appropriate field screening method.

2.0 EQUIPMENT/APPARATUS/REAGENTS

The contractor shall describe the equipment to be used to collect the sample, field screening equipment including calibration and quality control (QC) requirements for the samples to be taken. Each instrument will be calibrated according to the manufacturer's operating manual prior to each day's use. Instrument calibrations will be documented in the field book. During this calibration, an appropriate maintenance check will be performed on each piece of equipment. If damaged or failed parts are identified during the daily maintenance check and it is determined that the damage can impact the instrument's performance, the instrument will be removed from service until the part or parts are replaced or repaired. An equivalent piece of equipment will be substituted for the malfunctioning instrument to maintain schedule, if possible. Typical equipment required for subsurface sampling includes:

- Tape measure (in tenths of feet)
- Shelby tube samplers
- Rig-mounted extruder
- Knife
- Field logbook
- Waterproof and permanent marking pens
- Duct tape
- Decontamination supplies
- Paper towels
- Appropriate personal protective equipment (PPE)
- Sample jars with labels
- Cooler with ice
- Zip-lock bags
- Drum for drill cuttings, if necessary
- Organic Vapor Meter
- Table for examining drilled cores

3.0 PROCEDURES

When soil samples are to be submitted for laboratory analysis, they shall be collected using stainless steel, continuous drive, Shelby tube samplers. These samplers are 24 inches in length and have an outside diameter (OD) of 2 inches. Shelby tube samplers are not appropriate for use on sandy, unconsolidated materials.

1. Decontaminate the Shelby tube sampler to be used for soil sampling.
2. Soil sampling using a Shelby tube sampler is performed in conjunction with SOP 5.1 (Hollow Stem Borehole Advancement) or 5.3 (Mud Rotary Borehole Advancement).
3. Attach the Shelby tube sampler to the center rods and lower the sampler to the bottom of the bore hole.
4. Drive the sampler a depth of 2 feet into undisturbed soil.
5. Pull the Shelby tube sampler out of the bore hole and detach the sampler from the center rods.
6. Place the Shelby tube with the "bottom" (the end of the tube with the shallowest sample) of the tube against the extruder head. Extrude the sample into a decontaminated trough.
7. As soon as the Shelby tube sample is extruded, monitor the sample for organic vapors using the PID or FID.
8. Record the results on the boring log and in the field log book.

Carefully split the sample core using a decontaminated stainless steel knife. Immediately cut center sections for VOC samples and place into appropriate sample containers, filling the container as full as possible. Immediately place the sample in an iced cooler held at a temperature below 4 degrees C.

Samples collected to be tested for other analytical parameters concurrently with VOCs shall be then collected. Soil chemistry samples not being analyzed for VOCs shall be placed in 8 or 16-ounce, laboratory cleaned, EPA-approved glass containers with Teflon-lined lids. This shall be done using clean stainless steel sampling tools and rubber gloves. If initial screening results indicate the presence of organic vapors, a headspace analysis shall be conducted on remaining portions of the sample.

Grab samples shall be collected by obtaining a representative volume of soil from the area to be sampled and placing it directly into the sample bottle.

If soil samples are being collected for VOC analysis, the sample collection procedures discussed in TCEQ Superfund Program SOP No. 6.3 (Collection of VOC Samples) must be followed.

Collection of QC samples shall be done in accordance with SOP 6.5 (Collection of QC Samples).

The sampling equipment shall be decontaminated in accordance with SOP 1.5 (Decontamination) between each sample, and new gloves should be worn each time.

4.0 CAUTIONS AND INTERFERENCES

Rock or impenetrable soil may be encountered during Shelby tube sampling. If this is the case, a different method may be used (drill rig, etc), or it may be necessary to move to another location. If access is a problem, different drilling methods or locations may solve this problem as well. Additionally, if loose, unconsolidated materials are encountered, a different sampling method, such as the use of split spoon sampling devises, will be necessary, therefore the contractor should be prepared for all scenarios and uncertainties.

1.0 METHOD SUMMARY

TCEQ requires the use of Global Positional System (GPS) in conjunction with other technologies to collect and maintain positional data that provides physical and environmental site information about plume and contaminate changes over time. Also GPS technologies are used to provide the boundaries of buildings, real property, waste areas, locations of wells and other relevant site features.

2.0 GPS CERTIFICATION

To ensure that TCEQ receives reliable and accurate positional data, TCEQ OPP 8.12 requires that the GPS data collector must be certified. The TCEQ staff may obtain GPS certification by attending a training course presented by either an internal GPS trainer or by a manufacturer-certified GPS trainer. Non-TCEQ staff may obtain GPS certification from a manufacturer-certified GPS trainer. All GPS data collectors must verify that the certification instruction they have received meets the minimum elements listed in Table 1 - GPS Certified Training Minimum Elements in the Third Party GPS Training Certification section of this SOP.

3.0 EQUIPMENT/APPARATUS

A DGPS (Differential Global Positioning System) receiver can be either a stand alone unit, or a GPS module with Differential GPS antenna and relevant satellite subscription, plugged into a portable computer. The DGPS receiver must:

- Have six channel parallel reception or better.
- Have sub-meter horizontal accuracy.
- Employ these processing parameters:

Position acquisition rate	-	1/second or better
Position mode	-	3D (uses 4 satellites)
Maximum PDOP	-	6(or less)
Minimum Elevation	-	User-Selectable (record elevation accuracy)

- Have the ability to perform real-time differential correction (no post processing).
- Receive correction data from a recognized, reliable source, and which is appropriate for real-time correction in the geographic area in which the GPS measurements will be made.
- Output correction data in RTCM-SC104 (Radio Technical Commission of Maritime Service - Special Committee Paper No.104) format via an RS-232 cable or other compatible connection which matches the DGPS receiver.
- Have ability to store at least 180 position measurements.
- Have ability to transfer almanac and position data to a personal computer via a serial port or USB connection.
- Include software to perform mission planning, differential correction, point data averaging, and conversion to common formats (Grid or ArcView).
- Have a water and shock resistant case.
- Include portable power source(s) which will last a full working day.
- All weather proof Field Log Book.
- A laser rangefinder (optional)

4.0 GPS DATA COLLECTION AND ACCURACY

Horizontal Accuracy - All horizontal positions collected using certified GPS units shall maintain sub-meter

accuracy. In order to meet sub-meter accuracy, latitude and longitude coordinates should be carried out to at least 6 places for decimal degree and at least 2 place for decimal seconds.

DGPS - Differential Global Positioning System (DGPS) receiver which corrects the atmospheric effects. DGPS are used for realtime GPS mapping and tracking without the need for post-processing.

PDOP - Positional Dilution of Precision. A measure of the quality of a GPS measurement taken from a given set of four satellites at a given time. If the satellites are not widely distributed from the user's location, the PDOP value will be higher, and the quality of the measurement will be diminished. PDOP values greater than 6 are not acceptable.

Datum - A mathematical model used by cartographers to define the shape of the earth in a specific area. Always use North America Datum of 1983 (NAD 83).

Differential Correction - A process applied to raw GPS data that removes certain types of errors; primarily, the error introduced by Selective Availability. This process requires correction data from a reference GPS receiver operating from a precisely known location. Correction data must be obtained from a recognized, reliable source (such as the reference network maintained by the Texas Department of Transportation) or Racal LandStar, and certain Trimble units, provide a satellite delivered GPS correction service, which provide 24 hour accurate and reliable real time precise positioning on land and in the air. For full coverage in Texas, the differential signal is transmitted to the user by high-power geostationary satellites. The GPS and differential signal are both received by the GPS via a single antenna.

A single position reading obtained through appropriate use of real-time correction must have sub-meter accuracy.

Collection Methods - GPS data may be collected using one of three methods:

- Superimposed - The superimposed method involves standing on top of or next to the subject for which you are collecting GPS locational data. Collect 60-100 readings.
- Centroid - The centroid method is used when the superimposed method cannot be used (e.g. well inside a locked fence or structure). Take points equal distance from the desired point by starting and stopping the GPS and by averaging these points. The unit will average the point for each reading and then all the points as one point which will be the center of all the readings. Collect a minimum of 30 readings per point prior to averaging.
- Offset - The offset method is used when the superimposed method cannot be used and only when accurate offset measurements can be made (e.g. Using a laser rangefinder, tape measure, etc.) The potential error associated with the offset measurement must be added to the potential error associated with the GPS measurement. A note in the GPS logging software and the field log book of bearing and distance from the offset location can be used but location must be corrected before it is entered into a table or shape file.
- Points - The point is used for well and sample locations, gates, sub-meter objects, etc.
- Line - The line is used for trail, road, stream, berm, etc.

- Polygon - The polygon is used for buildings, site boundary, waste area, ponds or piles, etc. If it is hard to walk the entire perimeter, readings can be taken at each corner of the polygon by starting and stopping the GPS at the corners and within the same Station. The program will add the line in between the points of the Station to create a polygon.

5.0 DATA SUBMITTALS

Correction Status - All GPS data submitted must have a field indicating each record's differential correction status. There are only two selections available:

- Differential Correction - Indicates that the record has been differentially corrected.
- Uncorrected - Indicates that the record has not been differentially corrected.

Offset - The offset points must be noted in the field log book and actual points calculated before entering the station into the final database or shape file.

Events - Each event must be in separate data table or shape file.

Data Sets - Each data set must be in separate file or layer (e.g All wells, buildings, site boundaries, sample results/event, site features, roads, trails, utilities, etc. must be in separate layers/tables).
Arc View files - All data must be in Decimal Degrees, NAD 83 exported to Arc View 3.2 as a shape files with the relevant metadata, a hard copy of the Arc View tables must accompany the electronic version for TCEQ submittal.

Field Log Book - Site name location and details of field activity must be noted in the field log book, including the name and coordinates of each station and bearing and distance details describing any station off-sets.

Minimum Attributes - All GPS data submitted to TCEQ should conform to the data attributes defined in Table 1.

Table 1
GPS Data Attributes

Attribute	Data Type	Field Length	Description
Latitude	Number	Double	Decimal Degree to a minimum of six decimal places
Longitude	Number	Double	Decimal Degree to a minimum of six decimal places
Site Name	Text	50	Superfund Site Name
Station Name	Text	50	Monitoring well number or Sample name
Station Reference / Comments	Text	50	Station Location Relative to Facility
Station Type	Text	10	Point, Line or Polygon
Collector Name	Text	50	Last Name, First Initial
GPS Certificate Number	Text	8	TCEQ GPS Certificate Number
Collection Method	Text	15	Superimposed, Centroid, Offset
Datum	Text	5	Horizontal Datum (NAD27, NAD83 or WGS84)
Max PDOP	Number	Single	Maximum PDOP value in effect during data collection (not > 6)
Receiver Type	Text	50	GPS model name & accuracy
Correction Status*	Text	50	Tells whether or not GPS data was differentially corrected
GPS Date	Date	N/A	Date GPS data was collected
GPS Time	Text	8	Time GPS data was collected
Total Positions Collected	Number	Integer	Number of positions collected/corrected

* Data that is not differentially corrected will be rejected.

Data Format - GPS data submitted to TCEQ should be in electronic format (dBASE IV, .dbf file format is preferred). The following is an example of how the data table should be structured. The data may be submitted via email, on diskette, or CD.

Table 2
Third Party GPS Data

Example Data Table

Latitude	Longitude	Site Name	Station Name	Station Reference/ Comments	Collector Name	TCEQ GPS Certificate Number	Datum	Collection Method	Max PDOP	Receiver Type	Correction Status	GPS Date	GPS Time	Total Positions
11.111000	99.999000	Pioneer	MW-21	NW Corner	Terry, D	95081107	NAD83	Superimposed	4.4	Trimble XRS DGPS	Differential Correction	5/22/00	10:10 AM	61
11.111100	99.999100	Pioneer	MW-22	Center of the facility	Terry, D	95081107	NAD83	Centroid	5.2	Trimble XRS DGPS	Differential Correction	5/22/00	10:25 AM	108
11.111200	99.999200	Pioneer	MW-23	S of entrance	Terry, D.	95081107	NAD83	Superimposed	3.5	Trimble XRS DGPS	Differential Correction	5/22/00	1:38 PM	66
11.111200	99.999200	Pioneer	site location	South Entrance of facility	Terry, D.	95081107	NAD83	Superimposed	3.5	Trimble XRS DGPS	Differential Correction	5/22/00	3:38 PM	60

Third Party GPS Training Certification
Minimum Qualifications
Texas Natural Resource Conservation Commission

TCEQ OPP 8.12 requires all GPS training courses to include both lecture/classroom discussion and hands-on exercises. Table 1 contains the minimum elements that must be included in any TCEQ-recognized GPS certification training course

Table 1
GPS Certification Training
Minimum Elements

Minimum lecture and/or demonstration elements	Minimum hands-on exercises, to be successfully completed by each student
☐ Background of the Global Positioning System. ☐ GPS accuracy issues. ☐ Relevant Agency operating policies. ☐ Operation of GPS equipment, including basic troubleshooting. ☐ Data collection procedures. ☐ Differential correction, both real time processing and post processing. ☐ Coordinate averaging for point locations. ☐ Data output in formats appropriate for import to GIS or tabular databases.	☐ Pre-planning, including data quality objectives, equipment and materials needed, logistics of field data collection, and prediction of GPS data collection conditions. ☐ Navigation to a given coordinate. ☐ Storing and transferring raw positional data. ☐ Differential correction of raw data through post processing. ☐ Averaging corrected point data and outputting to a GIS file.
Class exercises shall also include computer plotting of point data to allow students to better understand GPS accuracy issues and the effects of differential correction and point data averaging	
Note: All certified GPS users recognized by TCEQ must be recertified every 2 years; • Sales or user demonstrations do NOT constitute GPS training; • GPS training courses should last a minimum of six to eight hours; • The TCEQ GPS operating policy is available online at: http://www.tceq.state.tx.us/gis/gisplcy.html	

Individuals obtaining or with current GPS certification training must verify that the instruction they have received meets the minimum elements listed in Table 1. Therefore, fill out the attached form, along with copies of GPS training certificates, and return them to:

David P. Terry
TCEQ GPS Coordinator (MCC-155)
SWAP Team
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087
(512) 239 4755
Email: dterry@tceq.state.tx.us

GPS Certification Verification Form
Texas Commission on Environmental Quality

Contact Information				
GPS Training Coordinator Information			**Training Provider Information**	
Name			Organization Providing GPS Training	
Organization			Instructor	
Mailing Address			Course Name	
City	State	ZIP	Course Date	Course Hours
Email Address			GPS System (e.g. Trimble, Magellan, etc.)	Manufacture Yes ☐ No ☐

The following individual(s) have received GPS certification training that complies with TCEQ OPP 8.12 minimum training elements:

Name	Title

I hereby state that the information provided is true, accurate, and complete to the best of my abilities

Signature of GPS Training Coordinator or GPS Trainer | Title | Date

Printed Name | Telephone Number | Extension

Appendix B

February 28, 2011

Omar Valdez, Project Manager
TCEQ Superfund Section, MC-136
P.O. Box 13087
Austin, Texas 78711-3087

Re: Summary of Field and Laboratory Metals Analysis
Dona Park Neighborhood, Corpus Christi, Texas

Dear Omar:

As requested, Daniel B. Stephens & Associates, Inc. (DBS&A) has completed its initial evaluation of the use of the field x-ray fluorescence (XRF) as a screening tool to determine whether measured metal concentrations in soils warrant cleanup. This letter briefly summarizes our analysis. We have also attached a series of data plots that support the conclusions being drawn.

Scope of Services

The field event was designed to evaluate whether portable field XRF could be used to determine if further action was required at each of the houses being evaluated. The field event included the performance of the following tasks: (1) collection of 20-point composite samples from both the front and back yards (study units) of the houses being evaluated, (2) collection of in-situ metal concentrations with a portable XRF device at each of the 20 locations making up the composite sample, (3) analysis of the composite sample five times with the field XRF, and (4) submittal of the composite sample to a fixed laboratory for total metals analysis.

As part of the continuing analysis of the data, the following additional tasks have been performed for each of the primary metals (cadmium, lead, and zinc):

- Evaluation of the correlation between the mean concentration of the composite samples and the results received from the fixed laboratory (this work was performed by an independent third party)

- Evaluation of the correlation between the 20-point composite samples and the mean composite concentration

- Evaluation of the correlation between 10-point composite samples selected from both randomly generated locations and pattern-based locations and the mean composite concentration

Daniel B. Stephens & Associates, Inc.

6020 Academy NE, Suite 100 505-822-9400
Albuquerque, NM 87109 FAX 505-822-8877

- Evaluation of the correlation between 5-point composite samples selected from both randomly generated locations and pattern-based locations and the mean composite concentration

- Evaluation of the correlation between 10-point composite samples selected from both randomly generated locations and pattern-based locations and the 20-point composite sample

- Evaluation of the correlation between 5-point composite samples selected from both randomly generated locations and pattern-based locations and the 20-point composite sample

For the random comparisons, a random number generator was used to select the samples locations being evaluated. For the spatially determined locations, study units were determined based on a 4 x 5 or 5 x 4 composite sampling grid. The sample locations for the 10-point in-situ analyses were selected at the corners of the yard and at alternating interior locations. For the 5-point in-situ analyses, samples were selected as near as possible to the property corners and the middle of the yard. Because two general sample location schemes were used at the houses, a total of four patterns were needed to locate samples for this analysis. Figure 1 is a schematic diagram showing how these points were selected.

Results

Four Star Environmental provided independent third party review of the correlation between the composite samples that were analyzed at the fixed laboratory and the mean concentration of the five readings of the composite sample that were taken before the sample was shipped. Correlation plots of the mean XRF results and the fixed laboratory results are included as Attachment 1. XRF in-situ and/or ex-situ readings for all study units are provided in Attachment 2. In-situ XRF readings were not collected at study units where the moisture content exceeded 25 percent.

R-squared (R^2) is a statistical measure of the predictability of a data set that is used when performing linear regressions. It is an expression of how well one variable can be estimated if only a second variable is known. If the data show a perfect correlation, R^2 equals 1. The calculated R^2 values for comparing the composite laboratory data with the mean field XRF analysis of the composite sample are:

- Cadmium 0.6184
- Lead 0.9736
- Zinc 0.9765

These data suggest that the correlation between field measurements and laboratory measurements is very strong for lead and zinc and less strong for cadmium samples due to the low cadmium concentrations, which are near the XRF level of detection for cadmium.

Similar plots have been prepared for each of these metals to evaluate the strength of the correlation of the field XRF between the 5-, 10-, and 20-point in-situ samples with each other and relative to the composite mean samples (Attachment 3).

Table 1 presents the correlation of the in-situ measurements with the 20-point composites for both lead and zinc as expressed by the calculated R^2. Based on this analysis, the following conclusions can be drawn:

- For lead, the calculated R^2 between the 20-point in-situ mean sample and the 10-point in-situ mean sample from randomly generated and pattern based distributions were all very good, with calculated R^2 values ranging between 0.949 and 0.972. This indicates that regardless of whether samples are collected randomly or at spatially selected locations, 10 samples are very representative of in-situ conditions.

- For lead, the strongest correlation between the 10-point in-situ mean sample and the composite mean was for the randomly collected samples, with an R^2 calculated at 0.595. This indicates that 10 randomly generated samples are more representative than 10 pattern based locations.

- For zinc, the calculated R^2 between the 20-point in-situ mean sample and the 10-point in-situ mean sample from randomly generated and pattern based distributions were all very good, with calculated R^2 values ranging between 0.961 and 0.983.

- Since the strongest correlation between the 10-point in-situ mean sample and the composite mean was for the randomly collected samples for lead, a similar analysis strategy should be used for zinc. The correlation (R^2) between the 10-point in-situ mean sample and the composite mean for the randomly collected samples for zinc was 0.789.

- Because of the high number of non-detections in the field data set for cadmium, similar calculations were not made. It appears that cadmium at concentrations below 25 parts per million (ppm) are not easily discernible.

Moisture was also analyzed for this scope of work. Although XRF studies have shown that in-situ moisture may lower the XRF readings, it was unknown whether it is the case at this site due to additional variables, including soil type variability, at the site. A plot of the in-situ versus ex-situ (prepared composite samples) moisture is provided in Attachment 4. Lead concentrations were plotted versus soil moisture for a number of study areas. This plot indicates that at the soil moistures measured, both in-situ and composite samples showed strong correlation, indicating that soil moisture was not affecting the readings.

Action Levels for Future Work

We believe that the XRF is an especially strong tool for evaluating lead and zinc in soils, although it is not as strong with cadmium, owing to the lower action level. For lead or zinc, we

believe that if composite samples are being used for the analysis, a 10-point composite is as accurate as a 20-point composite, and the samples may be collected at randomly selected locations. Because of the strong correlation between the field composites and lab composites, a field action level may be set equal to the risk level. For lead, this translates to 500 ppm in a 10-point composite. For zinc, 7,000 ppm appears appropriate for a 10-point composite sample.

For cadmium, because of the variability of the field measurements and the low cleanup level of 50 ppm, we believe that any detection over 25 ppm with the field XRF should be sent to the laboratory for confirmation purposes.

Sincerely,

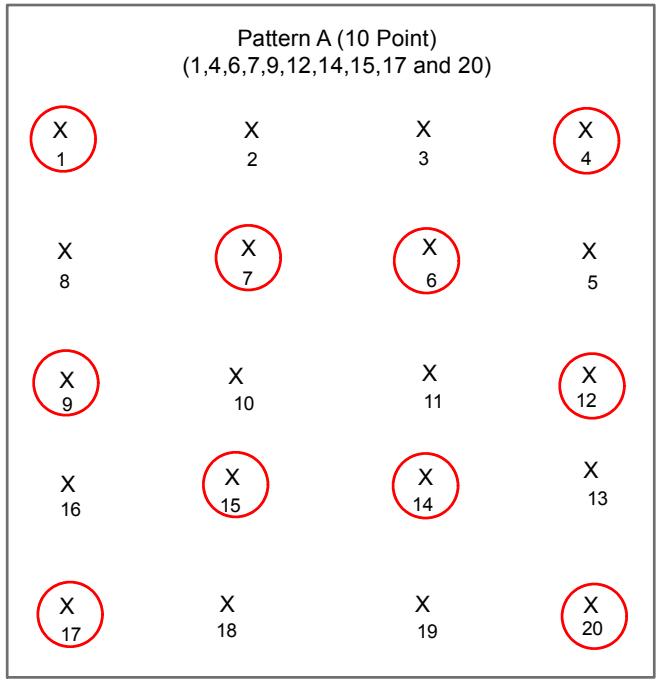
DANIEL B. STEPHENS & ASSOCIATES, INC.

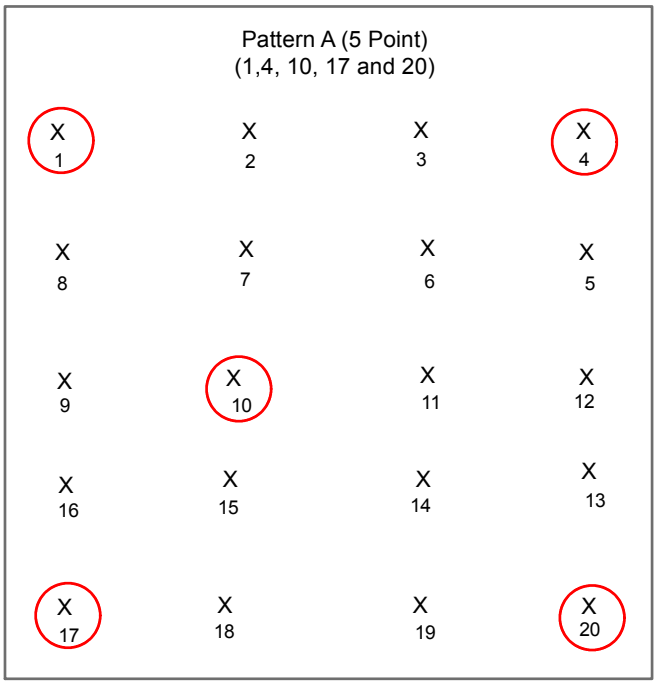
Douglas W. Reaber, P.G.
Technical Specialist

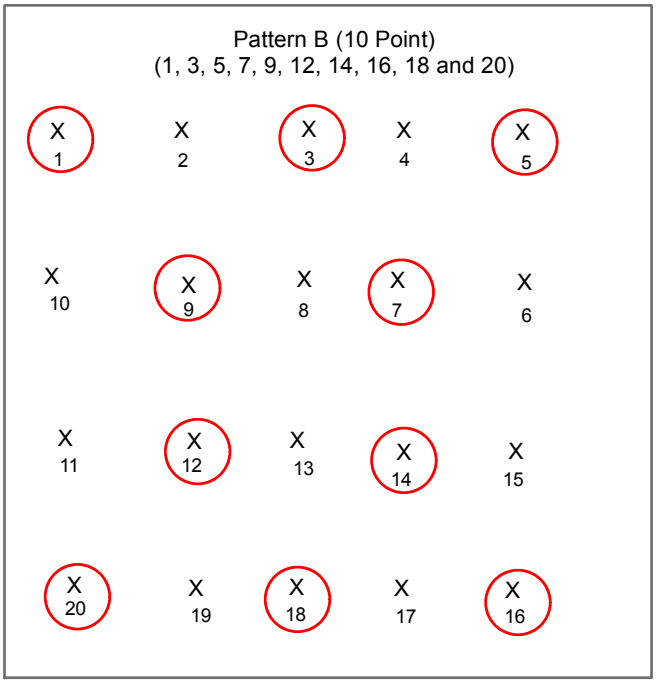
DWR/et
Attachments

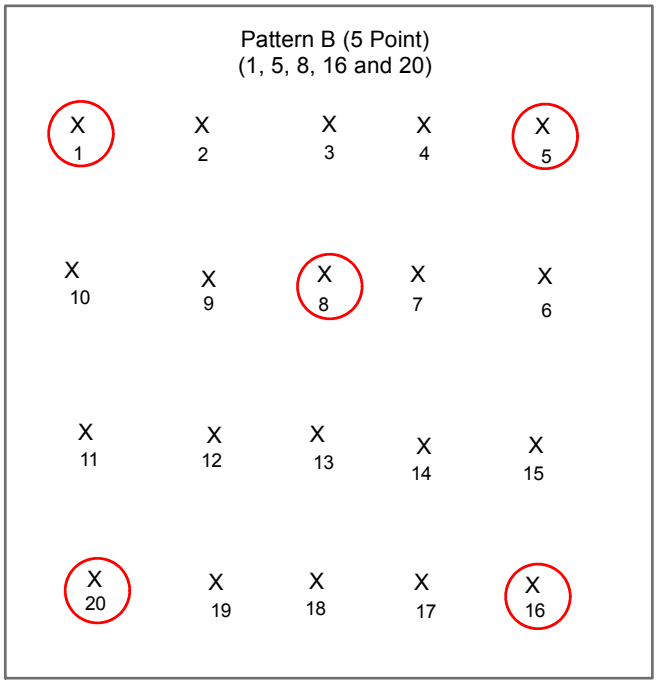
Table 1. Evaluation of Field and Laboratory Data, Dona Park

Correlation	Random		Pattern A		Pattern B	
	R^2	y intercept	R^2	y intercept	R^2	y intercept
Lead						
20-pt mean in-situ /10-pt mean in-situ	0.949	1.02x –0.58	0.954	1.0x +0.31	0.972	0.965x +0.16
20-pt mean in-situ /5-pt mean	0.165	1.59x +41.9	0.795	0.99x +3.8	0.912	0.842x +6.7
Composite / 20-pt mean in-situ	0.591	1.53x –4.4	0.569	1.2x +25.7	0.476	1.05x +10.9
Composite / 10-pt mean in-situ	0.595	1.45x	0.489	1.12x +39	0.490	1.1x +9.6
Composite / 5-pt mean in-situ	0.031	0.029x +157	0.569	1.11x +37	0.398	1.09x +16.2
Zinc						
20-pt mean in-situ /10-pt mean	0.9613	1.0037x +8.1475	0.9717	1.0233x –19.365	0.9813	0.9302x +26.931
20-pt mean / 5-pt mean in-situ	0.89	0.971x –17.948	0.8885	0.9676x +35.062	0.8942	0.8765x +67.046
Composite / 20-pt mean in-situ	0.8156	1.39x –131.81	0.7831	1.2972x +11.275	0.8656	1.5722x –386.83
Composite / 10-pt mean in-situ	0.7892	1.3355x –86.068	0.794	1.2582x +48.541	0.8052	1.6149x –372.21
Composite / 5-pt mean in-situ	0.6872	1.2395x +103.89	0.7226	1.2138x +132.13	0.7281	1.5556x –318.03









Not drawn to scale.

DONA PARK NEIGHBORHOOD

Pattern Schematic

N:/Client/TCEQ AIRS/Dona Park/FY11

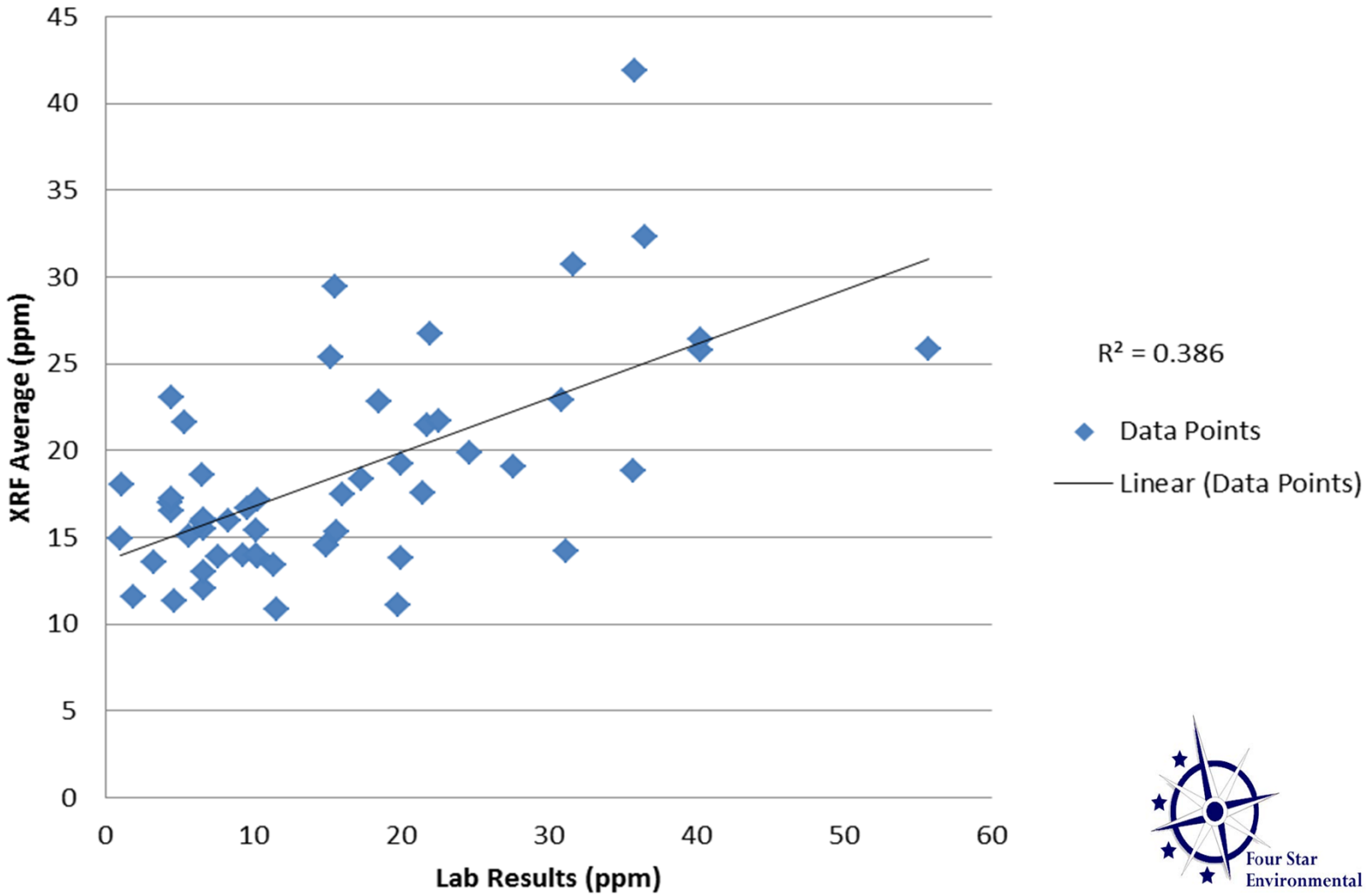
Daniel B. Stephens & Associates, Inc.

02/28/2011

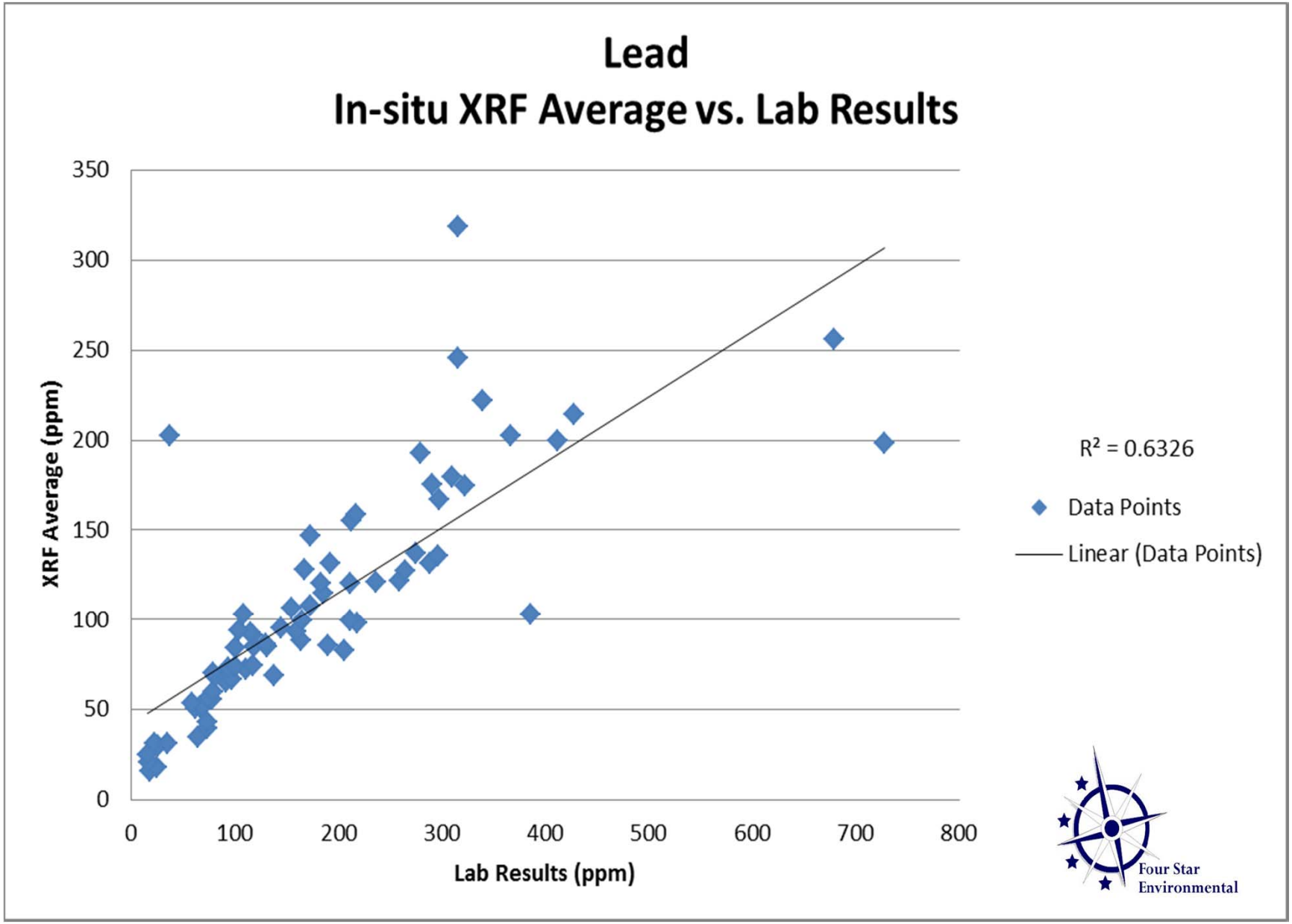
JN ES11.AIRS.09

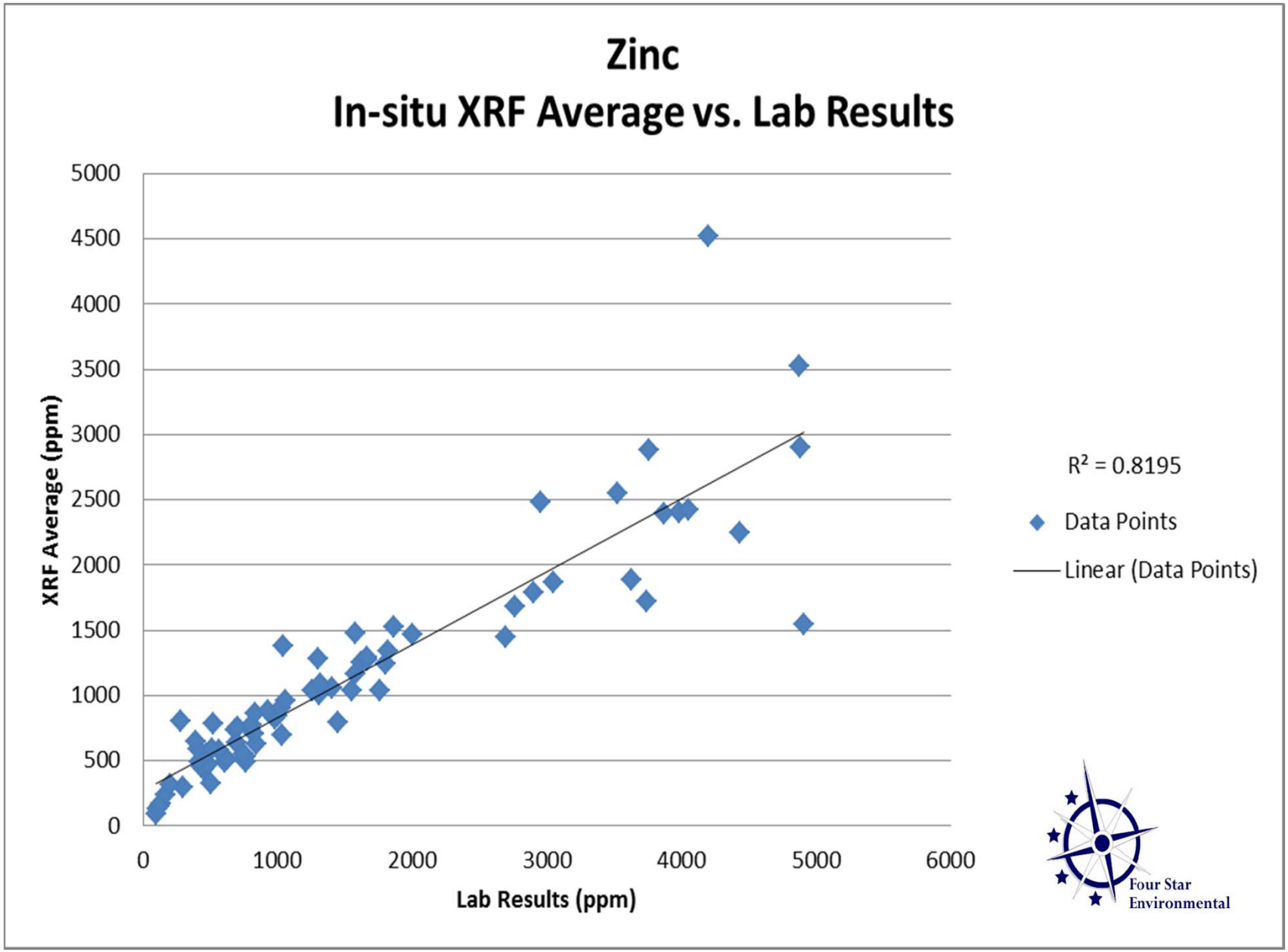
Figure 1

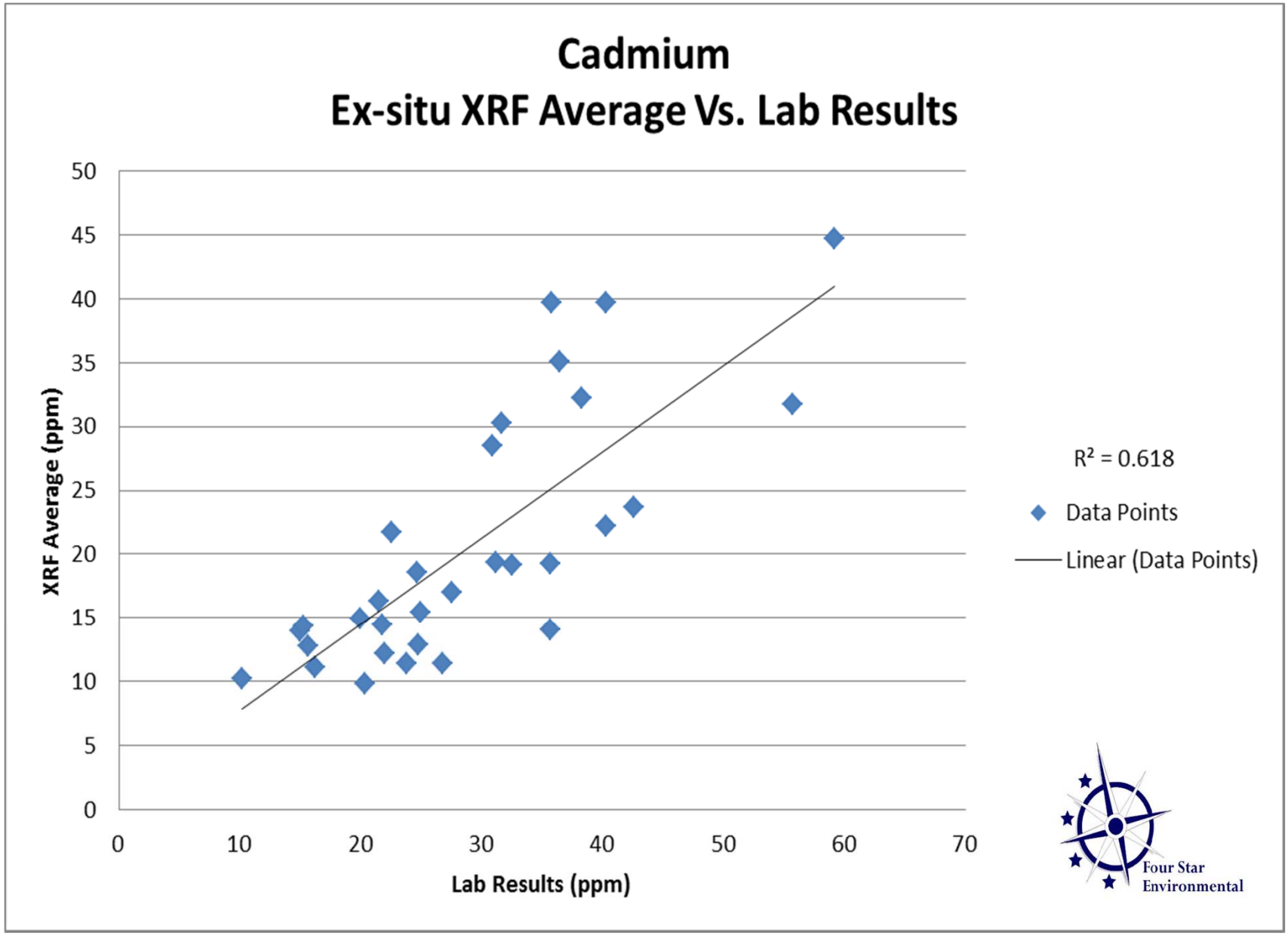
Cadmium
In-situ XRF Average vs. Lab Results

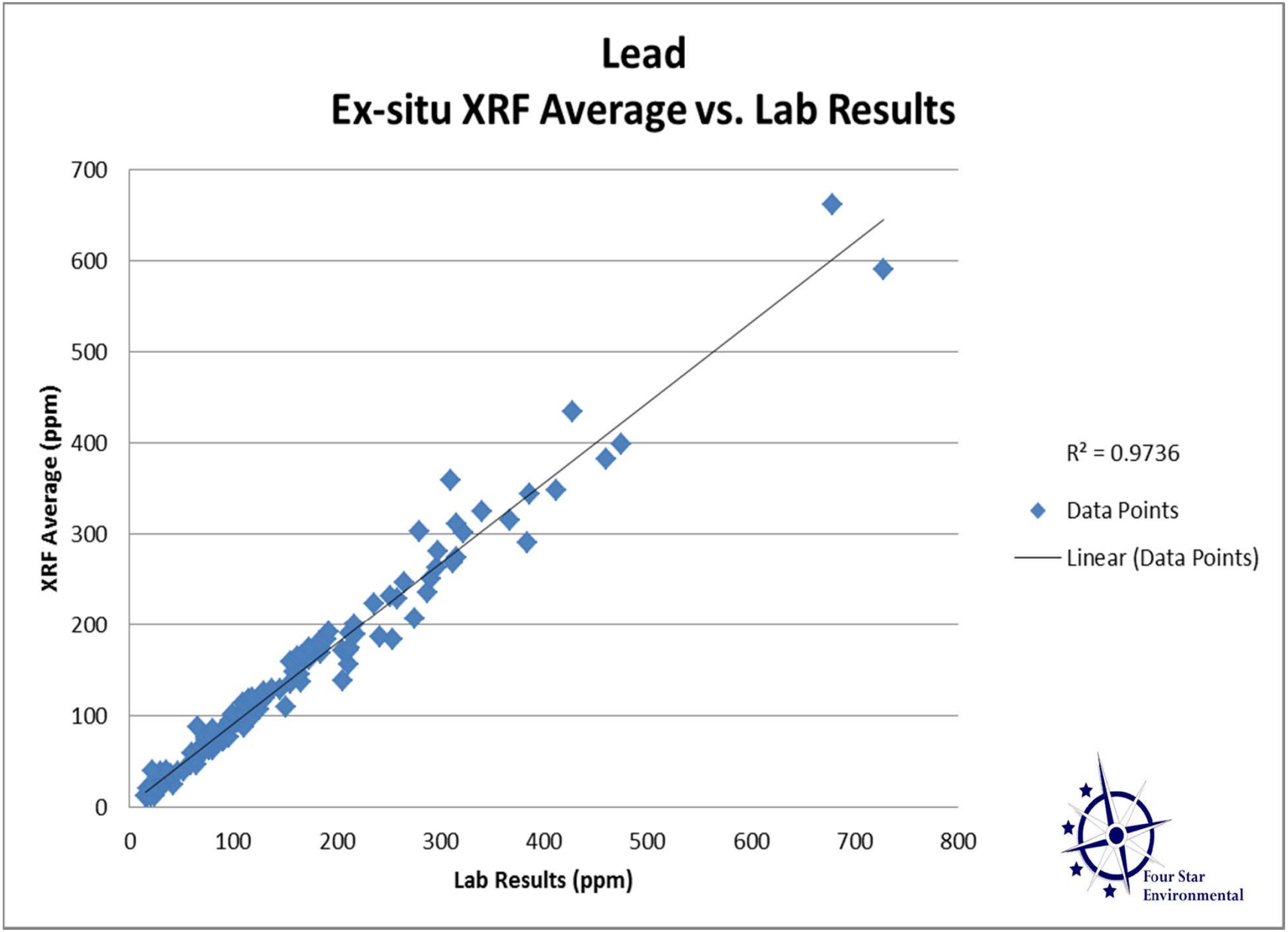


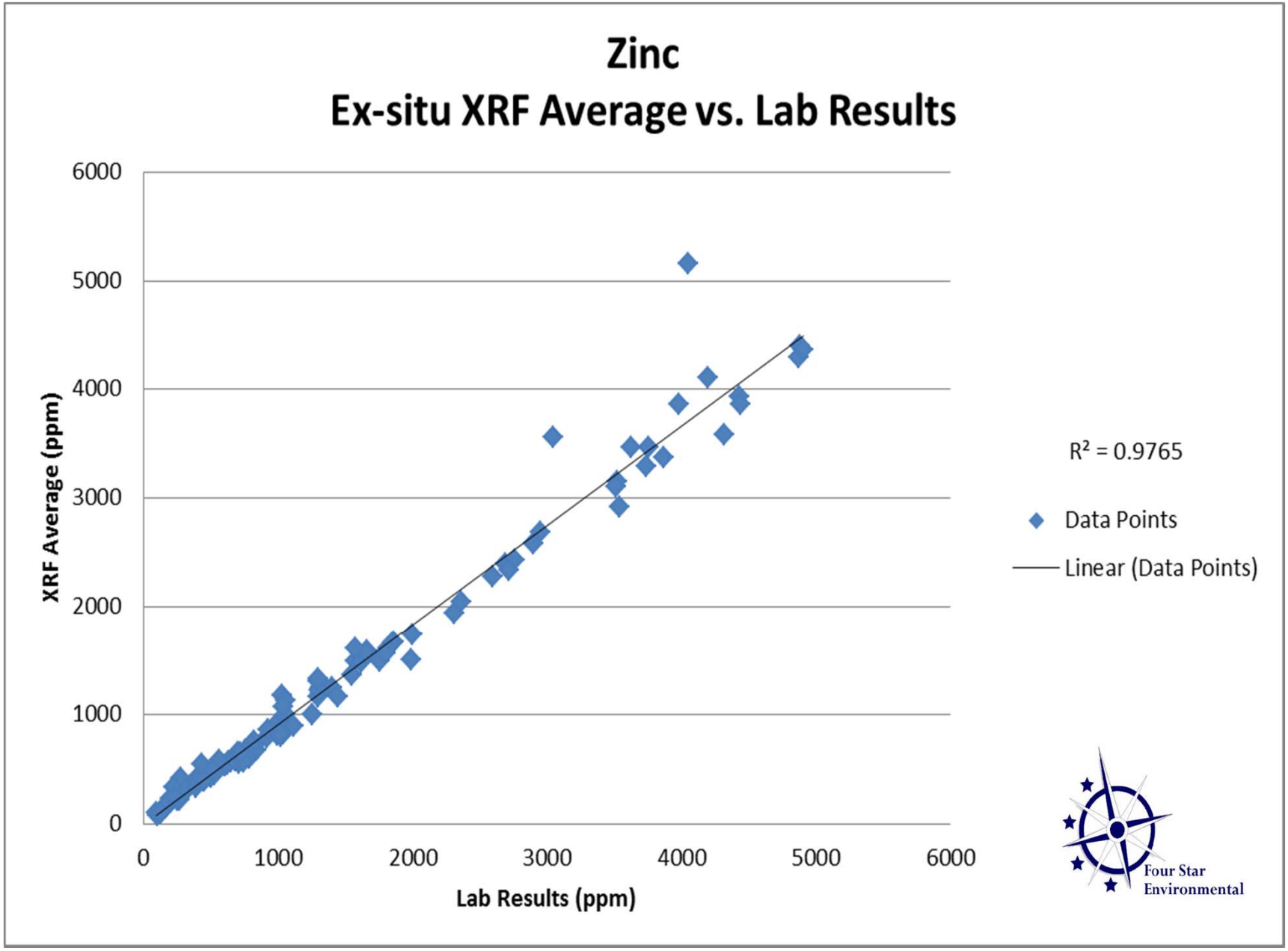
Four Star Environmental


Lead
In-situ XRF Average vs. Lab Results
XRF Average (ppm)
Lab Results (ppm)
0
50
100
150
200
250
300
350
0
100
200
300
400
500
600
700
800
R² = 0.6326
Data Points
Linear (Data Points)
Four Star
Environmental

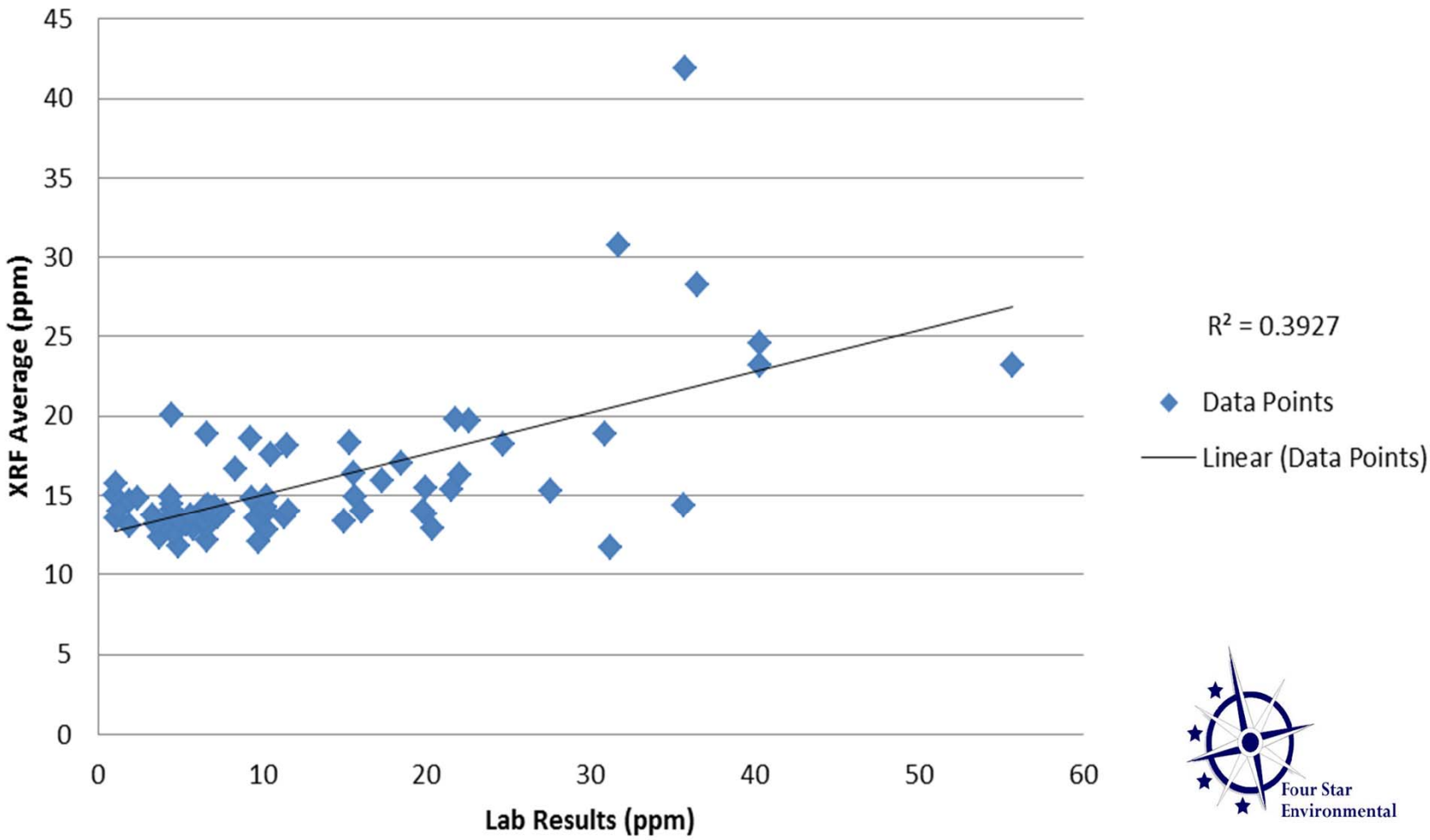

Zinc
In-situ XRF Average vs. Lab Results
XRF Average (ppm)
Lab Results (ppm)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
0
1000
2000
3000
4000
5000
6000
R² = 0.8195
Data Points
Linear (Data Points)
Four Star
Environmental


Cadmium
Ex-situ XRF Average Vs. Lab Results
XRF Average (ppm)
Lab Results (ppm)
0
5
10
15
20
25
30
35
40
45
50
0
10
20
30
40
50
60
70
R² = 0.618
Data Points
Linear (Data Points)
Four Star
Environmental


Lead
Ex-situ XRF Average vs. Lab Results
XRF Average (ppm)
Lab Results (ppm)
0
100
200
300
400
500
600
700
800
R² = 0.9736
Data Points
Linear (Data Points)
Four Star
Environmental

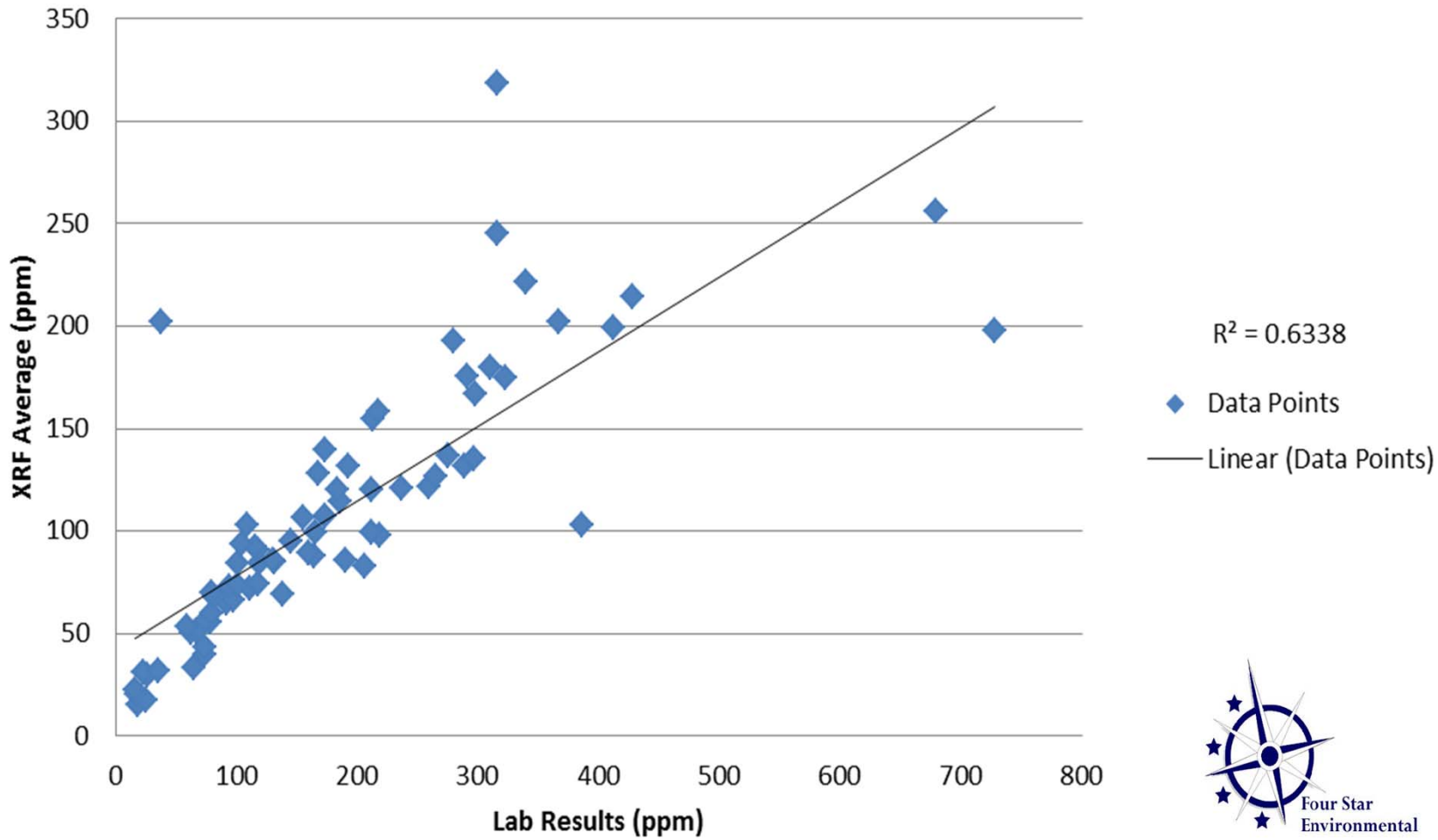

Zinc
Ex-situ XRF Average vs. Lab Results
XRF Average (ppm)
Lab Results (ppm)
0
1000
2000
3000
4000
5000
6000
R² = 0.9765
Data Points
Linear (Data Points)
Four Star
Environmental

Cadmium
In-situ XRF Averages vs. Lab Results
(XRF Averages Include <LOD Results as Error X 1.5)



Four Star Environmental

Lead
In-situ XRF Average vs. Lab Results
(XRF Averages Include <LOD Results as Error X 1.5)

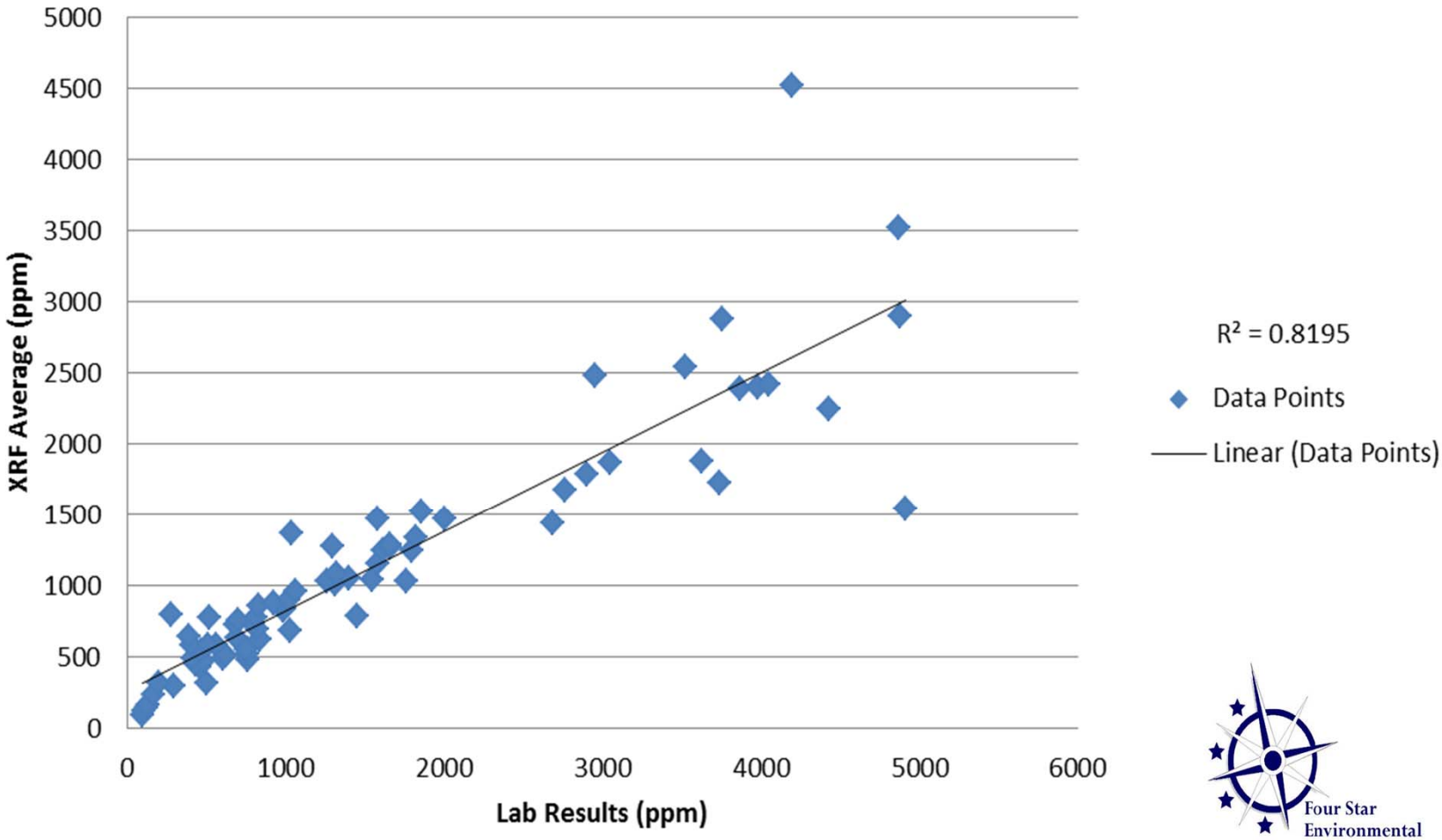


Four Star Environmental

Zinc

In-situ XRF Average vs. Lab Results

(XRF Averages Include <LOD Results as Error X 1.5)

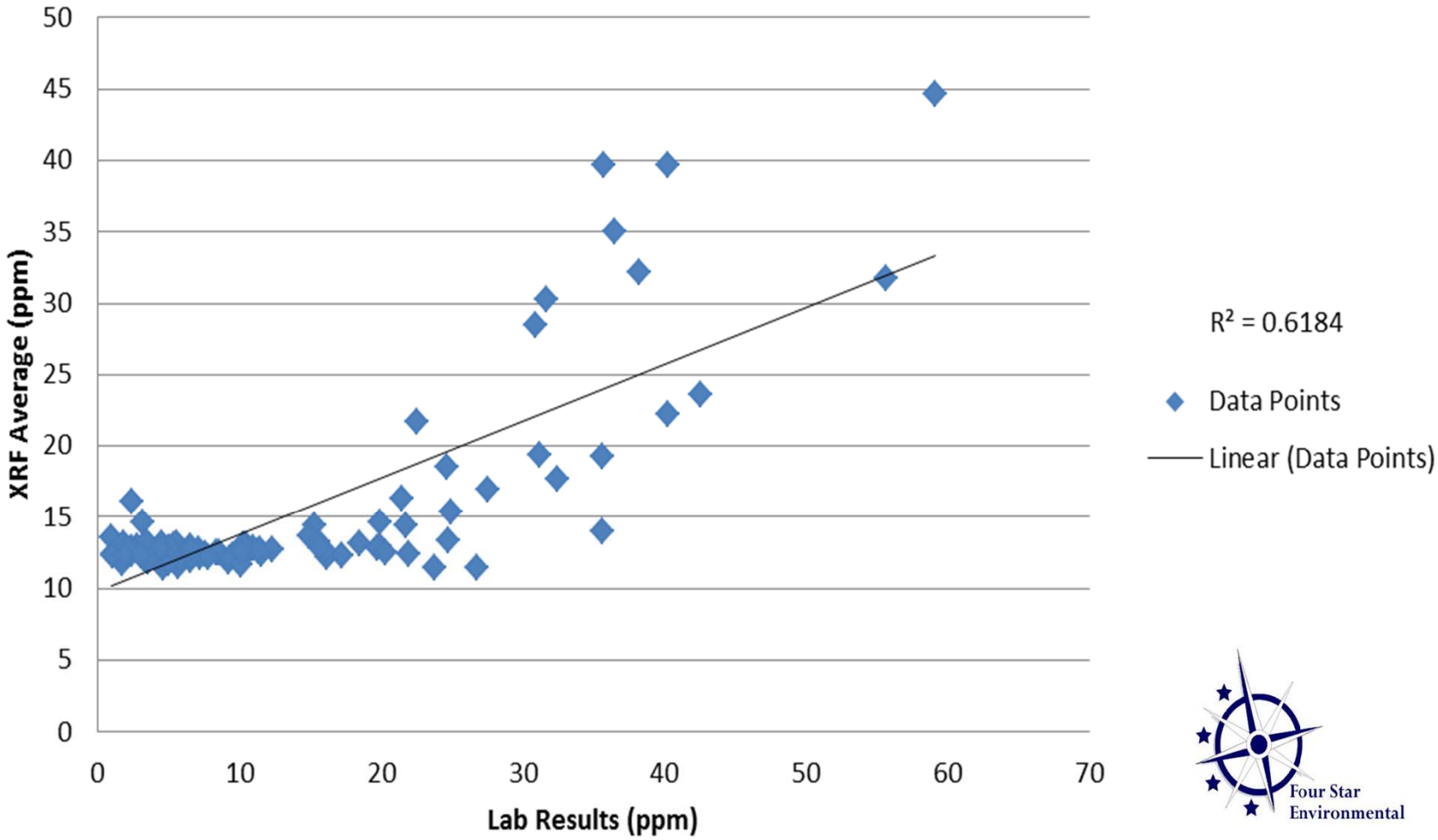


Four Star Environmental

Cadmium

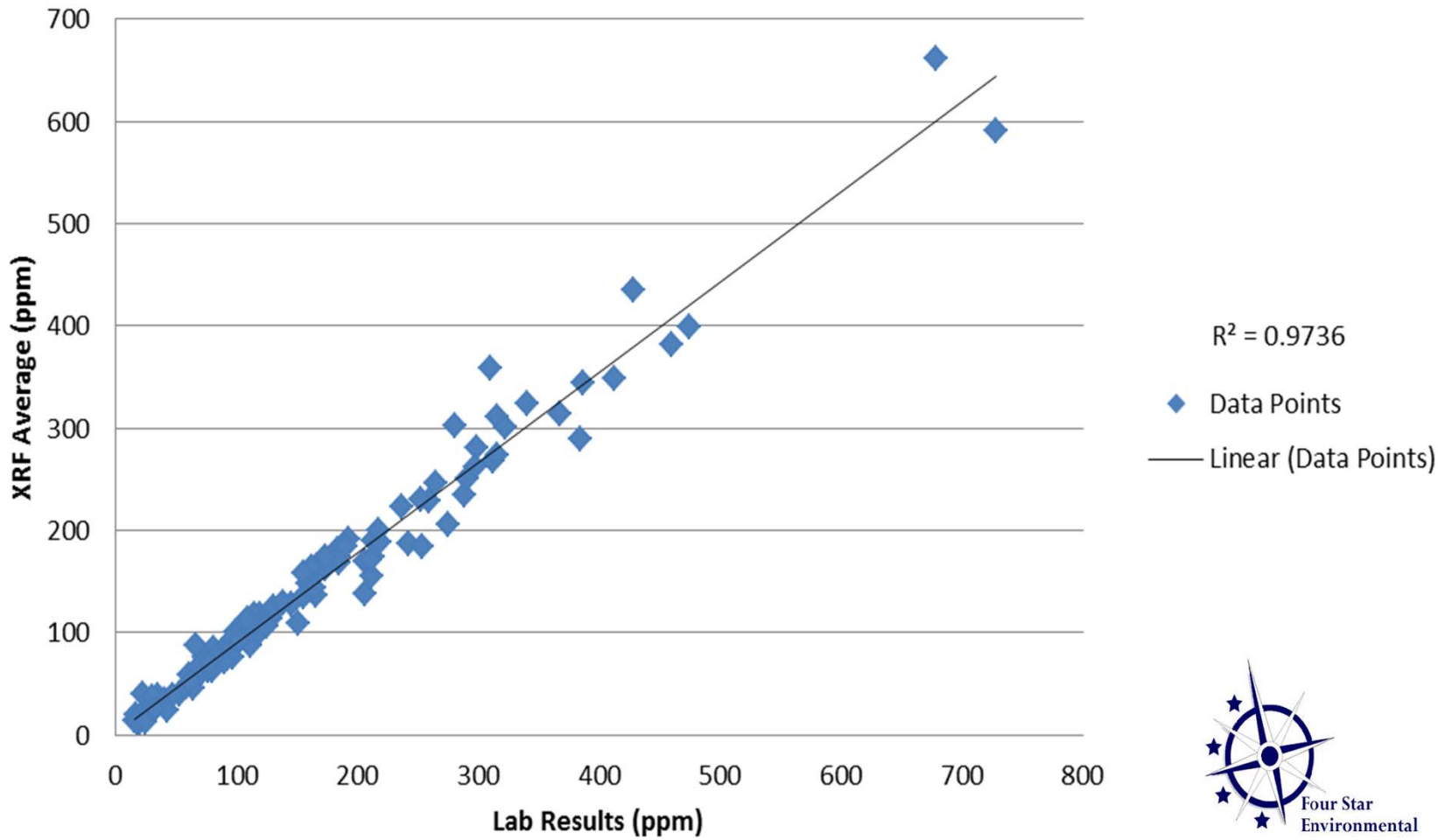
Ex-situ XRF Average vs. Lab Results

(XRF Averages Include <LOD Results as Error X 1.5)

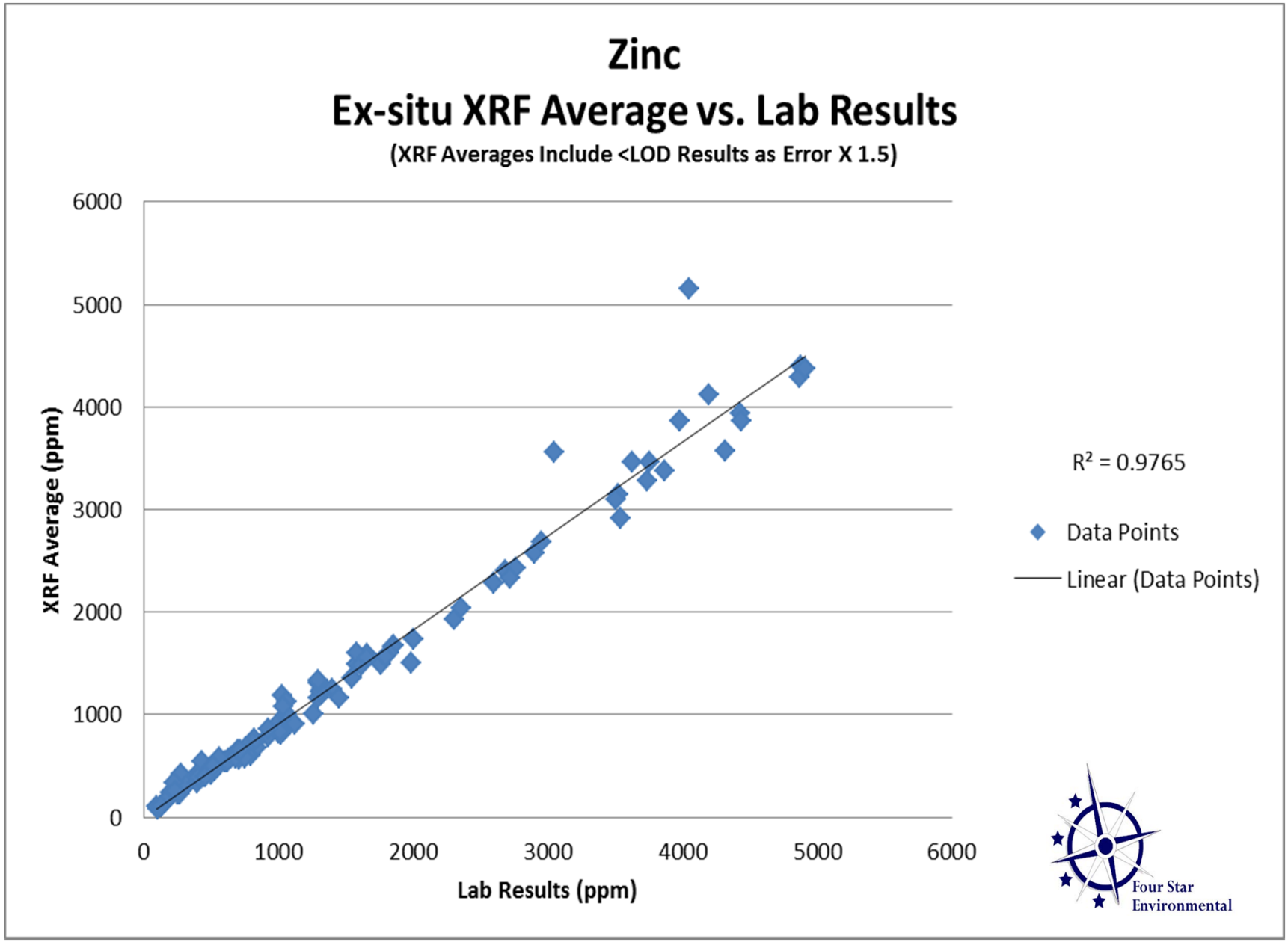


Four Star Environmental

Lead
Ex-situ XRF Average vs. Lab Results
(XRF Averages Include <LOD Results as Error X 1.5)



Four Star Environmental


Zinc
Ex-situ XRF Average vs. Lab Results
(XRF Averages Include <LOD Results as Error X 1.5)
XRF Average (ppm)
Lab Results (ppm)
0
1000
2000
3000
4000
5000
6000
R² = 0.9765
Data Points
Linear (Data Points)
Four Star
Environmental

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
31	11/9/2010 8:50	Soil	120	Final	1266	Manchester	Front	IDX	1	1	14.21	7.69	142.08	15.69	1593.43	59.27	ppm	38	BSHIRLEY
32	11/9/2010 8:53	Soil	120	Final	1266	Manchester	Front	IDX	1	2	76.79	9.18	262.36	19.64	3395.23	83.38	ppm	38	BSHIRLEY
33	11/9/2010 8:57	Soil	120	Final	1266	Manchester	Front	IDX	1	3	< LOD	9.76	149.37	14.27	2467.59	65.3	ppm	38	BSHIRLEY
35	11/9/2010 9:01	Soil	120	Final	1266	Manchester	Front	IDX	1	4	< LOD	8.96	106.67	11.98	1670.44	51.71	ppm	38	BSHIRLEY
36	11/9/2010 9:05	Soil	120	Final	1266	Manchester	Front	IDX	1	5	< LOD	9.89	99.12	12.16	1323.46	48.13	ppm	38	BSHIRLEY
37	11/9/2010 9:09	Soil	120	Final	1266	Manchester	Front	IDX	1	6	< LOD	8.62	80.38	10.22	981.09	37.67	ppm	38	BSHIRLEY
38	11/9/2010 9:12	Soil	120	Final	1266	Manchester	Front	IDX	1	7	< LOD	8.67	85.62	11.29	1434.8	49.21	ppm	38	BSHIRLEY
40	11/9/2010 9:21	Soil	120	Final	1266	Manchester	Front	IDX	1	8	< LOD	11.58	83.66	13.06	1009.43	48.37	ppm	38	BSHIRLEY
41	11/9/2010 9:26	Soil	120	Final	1266	Manchester	Front	IDX	1	9	< LOD	8.45	80.78	10.68	1307.46	45.35	ppm	38	BSHIRLEY
42	11/9/2010 9:30	Soil	120	Final	1266	Manchester	Front	IDX	1	10	15.88	8.29	138.84	16.61	1473.89	61.02	ppm	38	BSHIRLEY
43	11/9/2010 9:34	Soil	120	Final	1266	Manchester	Front	IDX	1	11	< LOD	13.05	124.13	16.62	1279.09	59.32	ppm	38	BSHIRLEY
45	11/9/2010 9:39	Soil	120	Final	1266	Manchester	Front	IDX	1	12	< LOD	9.33	85.01	11.27	1210.39	45.21	ppm	38	BSHIRLEY
46	11/9/2010 9:42	Soil	120	Final	1266	Manchester	Front	IDX	1	13	< LOD	9.22	62.34	9.93	973.73	39.67	ppm	38	BSHIRLEY
47	11/9/2010 9:46	Soil	120	Final	1266	Manchester	Front	IDX	1	14	< LOD	9.08	53.92	10.04	985.56	42.07	ppm	38	BSHIRLEY
48	11/9/2010 9:50	Soil	120	Final	1266	Manchester	Front	IDX	1	15	< LOD	10.52	70.69	11.06	819.4	39	ppm	38	BSHIRLEY
49	11/9/2010 9:53	Soil	120	Final	1266	Manchester	Front	IDX	1	16	10.51	6.48	43.33	8.71	618.37	31.28	ppm	38	BSHIRLEY
50	11/9/2010 9:57	Soil	120	Final	1266	Manchester	Front	IDX	1	17	< LOD	8.96	37	8.4	512.48	28.45	ppm	38	BSHIRLEY
51	11/9/2010 10:01	Soil	120	Final	1266	Manchester	Front	IDX	1	18	14.39	7.79	51.06	11.08	666.69	38.6	ppm	38	BSHIRLEY
52	11/9/2010 10:04	Soil	120	Final	1266	Manchester	Front	IDX	1	19	23.79	9.01	29.27	10.08	313.08	28.92	ppm	38	BSHIRLEY
53	11/9/2010 10:08	Soil	120	Final	1266	Manchester	Front	IDX	1	20	22.1	7.22	115.9	13.12	1388.96	50.14	ppm	38	BSHIRLEY
54	11/9/2010 10:30	Soil	120	Final	1266	Manchester	Front	ECX	1	1	14.72	6.46	122.76	12.09	1452.76	46.3	ppm	38	BSHIRLEY
55	11/9/2010 10:33	Soil	120	Final	1266	Manchester	Front	ECX	1	2	18.17	6.37	140.96	12.55	1644.03	48.27	ppm	38	BSHIRLEY
56	11/9/2010 10:36	Soil	120	Final	1266	Manchester	Front	ECX	1	3	14.55	6.44	124.63	12.36	1630.29	49.8	ppm	38	BSHIRLEY
57	11/9/2010 10:39	Soil	120	Final	1266	Manchester	Front	ECX	1	4	11.33	6.26	125.58	12.22	1680.04	49.44	ppm	38	BSHIRLEY
58	11/9/2010 10:41	Soil	120	Final	1266	Manchester	Front	ECX	1	5	13.18	6.11	127.03	12.11	1533.7	46.92	ppm	38	BSHIRLEY
30	11/9/2010 10:27	Soil	120	Final	1266	Manchester	Back	IDX	1	1	23.05	7.12	143.68	12.96	1466.31	45.93	ppm	18.1	CWOLF
31	11/9/2010 10:30	Soil	120	Final	1266	Manchester	Back	IDX	1	2	27.79	8.07	145.08	14.37	1850.31	56.57	ppm	18.1	CWOLF
32	11/9/2010 10:34	Soil	120	Final	1266	Manchester	Back	IDX	1	3	26.05	8.74	220.4	18.98	2543.17	73.36	ppm	18.1	CWOLF
33	11/9/2010 10:38	Soil	120	Final	1266	Manchester	Back	IDX	1	4	19.35	7.26	216.03	16.23	2924.85	67.69	ppm	18.1	CWOLF
35	11/9/2010 10:41	Soil	120	Final	1266	Manchester	Back	IDX	1	5	12.42	7.07	125.7	12.61	1441.41	46.82	ppm	18.1	CWOLF
36	11/9/2010 10:45	Soil	120	Final	1266	Manchester	Back	IDX	1	6	12.77	6.85	119.98	12.28	1601.03	48.63	ppm	18.1	CWOLF
37	11/9/2010 10:48	Soil	120	Final	1266	Manchester	Back	IDX	1	7	< LOD	9.59	124.29	12.11	1638.89	48.03	ppm	18.1	CWOLF
38	11/9/2010 10:51	Soil	120	Final	1266	Manchester	Back	IDX	1	8	21.03	8.86	148.29	16.31	1904.84	64.73	ppm	18.1	CWOLF
39	11/9/2010 10:54	Soil	120	Final	1266	Manchester	Back	IDX	1	9	25.37	7.8	93.39	11.75	1295.46	46.16	ppm	18.1	CWOLF
40	11/9/2010 10:58	Soil	120	Final	1266	Manchester	Back	IDX	1	10	18.41	7.35	101.64	11.68	1727.68	51.22	ppm	18.1	CWOLF
41	11/9/2010 11:01	Soil	120	Final	1266	Manchester	Back	IDX	1	11	15.79	7.35	102.56	11.68	1124.51	41.42	ppm	18.1	CWOLF
42	11/9/2010 11:05	Soil	120	Final	1266	Manchester	Back	IDX	1	12	30.23	8.55	159.67	15.28	2081.66	61.44	ppm	18.1	CWOLF
43	11/9/2010 11:08	Soil	120	Final	1266	Manchester	Back	IDX	1	13	19.55	7.34	122.64	12.52	1551.83	48.46	ppm	18.1	CWOLF
44	11/9/2010 11:12	Soil	120	Final	1266	Manchester	Back	IDX	1	14	< LOD	11.24	63.37	10.48	1005	42.22	ppm	18.1	CWOLF
45	11/9/2010 11:15	Soil	120	Final	1266	Manchester	Back	IDX	1	15	< LOD	10.98	74.29	11.01	972.89	40.97	ppm	18.1	CWOLF
46	11/9/2010 11:18	Soil	120	Final	1266	Manchester	Back	IDX	1	16	< LOD	8.63	116.87	11.83	1807.77	50.42	ppm	18.1	CWOLF
47	11/9/2010 11:22	Soil	120	Final	1266	Manchester	Back	IDX	1	17	< LOD	8.57	78.79	11.08	2097.27	58.44	ppm	18.1	CWOLF
48	11/9/2010 11:26	Soil	120	Final	1266	Manchester	Back	IDX	1	18	21.68	7.46	175.91	14.58	2142.29	57.09	ppm	18.1	CWOLF
49	11/9/2010 11:30	Soil	120	Final	1266	Manchester	Back	IDX	1	19	29.18	8.51	229.06	18.43	2421.78	68.34	ppm	18.1	CWOLF
50	11/9/2010 11:34	Soil	120	Final	1266	Manchester	Back	IDX	1	20	19.06	7.31	176.26	14.83	2273.84	59.64	ppm	18.1	CWOLF
52	11/9/2010 12:04	Soil	120	Final	1266	Manchester	Back	ECX	1	1	17.99	6.34	227.06	14.67	2619.55	56.78	ppm	18.1	CWOLF
53	11/9/2010 12:09	Soil	120	Final	1266	Manchester	Back	ECX	1	2	12.24	6.21	209.74	14.24	2563.09	56.53	ppm	18.1	CWOLF
54	11/9/2010 12:13	Soil	120	Final	1266	Manchester	Back	ECX	1	3	17.41	6.34	211.06	14.13	2705.02	57.48	ppm	18.1	CWOLF
55	11/9/2010 12:16	Soil	120	Final	1266	Manchester	Back	ECX	1	4	10	6.05	197.56	13.61	2576.94	55.53	ppm	18.1	CWOLF

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
56	11/9/2010 12:19	Soil	120	Final	1266	Manchester	Back	ECX	1	5	14.47	6.59	186.61	14.09	2423.54	57.16	ppm	18.1	CWOLF
67	11/9/2010 11:23	Soil	120	Final	1265	Manchester	Front	IDX	2	1	17.61	7.5	< LOD	10.52	60.24	13.33	ppm	26.6	BSHIRLEY
68	11/9/2010 11:27	Soil	120	Final	1265	Manchester	Front	IDX	2	2	18.75	7.63	15.01	7.93	161.67	19.1	ppm	26.6	BSHIRLEY
70	11/9/2010 11:31	Soil	120	Final	1265	Manchester	Front	IDX	2	3	18.66	6.98	28.47	8.18	253.53	21.38	ppm	26.6	BSHIRLEY
71	11/9/2010 11:35	Soil	120	Final	1265	Manchester	Front	IDX	2	4	13.76	7.15	32.45	8.6	192.76	19.59	ppm	26.6	BSHIRLEY
72	11/9/2010 11:38	Soil	120	Final	1265	Manchester	Front	IDX	2	5	17.94	7.25	15.16	7.49	182.68	19.03	ppm	26.6	BSHIRLEY
73	11/9/2010 11:43	Soil	120	Final	1265	Manchester	Front	IDX	2	6	< LOD	10.43	23.92	8.21	121.07	16.63	ppm	26.6	BSHIRLEY
75	11/9/2010 11:47	Soil	120	Final	1265	Manchester	Front	IDX	2	7	< LOD	9.59	23.91	7.59	157.65	16.94	ppm	26.6	BSHIRLEY
78	11/9/2010 11:51	Soil	120	Final	1265	Manchester	Front	IDX	2	8	< LOD	9.91	26.33	7.83	140.38	16.38	ppm	26.6	BSHIRLEY
80	11/9/2010 11:55	Soil	120	Final	1265	Manchester	Front	IDX	2	9	11.3	6.99	25.13	8.05	284.06	22.91	ppm	26.6	BSHIRLEY
82	11/9/2010 11:58	Soil	120	Final	1265	Manchester	Front	IDX	2	10	< LOD	10.01	27.51	8.11	191.24	19.03	ppm	26.6	BSHIRLEY
83	11/9/2010 12:01	Soil	120	Final	1265	Manchester	Front	IDX	2	11	12.64	7.62	19.15	8.32	90.37	15.42	ppm	26.6	BSHIRLEY
84	11/9/2010 12:04	Soil	120	Final	1265	Manchester	Front	IDX	2	12	12.08	7.28	< LOD	11.25	53.3	12.66	ppm	26.6	BSHIRLEY
85	11/9/2010 12:08	Soil	120	Final	1265	Manchester	Front	IDX	2	13	14.43	6.96	18.15	7.58	56.14	12.4	ppm	26.6	BSHIRLEY
86	11/9/2010 12:13	Soil	120	Final	1265	Manchester	Front	IDX	2	14	< LOD	10.76	62.97	10.92	106.48	16.72	ppm	26.6	BSHIRLEY
87	11/9/2010 12:16	Soil	120	Final	1265	Manchester	Front	IDX	2	15	12.26	6.68	25.09	7.73	105.66	14.56	ppm	26.6	BSHIRLEY
88	11/9/2010 12:20	Soil	120	Final	1265	Manchester	Front	IDX	2	16	< LOD	10.24	18.9	7.65	162.24	17.84	ppm	26.6	BSHIRLEY
89	11/9/2010 12:23	Soil	120	Final	1265	Manchester	Front	IDX	2	17	11.53	6.97	< LOD	10.12	24.86	10.22	ppm	26.6	BSHIRLEY
90	11/9/2010 12:27	Soil	120	Final	1265	Manchester	Front	IDX	2	18	21.09	8.11	< LOD	11.05	50.08	13.24	ppm	26.6	BSHIRLEY
91	11/9/2010 12:30	Soil	120	Final	1265	Manchester	Front	IDX	2	19	< LOD	10.19	12.42	7.19	107.86	15.32	ppm	26.6	BSHIRLEY
92	11/9/2010 12:33	Soil	120	Final	1265	Manchester	Front	IDX	2	20	11.59	6.94	< LOD	9.72	40.27	11.07	ppm	26.6	BSHIRLEY
128	11/9/2010 14:38	Soil	120	Final	1265	Manchester	Front	ECX	2	1	< LOD	9.02	< LOD	9.3	80.07	12.74	ppm		BSHIRLEY
129	11/9/2010 14:41	Soil	120	Final	1265	Manchester	Front	ECX	2	2	< LOD	9.02	< LOD	9.75	96.41	13.57	ppm		BSHIRLEY
130	11/9/2010 14:44	Soil	120	Final	1265	Manchester	Front	ECX	2	3	< LOD	9.36	< LOD	9.4	80.14	12.78	ppm		BSHIRLEY
131	11/9/2010 14:48	Soil	120	Final	1265	Manchester	Front	ECX	2	4	< LOD	8.72	< LOD	9.12	72.16	12.33	ppm		BSHIRLEY
132	11/9/2010 14:52	Soil	120	Final	1265	Manchester	Front	ECX	2	5	< LOD	9	12.49	6.6	84.96	12.93	ppm		BSHIRLEY
70	11/9/2010 12:59	Soil	120	Final	1265	Manchester	Back	IDX	2	1	44.19	7.77	316.63	18.89	3313.61	71.12	ppm	12.4	CWOLF
71	11/9/2010 13:03	Soil	120	Final	1265	Manchester	Back	IDX	2	2	38.29	7.51	273.98	17.33	2710.34	62.82	ppm	12.4	CWOLF
72	11/9/2010 13:06	Soil	120	Final	1265	Manchester	Back	IDX	2	3	30.25	7.09	229.7	15.68	2148.72	54.85	ppm	12.4	CWOLF
73	11/9/2010 13:09	Soil	120	Final	1265	Manchester	Back	IDX	2	4	17.94	6.63	216.84	15.03	2660.42	60.02	ppm	12.4	CWOLF
74	11/9/2010 13:11	Soil	120	Final	1265	Manchester	Back	IDX	2	5	< LOD	10.3	146.4	14.02	1744.65	53.79	ppm	12.4	CWOLF
75	11/9/2010 13:14	Soil	120	Final	1265	Manchester	Back	IDX	2	6	12.4	6.75	85.96	10.49	1027.16	38.21	ppm	12.4	CWOLF
76	11/9/2010 13:17	Soil	120	Final	1265	Manchester	Back	IDX	2	7	59.57	8.99	339.38	20.93	2823.57	70.26	ppm	12.4	CWOLF
77	11/9/2010 13:20	Soil	120	Final	1265	Manchester	Back	IDX	2	8	19.48	7.23	76.72	10.33	583.18	29.94	ppm	12.4	CWOLF
78	11/9/2010 13:22	Soil	120	Final	1265	Manchester	Back	IDX	2	9	< LOD	10.45	44.57	8.46	361.49	23.43	ppm	12.4	CWOLF
79	11/9/2010 13:25	Soil	120	Final	1265	Manchester	Back	IDX	2	10	48.5	7.63	407.1	20.53	4617.55	80.85	ppm	12.4	CWOLF
80	11/9/2010 13:27	Soil	120	Final	1265	Manchester	Back	IDX	2	11	47.46	8.26	288.11	18.61	3012.56	69.58	ppm	12.4	CWOLF
81	11/9/2010 13:30	Soil	120	Final	1265	Manchester	Back	IDX	2	12	30.48	7.05	207.43	14.84	2370.48	57.03	ppm	12.4	CWOLF
83	11/9/2010 13:35	Soil	120	Final	1265	Manchester	Back	IDX	2	13	28.54	7.68	125.13	12.72	2455.63	61.49	ppm	12.4	CWOLF
84	11/9/2010 13:38	Soil	120	Final	1265	Manchester	Back	IDX	2	14	< LOD	10.86	77.47	10.51	592.65	30.41	ppm	12.4	CWOLF
85	11/9/2010 13:41	Soil	120	Final	1265	Manchester	Back	IDX	2	15	20.97	8.13	84.53	11.46	595.35	32.34	ppm	12.4	CWOLF
86	11/9/2010 13:44	Soil	120	Final	1265	Manchester	Back	IDX	2	16	13.26	6.92	66.26	9.52	726.86	31.96	ppm	12.4	CWOLF
87	11/9/2010 13:47	Soil	120	Final	1265	Manchester	Back	IDX	2	17	< LOD	11.56	41.67	9.08	306.5	23.96	ppm	12.4	CWOLF
88	11/9/2010 13:50	Soil	120	Final	1265	Manchester	Back	IDX	2	18	< LOD	10.14	67.43	9.42	511.16	27	ppm	12.4	CWOLF
89	11/9/2010 13:52	Soil	120	Final	1265	Manchester	Back	IDX	2	19	41.48	8.36	217.07	17.06	2867.68	70.59	ppm	12.4	CWOLF
90	11/9/2010 13:55	Soil	120	Final	1265	Manchester	Back	IDX	2	20	32.34	7.48	181.42	14.47	2236.03	57.23	ppm	12.4	CWOLF
92	11/9/2010 15:05	Soil	120	Final	1265	Manchester	Back	ECX	2	1	38.87	6.86	304.93	16.69	3353	64.1	ppm	12.4	CWOLF
93	11/9/2010 15:09	Soil	120	Final	1265	Manchester	Back	ECX	2	2	33.25	6.71	302.38	16.57	3722.43	67.22	ppm	12.4	CWOLF
94	11/9/2010 15:12	Soil	120	Final	1265	Manchester	Back	ECX	2	3	40.59	6.86	280.12	16.05	3298.36	63.53	ppm	12.4	CWOLF

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
95	11/9/2010 15:14	Soil	120	Final	1265	Manchester	Back	ECX	2	4	33	6.72	316.69	16.96	3482.95	65.29	ppm	12.4	CWOLF
96	11/9/2010 15:17	Soil	120	Final	1265	Manchester	Back	ECX	2	5	29.51	6.65	299.93	16.85	3444.45	66.04	ppm	12.4	CWOLF
99	11/9/2010 13:16	Soil	120	Final	1258	Manchester	Front	IDX	3	1	13.63	7.9	47.71	10.51	500.26	33.06	ppm	34.8	BSHIRLEY
100	11/9/2010 13:20	Soil	120	Final	1258	Manchester	Front	IDX	3	2	21.89	11.2	37.84	13.35	275.66	34.02	ppm	34.8	BSHIRLEY
105	11/9/2010 13:28	Soil	120	Final	1258	Manchester	Front	IDX	3	3	41.2	15.12	29.57	14.33	205.7	34.64	ppm	34.8	BSHIRLEY
108	11/9/2010 13:32	Soil	120	Final	1258	Manchester	Front	IDX	3	4	34.23	8.3	190.17	16.69	2058.83	63.47	ppm	34.8	BSHIRLEY
110	11/9/2010 13:35	Soil	120	Final	1258	Manchester	Front	IDX	3	5	34.16	9.77	75.97	14.09	726.28	45.65	ppm	34.8	BSHIRLEY
111	11/9/2010 13:39	Soil	120	Final	1258	Manchester	Front	IDX	3	6	21.93	9.97	42.35	12.47	390.22	36.27	ppm	34.8	BSHIRLEY
112	11/9/2010 13:43	Soil	120	Final	1258	Manchester	Front	IDX	3	7	< LOD	10.48	15.78	8.73	192.53	22.14	ppm	34.8	BSHIRLEY
113	11/9/2010 13:47	Soil	120	Final	1258	Manchester	Front	IDX	3	8	< LOD	9.54	49.8	9.65	621.71	33.1	ppm	34.8	BSHIRLEY
114	11/9/2010 13:51	Soil	120	Final	1258	Manchester	Front	IDX	3	9	17.5	9.23	61.36	13.02	475.43	37.23	ppm	34.8	BSHIRLEY
115	11/9/2010 13:55	Soil	120	Final	1258	Manchester	Front	IDX	3	10	19.56	7.61	36.93	9.37	390.99	27.94	ppm	34.8	BSHIRLEY
116	11/9/2010 13:59	Soil	120	Final	1258	Manchester	Front	IDX	3	11	18.38	7.46	60.82	10.53	527.26	31.66	ppm	34.8	BSHIRLEY
117	11/9/2010 14:02	Soil	120	Final	1258	Manchester	Front	IDX	3	12	< LOD	11.01	69.45	11.7	954.56	44.33	ppm	34.8	BSHIRLEY
118	11/9/2010 14:05	Soil	120	Final	1258	Manchester	Front	IDX	3	13	< LOD	11.48	72.38	12.35	780.96	42.28	ppm	34.8	BSHIRLEY
119	11/9/2010 14:09	Soil	120	Final	1258	Manchester	Front	IDX	3	14	< LOD	9.48	22.72	8.12	346.61	25.51	ppm	34.8	BSHIRLEY
120	11/9/2010 14:13	Soil	120	Final	1258	Manchester	Front	IDX	3	15	< LOD	11.33	37.44	9.81	426.91	30.56	ppm	34.8	BSHIRLEY
121	11/9/2010 14:17	Soil	120	Final	1258	Manchester	Front	IDX	3	16	19.17	9.05	64.11	12.83	551.75	38.83	ppm	34.8	BSHIRLEY
122	11/9/2010 14:20	Soil	120	Final	1258	Manchester	Front	IDX	3	17	< LOD	10.24	50.56	9.99	441.77	29.12	ppm	34.8	BSHIRLEY
123	11/9/2010 14:23	Soil	120	Final	1258	Manchester	Front	IDX	3	18	23.59	9.95	36.4	11.95	383.46	35.45	ppm	34.8	BSHIRLEY
124	11/9/2010 14:27	Soil	120	Final	1258	Manchester	Front	IDX	3	19	11.73	7.38	30.44	8.86	289.44	24.25	ppm	34.8	BSHIRLEY
125	11/9/2010 14:30	Soil	120	Final	1258	Manchester	Front	IDX	3	20	< LOD	9.01	35.79	9.07	461.59	29.49	ppm	34.8	BSHIRLEY
133	11/9/2010 15:13	Soil	120	Final	1258	Manchester	Front	ECX	3	1	< LOD	8.62	48.73	8.5	436.81	25.02	ppm		BSHIRLEY
134	11/9/2010 15:15	Soil	120	Final	1258	Manchester	Front	ECX	3	2	< LOD	8.63	51.11	8.68	583.05	28.89	ppm		BSHIRLEY
135	11/9/2010 15:18	Soil	120	Final	1258	Manchester	Front	ECX	3	3	< LOD	8.81	45.83	8.47	434.86	25.26	ppm		BSHIRLEY
136	11/9/2010 15:21	Soil	120	Final	1258	Manchester	Front	ECX	3	4	< LOD	8.9	37.81	8.05	453.19	25.74	ppm		BSHIRLEY
137	11/9/2010 15:23	Soil	120	Final	1258	Manchester	Front	ECX	3	5	< LOD	8.8	49.6	8.61	417.15	24.57	ppm		BSHIRLEY
108	11/9/2010 16:08	Soil	120	Final	1258	Manchester	Back	ECX	3	1	< LOD	10.75	26.19	7.72	273.66	21.65	ppm	12.5	CWOLF
109	11/9/2010 16:12	Soil	120	Final	1258	Manchester	Back	ECX	3	2	< LOD	9.73	30.54	7.37	274.73	20.07	ppm	12.5	CWOLF
110	11/9/2010 16:14	Soil	120	Final	1258	Manchester	Back	ECX	3	3	< LOD	10	26.09	7.36	220.5	18.81	ppm	12.5	CWOLF
111	11/9/2010 16:17	Soil	120	Final	1258	Manchester	Back	ECX	3	4	< LOD	9.75	27.58	7.43	267.01	20.27	ppm	12.5	CWOLF
112	11/9/2010 16:19	Soil	120	Final	1258	Manchester	Back	ECX	3	5	< LOD	9.78	23.59	7.2	298.22	21.43	ppm	12.5	CWOLF
113	11/9/2010 16:23	Soil	120	Final	1258	Manchester	Back	ECX	3	6	< LOD	10.6	33.04	8.23	355.09	24.78	ppm	12.5	CWOLF
114	11/9/2010 16:26	Soil	120	Final	1258	Manchester	Back	ECX	3	7	< LOD	10.24	11.6	6.17	149.6	16	ppm	12.5	CWOLF
115	11/9/2010 16:29	Soil	120	Final	1258	Manchester	Back	IDX	3	8	< LOD	9.6	27.2	7.31	241.78	19.19	ppm	12.5	CWOLF
116	11/9/2010 16:33	Soil	120	Final	1258	Manchester	Back	IDX	3	9	< LOD	8.02	28.65	7.06	328.26	20.97	ppm	12.5	CWOLF
117	11/9/2010 16:35	Soil	120	Final	1258	Manchester	Back	IDX	3	10	11.53	7.05	47.55	8.7	438.74	25.93	ppm	12.5	CWOLF
119	11/9/2010 16:39	Soil	120	Final	1258	Manchester	Back	IDX	3	11	< LOD	11.27	18.52	7.54	237.24	21.53	ppm	12.5	CWOLF
120	11/9/2010 16:41	Soil	120	Final	1258	Manchester	Back	IDX	3	12	< LOD	8.61	24.71	6.86	317.15	20.85	ppm	12.5	CWOLF
121	11/9/2010 16:44	Soil	120	Final	1258	Manchester	Back	IDX	3	13	< LOD	10.44	22.51	7.5	266.41	21.55	ppm	12.5	CWOLF
122	11/9/2010 16:47	Soil	120	Final	1258	Manchester	Back	IDX	3	14	< LOD	8.79	28.51	6.97	316.08	20.45	ppm	12.5	CWOLF
123	11/9/2010 16:50	Soil	120	Final	1258	Manchester	Back	IDX	3	15	< LOD	10.37	23.77	7.72	228.76	20.73	ppm	12.5	CWOLF
124	11/9/2010 16:53	Soil	120	Final	1258	Manchester	Back	IDX	3	16	< LOD	8.19	50.93	8.08	659.6	28.33	ppm	12.5	CWOLF
125	11/9/2010 16:55	Soil	120	Final	1258	Manchester	Back	IDX	3	17	< LOD	9.43	41.76	7.99	445.3	24.95	ppm	12.5	CWOLF
127	11/9/2010 16:58	Soil	120	Final	1258	Manchester	Back	IDX	3	18	< LOD	9.01	27.96	7.4	343.63	22.69	ppm	12.5	CWOLF
128	11/9/2010 17:01	Soil	120	Final	1258	Manchester	Back	IDX	3	19	< LOD	10.49	24.57	7.54	223.73	19.58	ppm	12.5	CWOLF
129	11/9/2010 17:04	Soil	120	Final	1258	Manchester	Back	IDX	3	20	< LOD	11.79	45.94	10.21	440.19	30.91	ppm	12.5	CWOLF
131	11/9/2010 17:44	Soil	120	Final	1258	Manchester	Back	ECX	3	1	< LOD	8.65	20.33	6.21	202.5	16.09	ppm	12.5	CWOLF
132	11/9/2010 17:48	Soil	120	Final	1258	Manchester	Back	ECX	3	2	< LOD	8.33	21.03	6.34	204.15	16.3	ppm	12.5	CWOLF

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
133	11/9/2010 17:51	Soil	120	Final	1258	Manchester	Back	ECX	3	3	< LOD	8.48	19.71	6.19	195.09	15.93	ppm	12.5	CWOLF
134	11/9/2010 17:53	Soil	120	Final	1258	Manchester	Back	ECX	3	4	< LOD	8.39	19.09	6.21	206.2	16.26	ppm	12.5	CWOLF
135	11/9/2010 17:56	Soil	120	Final	1258	Manchester	Back	ECX	3	5	< LOD	0.15	0.58	0.1	0.79	0.1	ppm	12.5	CWOLF
144	11/9/2010 16:29	Soil	120	Final	1250	Manchester	Front	IDX	4	1	< LOD	8.29	206.53	14.84	3460.76	70.72	ppm	11	BSHIRLEY
145	11/9/2010 16:32	Soil	120	Final	1250	Manchester	Front	IDX	4	2	13.8	7.07	97.69	12.77	1799.27	58.9	ppm	11	BSHIRLEY
146	11/9/2010 16:35	Soil	120	Final	1250	Manchester	Front	IDX	4	3	14.21	6.8	173.2	15.03	2833.68	69.82	ppm	11	BSHIRLEY
148	11/9/2010 16:38	Soil	120	Final	1250	Manchester	Front	IDX	4	4	26.86	7.21	276.64	18.72	3627.82	80.31	ppm	11	BSHIRLEY
149	11/9/2010 16:41	Soil	120	Final	1250	Manchester	Front	IDX	4	5	35.6	7.3	226.24	16.65	2939.86	70.2	ppm	11	BSHIRLEY
151	11/9/2010 16:44	Soil	120	Final	1250	Manchester	Front	IDX	4	6	38.6	6.84	478.5	22	5978.7	94.52	ppm	11	BSHIRLEY
152	11/9/2010 16:47	Soil	120	Final	1250	Manchester	Front	IDX	4	7	40.28	6.76	519.47	23.08	7129.26	103.92	ppm	11	BSHIRLEY
153	11/9/2010 16:50	Soil	120	Final	1250	Manchester	Front	IDX	4	8	16.41	7.05	187.98	16.42	2774.4	72.77	ppm	11	BSHIRLEY
154	11/9/2010 16:53	Soil	120	Final	1250	Manchester	Front	IDX	4	9	< LOD	8.36	116.23	11.78	2080.28	54.71	ppm	11	BSHIRLEY
155	11/9/2010 16:56	Soil	120	Final	1250	Manchester	Front	IDX	4	10	< LOD	9.12	146.11	13.42	2659.98	64.66	ppm	11	BSHIRLEY
156	11/9/2010 16:59	Soil	120	Final	1250	Manchester	Front	IDX	4	11	23.06	7.49	142.65	15.28	2621.55	73.56	ppm	11	BSHIRLEY
157	11/9/2010 17:02	Soil	120	Final	1250	Manchester	Front	IDX	4	12	< LOD	10.71	153.52	15.34	2119.86	64.48	ppm	11	BSHIRLEY
158	11/9/2010 17:04	Soil	120	Final	1250	Manchester	Front	IDX	4	13	30.34	7.15	245.77	17.33	3284.02	74.23	ppm	11	BSHIRLEY
159	11/9/2010 17:08	Soil	120	Final	1250	Manchester	Front	IDX	4	14	22.7	7.21	177.33	15.17	2184.85	61.25	ppm	11	BSHIRLEY
160	11/9/2010 17:11	Soil	120	Final	1250	Manchester	Front	IDX	4	15	21.4	6.66	223.25	15.98	2739.32	65.53	ppm	11	BSHIRLEY
162	11/9/2010 17:15	Soil	120	Final	1250	Manchester	Front	IDX	4	16	39.34	7.47	169.26	14.49	2795.91	67.24	ppm	11	BSHIRLEY
163	11/9/2010 17:18	Soil	120	Final	1250	Manchester	Front	IDX	4	17	19.52	6.64	114.64	11.88	1522.88	47.78	ppm	11	BSHIRLEY
164	11/9/2010 17:21	Soil	120	Final	1250	Manchester	Front	IDX	4	18	24.19	7.35	68.89	10.7	908.58	39.71	ppm	11	BSHIRLEY
165	11/9/2010 17:24	Soil	120	Final	1250	Manchester	Front	IDX	4	19	29.21	6.87	185.01	14.68	2358.6	60.6	ppm	11	BSHIRLEY
166	11/9/2010 17:28	Soil	120	Final	1250	Manchester	Front	IDX	4	20	< LOD	9.22	134.66	13.49	2140.76	60.23	ppm	11	BSHIRLEY
42	11/10/2010 9:22	Soil	120	Final	1250	Manchester	Front	ECX	4	1	20.51	6.02	< LOD	8.23	4450.12	77.11	ppm	4.1	BSHIRLEY
43	11/10/2010 9:28	Soil	120	Final	1250	Manchester	Front	ECX	4	2	21.31	6.07	< LOD	8.63	4365.26	77.01	ppm	4.1	BSHIRLEY
44	11/10/2010 9:30	Soil	120	Final	1250	Manchester	Front	ECX	4	3	21.37	6.05	< LOD	8.53	4425.4	76.26	ppm	4.1	BSHIRLEY
45	11/10/2010 9:33	Soil	120	Final	1250	Manchester	Front	ECX	4	4	19.98	6.05	< LOD	8.34	4325.17	76.49	ppm	4.1	BSHIRLEY
46	11/10/2010 9:36	Soil	120	Final	1250	Manchester	Front	ECX	4	5	28.06	6.28	< LOD	8.71	4444.79	78.16	ppm	4.1	BSHIRLEY
22	11/10/2010 8:11	Soil	120	Final	1250	Manchester	Back	IDX	4	1	< LOD	9.87	206.53	14.84	1041.92	45.26	ppm	n-a	BSHIRLEY
23	11/10/2010 8:14	Soil	120	Final	1250	Manchester	Back	IDX	4	2	< LOD	10.12	97.69	12.77	576.04	35.31	ppm	n-a	BSHIRLEY
24	11/10/2010 8:18	Soil	120	Final	1250	Manchester	Back	IDX	4	3	< LOD	10.38	173.2	15.03	764.85	39.42	ppm	n-a	BSHIRLEY
25	11/10/2010 8:21	Soil	120	Final	1250	Manchester	Back	IDX	4	4	< LOD	9.57	276.64	18.72	675.49	36.8	ppm	n-a	BSHIRLEY
26	11/10/2010 8:25	Soil	120	Final	1250	Manchester	Back	IDX	4	5	< LOD	8	226.24	16.65	960.45	39.93	ppm	n-a	BSHIRLEY
27	11/10/2010 8:28	Soil	120	Final	1250	Manchester	Back	IDX	4	6	< LOD	8.27	478.5	22	1130.02	44.36	ppm	n-a	BSHIRLEY
28	11/10/2010 8:31	Soil	120	Final	1250	Manchester	Back	IDX	4	7	< LOD	11.55	519.47	23.08	496.77	36.44	ppm	n-a	BSHIRLEY
29	11/10/2010 8:35	Soil	120	Final	1250	Manchester	Back	IDX	4	8	< LOD	11.69	187.98	16.42	413.95	32.05	ppm	n-a	BSHIRLEY
30	11/10/2010 8:39	Soil	120	Final	1250	Manchester	Back	IDX	4	9	< LOD	10.52	116.23	11.78	460.73	32.68	ppm	n-a	BSHIRLEY
31	11/10/2010 8:42	Soil	120	Final	1250	Manchester	Back	IDX	4	10	< LOD	9.25	146.11	13.42	1061.52	47	ppm	n-a	BSHIRLEY
32	11/10/2010 8:45	Soil	120	Final	1250	Manchester	Back	IDX	4	11	< LOD	8.96	142.65	15.28	780.66	37.7	ppm	n-a	BSHIRLEY
33	11/10/2010 8:48	Soil	120	Final	1250	Manchester	Back	IDX	4	12	< LOD	9.04	153.52	15.34	525.16	31.78	ppm	n-a	BSHIRLEY
34	11/10/2010 8:51	Soil	120	Final	1250	Manchester	Back	IDX	4	13	< LOD	11.92	245.77	17.33	374.25	31.26	ppm	n-a	BSHIRLEY
35	11/10/2010 8:54	Soil	120	Final	1250	Manchester	Back	IDX	4	14	< LOD	11.77	177.33	15.17	770.04	43.72	ppm	n-a	BSHIRLEY
36	11/10/2010 8:57	Soil	120	Final	1250	Manchester	Back	IDX	4	15	< LOD	7.48	223.25	15.98	929.08	38.5	ppm	n-a	BSHIRLEY
37	11/10/2010 8:59	Soil	120	Final	1250	Manchester	Back	IDX	4	16	< LOD	8.17	169.26	14.49	1524.69	49.92	ppm	n-a	BSHIRLEY
38	11/10/2010 9:02	Soil	120	Final	1250	Manchester	Back	IDX	4	17	< LOD	9.13	114.64	11.88	2166.55	62.51	ppm	n-a	BSHIRLEY
39	11/10/2010 9:06	Soil	120	Final	1250	Manchester	Back	IDX	4	18	< LOD	9.58	68.89	10.7	458.67	29.08	ppm	n-a	BSHIRLEY
40	11/10/2010 9:08	Soil	120	Final	1250	Manchester	Back	IDX	4	19	< LOD	11.72	185.01	14.68	427.05	32.71	ppm	n-a	BSHIRLEY
41	11/10/2010 9:11	Soil	120	Final	1250	Manchester	Back	IDX	4	20	< LOD	10.59	134.66	13.49	532.96	33.74	ppm	n-a	BSHIRLEY
48	11/10/2010 9:48	Soil	120	Final	1250	Manchester	Back	ECX	4	1	< LOD	10.85	35.67	9.54	415.77	29.69	ppm	3.7	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
49	11/10/2010 9:52	Soil	120	Final	1250	Manchester	Back	ECX	4	2	< LOD	10.31	30.77	9	476.91	31.09	ppm	3.7	BSHIRLEY
50	11/10/2010 9:55	Soil	120	Final	1250	Manchester	Back	ECX	4	3	< LOD	10.92	32.68	9.38	391.19	29.16	ppm	3.7	BSHIRLEY
51	11/10/2010 9:57	Soil	120	Final	1250	Manchester	Back	ECX	4	4	< LOD	10.71	29.62	8.96	419.42	29.36	ppm	3.7	BSHIRLEY
52	11/10/2010 10:00	Soil	120	Final	1250	Manchester	Back	ECX	4	5	< LOD	10.99	42.65	10.01	399.99	29.67	ppm	3.7	BSHIRLEY
57	11/10/2010 10:23	Soil	120	Final	1246	Manchester	Front	IDX	5	1	16.65	9.63	215.22	22.05	1871.03	76.12	ppm	12.4	BSHIRLEY
58	11/10/2010 10:26	Soil	120	Final	1246	Manchester	Front	IDX	5	2	39.83	7.67	218.81	16.56	1067.72	43.12	ppm	12.4	BSHIRLEY
59	11/10/2010 10:29	Soil	120	Final	1246	Manchester	Front	IDX	5	3	26.11	7.59	240.07	18.45	1835.17	60.01	ppm	12.4	BSHIRLEY
60	11/10/2010 10:31	Soil	120	Final	1246	Manchester	Front	IDX	5	4	29.2	7.16	899.92	31.85	3576.42	78.57	ppm	12.4	BSHIRLEY
61	11/10/2010 10:34	Soil	120	Final	1246	Manchester	Front	IDX	5	5	18.57	7.04	220.51	17.46	2430.23	67.51	ppm	12.4	BSHIRLEY
62	11/10/2010 10:37	Soil	120	Final	1246	Manchester	Front	IDX	5	6	17.67	7.35	268.95	19.66	2364.8	69.15	ppm	12.4	BSHIRLEY
63	11/10/2010 10:40	Soil	120	Final	1246	Manchester	Front	IDX	5	7	< LOD	8.86	187.32	15.34	2873.77	69.62	ppm	12.4	BSHIRLEY
64	11/10/2010 10:43	Soil	120	Final	1246	Manchester	Front	IDX	5	8	13.71	5.88	455.87	21.57	3388.54	71.51	ppm	12.4	BSHIRLEY
65	11/10/2010 10:47	Soil	120	Final	1246	Manchester	Front	IDX	5	9	15.77	6.58	160.14	13.95	1759.26	52.45	ppm	12.4	BSHIRLEY
66	11/10/2010 10:50	Soil	120	Final	1246	Manchester	Front	IDX	5	10	< LOD	8.65	140.69	13.73	1512.07	50.77	ppm	12.4	BSHIRLEY
67	11/10/2010 10:53	Soil	120	Final	1246	Manchester	Front	IDX	5	11	< LOD	11.3	50.04	10.76	941.61	44.8	ppm	12.4	BSHIRLEY
68	11/10/2010 10:56	Soil	120	Final	1246	Manchester	Front	IDX	5	12	< LOD	9.21	186.16	15.31	2298.81	62.01	ppm	12.4	BSHIRLEY
71	11/10/2010 11:00	Soil	120	Final	1246	Manchester	Front	IDX	5	13	< LOD	8.65	126.11	12.52	1653.42	50.57	ppm	12.4	BSHIRLEY
72	11/10/2010 11:02	Soil	120	Final	1246	Manchester	Front	IDX	5	14	15.74	7.68	33.37	9.48	375.99	28.26	ppm	12.4	BSHIRLEY
73	11/10/2010 11:05	Soil	120	Final	1246	Manchester	Front	IDX	5	15	< LOD	9.62	42.16	8.98	514.21	29.69	ppm	12.4	BSHIRLEY
74	11/10/2010 11:10	Soil	120	Final	1246	Manchester	Front	IDX	5	16	35.92	6.92	343.82	19.37	2508.79	62.95	ppm	12.4	BSHIRLEY
75	11/10/2010 11:12	Soil	120	Final	1246	Manchester	Front	IDX	5	17	22.32	6.99	130.75	13.37	1454.79	49.82	ppm	12.4	BSHIRLEY
76	11/10/2010 11:15	Soil	120	Final	1246	Manchester	Front	IDX	5	18	< LOD	9.52	87.77	11.28	1377.41	47.14	ppm	12.4	BSHIRLEY
77	11/10/2010 11:18	Soil	120	Final	1246	Manchester	Front	IDX	5	19	< LOD	9.16	156.66	14.17	2041.12	58.19	ppm	12.4	BSHIRLEY
78	11/10/2010 11:21	Soil	120	Final	1246	Manchester	Front	IDX	5	20	< LOD	9.52	117.24	12.44	1543.25	49.74	ppm	12.4	BSHIRLEY
83	11/10/2010 11:48	Soil	120	Final	1246	Manchester	Front	ECX	5	1	30.39	6.24	432.67	19.88	3161.02	65.21	ppm	12.4	BSHIRLEY
84	11/10/2010 11:51	Soil	120	Final	1246	Manchester	Front	ECX	5	2	34.68	6.65	377.49	19.08	5060.38	84.02	ppm	12.4	BSHIRLEY
85	11/10/2010 11:54	Soil	120	Final	1246	Manchester	Front	ECX	5	3	24.35	6.19	488.07	21.24	3291.81	67.18	ppm	12.4	BSHIRLEY
86	11/10/2010 11:57	Soil	120	Final	1246	Manchester	Front	ECX	5	4	25.62	6.24	470.18	20.82	3279.86	66.88	ppm	12.4	BSHIRLEY
87	11/10/2010 11:59	Soil	120	Final	1246	Manchester	Front	ECX	5	5	27.26	6.29	404.54	19.34	2980.97	63.45	ppm	12.4	BSHIRLEY
90	11/10/2010 12:09	Soil	120	Final	1246	Manchester	Back	IDX	5	1	21.96	6.55	305.03	17.62	2665.81	62.31	ppm	14.9	BSHIRLEY
91	11/10/2010 12:12	Soil	120	Final	1246	Manchester	Back	IDX	5	2	33.26	7.3	207.32	15.65	2245.57	59.87	ppm	14.9	BSHIRLEY
92	11/10/2010 12:16	Soil	120	Final	1246	Manchester	Back	IDX	5	3	18.55	6.49	181.5	14.18	2158.33	56.36	ppm	14.9	BSHIRLEY
93	11/10/2010 12:18	Soil	120	Final	1246	Manchester	Back	IDX	5	4	11.72	6.78	71.35	10.77	910.77	39.59	ppm	14.9	BSHIRLEY
94	11/10/2010 12:21	Soil	120	Final	1246	Manchester	Back	IDX	5	5	27.73	7.36	132.19	13.51	1237.7	46.4	ppm	14.9	BSHIRLEY
95	11/10/2010 12:25	Soil	120	Final	1246	Manchester	Back	IDX	5	6	15.66	7.29	79.16	11.6	962	42.47	ppm	14.9	BSHIRLEY
96	11/10/2010 12:28	Soil	120	Final	1246	Manchester	Back	IDX	5	7	< LOD	10.41	160.01	16.94	1809.34	64.7	ppm	14.9	BSHIRLEY
97	11/10/2010 12:32	Soil	120	Final	1246	Manchester	Back	IDX	5	8	12.45	7.1	105.31	13.21	2646.54	71.61	ppm	14.9	BSHIRLEY
98	11/10/2010 12:35	Soil	120	Final	1246	Manchester	Back	IDX	5	9	< LOD	8.23	171.67	14.1	2051.25	55.94	ppm	14.9	BSHIRLEY
99	11/10/2010 12:38	Soil	120	Final	1246	Manchester	Back	IDX	5	10	< LOD	10.64	125.4	14.18	1295.53	50.67	ppm	14.9	BSHIRLEY
100	11/10/2010 12:41	Soil	120	Final	1246	Manchester	Back	IDX	5	11	< LOD	7.99	141	13.13	2507.93	62.32	ppm	14.9	BSHIRLEY
101	11/10/2010 12:44	Soil	120	Final	1246	Manchester	Back	IDX	5	12	15.87	8.91	154.25	18.41	1868.23	72.55	ppm	14.9	BSHIRLEY
102	11/10/2010 12:48	Soil	120	Final	1246	Manchester	Back	IDX	5	13	< LOD	10.94	82.04	12.04	1376.43	51.6	ppm	14.9	BSHIRLEY
103	11/10/2010 12:51	Soil	120	Final	1246	Manchester	Back	IDX	5	14	< LOD	9.89	51.21	9.84	710.09	35.65	ppm	14.9	BSHIRLEY
104	11/10/2010 12:54	Soil	120	Final	1246	Manchester	Back	IDX	5	15	14.68	6.97	67.49	10.54	1036.32	42.21	ppm	14.9	BSHIRLEY
105	11/10/2010 12:57	Soil	120	Final	1246	Manchester	Back	IDX	5	16	23.11	6.8	229.82	16.33	2143.98	58.5	ppm	14.9	BSHIRLEY
106	11/10/2010 13:00	Soil	120	Final	1246	Manchester	Back	IDX	5	17	23.14	6.82	54.83	9.18	770.39	34.14	ppm	14.9	BSHIRLEY
107	11/10/2010 13:03	Soil	120	Final	1246	Manchester	Back	IDX	5	18	24.25	7.52	172.26	15.41	1223.58	47.22	ppm	14.9	BSHIRLEY
108	11/10/2010 13:06	Soil	120	Final	1246	Manchester	Back	IDX	5	19	25.63	7.49	123.97	13.72	2167.45	63.17	ppm	14.9	BSHIRLEY
109	11/10/2010 13:10	Soil	120	Final	1246	Manchester	Back	IDX	5	20	10.03	6.42	95.24	11.47	1848.42	54.23	ppm	14.9	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
148	11/10/2010 15:59	Soil	120	Final	1246	Manchester	Back	ECX	5	1	16.77	6.08	270.02	16.3	2398.02	57.59	ppm		BSHIRLEY
149	11/10/2010 16:02	Soil	120	Final	1246	Manchester	Back	ECX	5	2	19.43	6.21	299.34	17.08	2508.81	58.97	ppm		BSHIRLEY
150	11/10/2010 16:05	Soil	120	Final	1246	Manchester	Back	ECX	5	3	17.04	6.14	260.09	15.98	2587.12	59.57	ppm		BSHIRLEY
151	11/10/2010 16:08	Soil	120	Final	1246	Manchester	Back	ECX	5	4	17.17	6.18	248.92	15.75	2368.35	57.33	ppm		BSHIRLEY
152	11/10/2010 16:11	Soil	120	Final	1246	Manchester	Back	ECX	5	5	22.43	6.32	233.6	15.27	2260.55	55.75	ppm		BSHIRLEY
113	11/10/2010 14:01	Soil	120	Final	1249	Manchester	Front	IDX	6	1	33.03	9.13	49.89	11.48	593.96	37.6	ppm	10.8	BSHIRLEY
116	11/10/2010 14:04	Soil	120	Final	1249	Manchester	Front	IDX	6	2	36.89	7.76	203.35	16.09	2127.47	60.54	ppm	10.8	BSHIRLEY
118	11/10/2010 14:08	Soil	120	Final	1249	Manchester	Front	IDX	6	3	25.45	7.63	90.97	12.16	1417.61	51.04	ppm	10.8	BSHIRLEY
120	11/10/2010 14:11	Soil	120	Final	1249	Manchester	Front	IDX	6	4	30.11	7.46	125.75	13.13	1769.09	54.61	ppm	10.8	BSHIRLEY
121	11/10/2010 14:14	Soil	120	Final	1249	Manchester	Front	IDX	6	5	40.2	7.68	219.17	16.49	2874.79	69.78	ppm	10.8	BSHIRLEY
122	11/10/2010 14:18	Soil	120	Final	1249	Manchester	Front	IDX	6	6	17.83	6.61	281	18.34	4491.33	86.94	ppm	10.8	BSHIRLEY
124	11/10/2010 14:21	Soil	120	Final	1249	Manchester	Front	IDX	6	7	25.19	7.02	214.86	15.91	3026.45	69.63	ppm	10.8	BSHIRLEY
125	11/10/2010 14:24	Soil	120	Final	1249	Manchester	Front	IDX	6	8	38.42	7.3	150.46	13.6	1578.43	50.01	ppm	10.8	BSHIRLEY
126	11/10/2010 14:27	Soil	120	Final	1249	Manchester	Front	IDX	6	9	43.5	7.37	327.77	19.3	4510.49	85.46	ppm	10.8	BSHIRLEY
127	11/10/2010 14:30	Soil	120	Final	1249	Manchester	Front	IDX	6	10	38.08	7.42	367.8	21.07	5239.76	95.61	ppm	10.8	BSHIRLEY
128	11/10/2010 14:33	Soil	120	Final	1249	Manchester	Front	IDX	6	11	11.52	6.18	362.65	20.16	4992.36	89.91	ppm	10.8	BSHIRLEY
129	11/10/2010 14:36	Soil	120	Final	1249	Manchester	Front	IDX	6	12	18.89	6.87	128.67	13	1402.61	47.99	ppm	10.8	BSHIRLEY
130	11/10/2010 14:39	Soil	120	Final	1249	Manchester	Front	IDX	6	13	27.01	6.97	274.88	18.71	4167.2	85.86	ppm	10.8	BSHIRLEY
131	11/10/2010 14:42	Soil	120	Final	1249	Manchester	Front	IDX	6	14	37.26	6.85	506.98	24.02	7651.18	113.24	ppm	10.8	BSHIRLEY
132	11/10/2010 14:45	Soil	120	Final	1249	Manchester	Front	IDX	6	15	49.04	7.36	401.57	20.85	5868.73	96.15	ppm	10.8	BSHIRLEY
133	11/10/2010 14:48	Soil	120	Final	1249	Manchester	Front	IDX	6	16	81.47	8.32	546.06	25.28	8133.65	118.86	ppm	10.8	BSHIRLEY
134	11/10/2010 14:51	Soil	120	Final	1249	Manchester	Front	IDX	6	17	98.13	9.26	689.52	29.7	9061.21	131.87	ppm	10.8	BSHIRLEY
135	11/10/2010 14:54	Soil	120	Final	1249	Manchester	Front	IDX	6	18	96.02	9.12	761.21	31.67	11057.4	148.13	ppm	10.8	BSHIRLEY
136	11/10/2010 14:57	Soil	120	Final	1249	Manchester	Front	IDX	6	19	41.11	6.96	364.75	19.56	5389.12	90.15	ppm	10.8	BSHIRLEY
137	11/10/2010 15:00	Soil	120	Final	1249	Manchester	Front	IDX	6	20	49.01	7.88	308.05	19.48	5035.48	93.67	ppm	10.8	BSHIRLEY
138	11/10/2010 15:23	Soil	120	Final	1249	Manchester	Front	ECX	6	1	40.9	6.73	309.22	17.35	4194.41	75.92	ppm	4.2	BSHIRLEY
139	11/10/2010 15:25	Soil	120	Final	1249	Manchester	Front	ECX	6	2	38.51	6.77	258.13	16.09	3640.43	71.2	ppm	4.2	BSHIRLEY
140	11/10/2010 15:28	Soil	120	Final	1249	Manchester	Front	ECX	6	3	39.17	6.76	342.57	18.35	4672.47	81.02	ppm	4.2	BSHIRLEY
141	11/10/2010 15:31	Soil	120	Final	1249	Manchester	Front	ECX	6	4	37.39	6.71	311.98	17.59	3957.98	74.69	ppm	4.2	BSHIRLEY
142	11/10/2010 15:34	Soil	120	Final	1249	Manchester	Front	ECX	6	5	42.59	6.83	331.12	18.05	4103.66	76.02	ppm	4.2	BSHIRLEY
157	11/10/2010 16:32	Soil	120	Final	1249	Manchester	Back	IDX	6	1	14.74	6.57	202.98	15.52	2259.56	60.19	ppm	23.7	BSHIRLEY
158	11/10/2010 16:35	Soil	120	Final	1249	Manchester	Back	IDX	6	2	11.45	6.22	192.56	14.96	3236.71	70.78	ppm	23.7	BSHIRLEY
159	11/10/2010 16:38	Soil	120	Final	1249	Manchester	Back	IDX	6	3	22.44	7.32	86.37	11.28	834.18	37.56	ppm	23.7	BSHIRLEY
160	11/10/2010 16:41	Soil	120	Final	1249	Manchester	Back	IDX	6	4	19.92	6.8	95.63	11.13	1263.93	43.6	ppm	23.7	BSHIRLEY
161	11/10/2010 16:43	Soil	120	Final	1249	Manchester	Back	IDX	6	5	34.64	7.05	252.26	16.93	3549.72	74.88	ppm	23.7	BSHIRLEY
162	11/10/2010 16:46	Soil	120	Final	1249	Manchester	Back	IDX	6	6	26.34	7.2	127.72	13.12	1576.33	51.5	ppm	23.7	BSHIRLEY
163	11/10/2010 16:49	Soil	120	Final	1249	Manchester	Back	IDX	6	7	49.4	7.43	316.09	18.98	2839.14	67.9	ppm	23.7	BSHIRLEY
164	11/10/2010 16:52	Soil	120	Final	1249	Manchester	Back	IDX	6	8	28.8	6.83	97.38	11.1	1560.13	47.92	ppm	23.7	BSHIRLEY
165	11/10/2010 16:54	Soil	120	Final	1249	Manchester	Back	IDX	6	9	60.17	8.38	285.49	19.21	4182.61	87.09	ppm	23.7	BSHIRLEY
166	11/10/2010 16:57	Soil	120	Final	1249	Manchester	Back	IDX	6	10	38.48	7.78	185.83	15.82	2411.88	65.52	ppm	23.7	BSHIRLEY
167	11/10/2010 17:00	Soil	120	Final	1249	Manchester	Back	IDX	6	11	26.79	6.78	177.64	14.43	2184.88	58.09	ppm	23.7	BSHIRLEY
168	11/10/2010 17:03	Soil	120	Final	1249	Manchester	Back	IDX	6	12	20.84	7.48	71.19	11.15	861.11	39.75	ppm	23.7	BSHIRLEY
169	11/10/2010 17:06	Soil	120	Final	1249	Manchester	Back	IDX	6	13	13.38	6.46	117.36	12.06	1381.65	45.68	ppm	23.7	BSHIRLEY
170	11/10/2010 17:09	Soil	120	Final	1249	Manchester	Back	IDX	6	14	11.51	6.6	67.74	10.45	888.41	38.69	ppm	23.7	BSHIRLEY
171	11/10/2010 17:12	Soil	120	Final	1249	Manchester	Back	IDX	6	15	12.28	6.93	82.36	11.31	998.13	41.45	ppm	23.7	BSHIRLEY
172	11/10/2010 17:15	Soil	120	Final	1249	Manchester	Back	IDX	6	16	39.54	7.82	329.66	21.02	4877.87	96.59	ppm	23.7	BSHIRLEY
173	11/10/2010 17:18	Soil	120	Final	1249	Manchester	Back	IDX	6	17	48.71	8.23	210.05	16.93	2661.06	69.96	ppm	23.7	BSHIRLEY
174	11/10/2010 17:21	Soil	120	Final	1249	Manchester	Back	IDX	6	18	56.7	7.76	323.3	19.3	3519.71	75.96	ppm	23.7	BSHIRLEY
175	11/10/2010 17:24	Soil	120	Final	1249	Manchester	Back	IDX	6	19	43.49	7.95	127.95	13.66	1642.27	54.31	ppm	23.7	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
176	11/10/2010 17:26	Soil	120	Final	1249	Manchester	Back	IDX	6	20	35.17	7.31	162.04	14.38	5110.8	91.63	ppm	23.7	BSHIRLEY
177	11/10/2010 17:51	Soil	120	Final	1249	Manchester	Back	ECX	6	1	33.71	6.54	247.49	15.6	3409.52	68.23	ppm	4.6	BSHIRLEY
178	11/10/2010 17:54	Soil	120	Final	1249	Manchester	Back	ECX	6	2	25.79	6.37	235.89	15.26	3371.17	67.74	ppm	4.6	BSHIRLEY
179	11/10/2010 17:56	Soil	120	Final	1249	Manchester	Back	ECX	6	3	31.28	6.58	254.61	16.07	3373.03	68.95	ppm	4.6	BSHIRLEY
180	11/10/2010 17:59	Soil	120	Final	1249	Manchester	Back	ECX	6	4	30.23	6.5	246.73	15.71	3263.31	67.09	ppm	4.6	BSHIRLEY
181	11/10/2010 18:01	Soil	120	Final	1249	Manchester	Back	ECX	6	5	30.11	6.47	266.53	16.21	3450.61	68.99	ppm	4.6	BSHIRLEY
203	11/11/2010 8:53	Soil	120	Final	1254	Manchester	Front	ECX	7	1	< LOD	8.48	22.37	7.11	239.2	19.2	ppm	6.6	BSHIRLEY
204	11/11/2010 8:56	Soil	120	Final	1254	Manchester	Front	ECX	7	2	< LOD	8.55	30.8	7.57	238.2	19.06	ppm	6.6	BSHIRLEY
205	11/11/2010 8:59	Soil	120	Final	1254	Manchester	Front	ECX	7	3	< LOD	8.58	20.45	6.95	236.9	19.04	ppm	6.6	BSHIRLEY
206	11/11/2010 9:01	Soil	120	Final	1254	Manchester	Front	ECX	7	4	< LOD	8.56	33.81	7.75	239.62	19.17	ppm	6.6	BSHIRLEY
207	11/11/2010 9:04	Soil	120	Final	1254	Manchester	Front	ECX	7	5	< LOD	8.44	28.15	7.5	260.82	19.91	ppm	6.6	BSHIRLEY
189	11/23/2010 10:43	Soil	120	Final	1254	Manchester	Back	ECX	7	1	< LOD	8.53	25.29	7.23	190.56	17.2	ppm	10.8	BBRAND
190	11/23/2010 10:46	Soil	120	Final	1254	Manchester	Back	ECX	7	2	< LOD	8.49	70.56	9.49	283.99	20.43	ppm	10.8	BBRAND
191	11/23/2010 10:48	Soil	120	Final	1254	Manchester	Back	ECX	7	3	< LOD	8.41	22.21	7.13	209.06	18.19	ppm	10.8	BBRAND
192	11/23/2010 10:51	Soil	120	Final	1254	Manchester	Back	ECX	7	4	< LOD	8.64	19.55	6.92	198.96	17.7	ppm	10.8	BBRAND
193	11/23/2010 10:53	Soil	120	Final	1254	Manchester	Back	ECX	7	5	< LOD	8.39	33.92	7.82	279.91	20.6	ppm	10.8	BBRAND
212	11/11/2010 9:34	Soil	120	Final	1214	Manchester	Front	IDX	8	1	< LOD	9.3	67.58	9.73	531.47	28.37	ppm	18.8	BSHIRLEY
213	11/11/2010 9:38	Soil	120	Final	1214	Manchester	Front	IDX	8	2	< LOD	9.12	48.86	8.79	521.96	27.8	ppm	18.8	BSHIRLEY
214	11/11/2010 9:41	Soil	120	Final	1214	Manchester	Front	IDX	8	3	18.61	7.85	55.04	11.08	668.24	38.12	ppm	18.8	BSHIRLEY
215	11/11/2010 9:45	Soil	120	Final	1214	Manchester	Front	IDX	8	4	< LOD	8.79	84.32	10.41	1342.15	43.72	ppm	18.8	BSHIRLEY
216	11/11/2010 9:48	Soil	120	Final	1214	Manchester	Front	IDX	8	5	14.07	8.07	108.55	14.78	1293.59	55.5	ppm	18.8	BSHIRLEY
217	11/11/2010 9:51	Soil	120	Final	1214	Manchester	Front	IDX	8	6	15.5	6.99	142.53	14.08	1323.72	48.39	ppm	18.8	BSHIRLEY
218	11/11/2010 9:55	Soil	120	Final	1214	Manchester	Front	IDX	8	7	< LOD	8.6	82.25	10.03	1169.05	39.98	ppm	18.8	BSHIRLEY
219	11/11/2010 10:00	Soil	120	Final	1214	Manchester	Front	IDX	8	8	< LOD	8.2	53.52	8.48	880.49	33.69	ppm	18.8	BSHIRLEY
220	11/11/2010 10:03	Soil	120	Final	1214	Manchester	Front	IDX	8	9	13.01	6.78	71.84	10.37	795.8	35.59	ppm	18.8	BSHIRLEY
221	11/11/2010 10:07	Soil	120	Final	1214	Manchester	Front	IDX	8	10	< LOD	8.68	62.47	8.86	670.21	29.52	ppm	18.8	BSHIRLEY
222	11/11/2010 10:10	Soil	120	Final	1214	Manchester	Front	IDX	8	11	11.36	6.76	44.34	8.97	420.15	26.73	ppm	18.8	BSHIRLEY
223	11/11/2010 10:13	Soil	120	Final	1214	Manchester	Front	IDX	8	12	< LOD	9.58	61.79	9.66	817.37	35.57	ppm	18.8	BSHIRLEY
224	11/11/2010 10:16	Soil	120	Final	1214	Manchester	Front	IDX	8	13	< LOD	8.79	62.74	9.24	869.14	35.01	ppm	18.8	BSHIRLEY
225	11/11/2010 10:19	Soil	120	Final	1214	Manchester	Front	IDX	8	14	< LOD	8.15	73.92	10.22	1024.05	39.46	ppm	18.8	BSHIRLEY
226	11/11/2010 10:22	Soil	120	Final	1214	Manchester	Front	IDX	8	15	< LOD	8.11	124.89	11.98	1728.9	49.5	ppm	18.8	BSHIRLEY
227	11/11/2010 10:26	Soil	120	Final	1214	Manchester	Front	IDX	8	16	< LOD	6.97	109.36	10.44	1919.64	47.9	ppm	18.8	BSHIRLEY
228	11/11/2010 10:30	Soil	120	Final	1214	Manchester	Front	IDX	8	17	< LOD	8.06	121.48	11.98	1495.47	46.62	ppm	18.8	BSHIRLEY
229	11/11/2010 10:33	Soil	120	Final	1214	Manchester	Front	IDX	8	18	< LOD	8.38	88.65	10.52	1056.59	38.79	ppm	18.8	BSHIRLEY
230	11/11/2010 10:36	Soil	120	Final	1214	Manchester	Front	IDX	8	19	< LOD	9.3	96.23	11.91	1327.5	47.74	ppm	18.8	BSHIRLEY
231	11/11/2010 10:39	Soil	120	Final	1214	Manchester	Front	IDX	8	20	< LOD	9.59	90.83	11.16	926.59	38.21	ppm	18.8	BSHIRLEY
232	11/11/2010 10:48	Soil	120	Final	1214	Manchester	Front	ECX	8	1	< LOD	8.75	130.61	11.6	1381.86	42.18	ppm	7.7	BSHIRLEY
233	11/11/2010 10:51	Soil	120	Final	1214	Manchester	Front	ECX	8	2	16.67	6.11	154.71	12.48	1467.64	43.88	ppm	7.7	BSHIRLEY
234	11/11/2010 10:54	Soil	120	Final	1214	Manchester	Front	ECX	8	3	9.16	5.87	126.35	11.48	1461.05	43.41	ppm	7.7	BSHIRLEY
235	11/11/2010 10:58	Soil	120	Final	1214	Manchester	Front	ECX	8	4	< LOD	8.76	127.6	11.67	1534.19	45.07	ppm	7.7	BSHIRLEY
236	11/11/2010 11:01	Soil	120	Final	1214	Manchester	Front	ECX	8	5	15.98	6.03	152.62	12.3	1639.9	46.05	ppm	7.7	BSHIRLEY
27	11/11/2010 13:11	Soil	120	Final	1214	Manchester	Back	IDX	8	1	< LOD	9.01	44.45	7.71	230.73	19.08	ppm		cwolf
29	11/11/2010 13:16	Soil	120	Final	1214	Manchester	Back	IDX	8	2	< LOD	7.58	21.5	5.48	131.19	13.28	ppm		cwolf
30	11/11/2010 13:21	Soil	120	Final	1214	Manchester	Back	IDX	8	3	< LOD	9.82	26.62	7.07	134.81	16.31	ppm		cwolf
31	11/11/2010 13:26	Soil	120	Final	1214	Manchester	Back	IDX	8	4	< LOD	9.31	42.26	7.96	243.53	20.51	ppm		cwolf
32	11/11/2010 13:30	Soil	120	Final	1214	Manchester	Back	IDX	8	5	< LOD	8.12	66.81	8.63	411.7	24	ppm		cwolf
33	11/11/2010 13:54	Soil	120	Final	1214	Manchester	Back	IDX	8	6	< LOD	13.74	30.83	9	152.13	21.66	ppm		cwolf
34	11/11/2010 14:01	Soil	120	Final	1214	Manchester	Back	IDX	8	7	< LOD	10.06	25.43	6.97	103.38	14.97	ppm		cwolf
35	11/11/2010 14:07	Soil	120	Final	1214	Manchester	Back	IDX	8	8	< LOD	9.26	22.96	6.59	187.19	18.18	ppm		cwolf

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
37	11/11/2010 14:12	Soil	120	Final	1214	Manchester	Back	IDX	8	9	< LOD	8.7	20.24	6.48	193.09	19.15	ppm		cwolf
38	11/11/2010 14:15	Soil	120	Final	1214	Manchester	Back	IDX	8	10	< LOD	8.37	50.71	7.88	454.39	25.48	ppm		cwolf
39	11/11/2010 14:19	Soil	120	Final	1214	Manchester	Back	IDX	8	11	< LOD	8.48	30.31	6.7	209.52	18.12	ppm		cwolf
40	11/11/2010 14:23	Soil	120	Final	1214	Manchester	Back	IDX	8	12	< LOD	7.97	21.44	6.06	200.09	17.68	ppm		cwolf
41	11/11/2010 14:28	Soil	120	Final	1214	Manchester	Back	IDX	8	13	< LOD	7.57	25.11	5.88	241.6	17.69	ppm		cwolf
42	11/11/2010 14:32	Soil	120	Final	1214	Manchester	Back	IDX	8	14	< LOD	7.95	19.63	5.56	239.8	17.78	ppm		cwolf
43	11/11/2010 14:35	Soil	120	Final	1214	Manchester	Back	IDX	8	15	< LOD	14.69	26.96	9.66	190.81	26.88	ppm		cwolf
44	11/11/2010 14:38	Soil	120	Final	1214	Manchester	Back	IDX	8	16	< LOD	10.95	25.02	7.2	169.55	19.07	ppm		cwolf
45	11/11/2010 14:41	Soil	120	Final	1214	Manchester	Back	IDX	8	17	< LOD	8.91	35.29	7.24	403.6	25.08	ppm		cwolf
46	11/11/2010 14:46	Soil	120	Final	1214	Manchester	Back	IDX	8	18	< LOD	8.37	20.17	6.48	286.69	22.83	ppm		cwolf
47	11/11/2010 14:50	Soil	120	Final	1214	Manchester	Back	IDX	8	19	< LOD	8.84	30.14	6.91	308.03	21.97	ppm		cwolf
48	11/11/2010 14:54	Soil	120	Final	1214	Manchester	Back	IDX	8	20	< LOD	8.36	33.2	6.74	245.44	18.95	ppm		cwolf
20	11/11/2010 12:40	Soil	120	Final	1214	Manchester	Back	ECX	8	1	< LOD	8.33	29.1	6.07	153.72	14.43	ppm		cwolf
21	11/11/2010 12:43	Soil	120	Final	1214	Manchester	Back	ECX	8	2	< LOD	8.21	29.35	6.1	152.15	14.55	ppm		cwolf
22	11/11/2010 12:47	Soil	120	Final	1214	Manchester	Back	ECX	8	3	< LOD	8.39	89.04	9.04	161.67	14.72	ppm		cwolf
23	11/11/2010 12:49	Soil	120	Final	1214	Manchester	Back	ECX	8	4	< LOD	8.18	20.99	5.53	163.5	14.72	ppm		cwolf
24	11/11/2010 12:52	Soil	120	Final	1214	Manchester	Back	ECX	8	5	< LOD	8.11	29.73	6.02	156.92	14.53	ppm		cwolf
241	11/11/2010 11:26	Soil	120	Final	1201	Manchester	Front	IDX	9	1	10.9	5.55	229.43	14.16	2011.82	49.16	ppm	16.5	BSHIRLEY
243	11/11/2010 11:29	Soil	120	Final	1201	Manchester	Front	IDX	9	2	10.07	6.29	208.66	15.01	1967.57	53.66	ppm	16.5	BSHIRLEY
244	11/11/2010 11:32	Soil	120	Final	1201	Manchester	Front	IDX	9	3	22.13	7.95	209.5	17.98	2175.75	67.44	ppm	16.5	BSHIRLEY
245	11/11/2010 11:36	Soil	120	Final	1201	Manchester	Front	IDX	9	4	24.54	7.5	171.15	15.5	1636.29	55.05	ppm	16.5	BSHIRLEY
246	11/11/2010 11:38	Soil	120	Final	1201	Manchester	Front	IDX	9	5	< LOD	9.22	77.15	9.93	1002.19	37.62	ppm	16.5	BSHIRLEY
247	11/11/2010 11:42	Soil	120	Final	1201	Manchester	Front	IDX	9	6	10.62	6.18	136.4	12.33	1524.04	46.28	ppm	16.5	BSHIRLEY
248	11/11/2010 11:45	Soil	120	Final	1201	Manchester	Front	IDX	9	7	< LOD	8.53	131.02	12.65	1562.24	48.76	ppm	16.5	BSHIRLEY
249	11/11/2010 11:48	Soil	120	Final	1201	Manchester	Front	IDX	9	8	29.76	8.16	84.15	12.12	1087.55	46.15	ppm	16.5	BSHIRLEY
250	11/11/2010 11:51	Soil	120	Final	1201	Manchester	Front	IDX	9	9	17.19	6.64	126.44	12.72	1439.28	47.65	ppm	16.5	BSHIRLEY
251	11/11/2010 11:55	Soil	120	Final	1201	Manchester	Front	IDX	9	10	< LOD	8.41	168.69	13.19	2107.62	53.44	ppm	16.5	BSHIRLEY
252	11/11/2010 11:59	Soil	120	Final	1201	Manchester	Front	IDX	9	11	11.2	5.93	129.51	12.06	1640.19	48.12	ppm	16.5	BSHIRLEY
253	11/11/2010 12:02	Soil	120	Final	1201	Manchester	Front	IDX	9	12	< LOD	8.25	78.68	9.51	823.29	32.52	ppm	16.5	BSHIRLEY
254	11/11/2010 12:05	Soil	120	Final	1201	Manchester	Front	IDX	9	13	< LOD	9.18	78.89	10.21	657.75	31.3	ppm	16.5	BSHIRLEY
255	11/11/2010 12:08	Soil	120	Final	1201	Manchester	Front	IDX	9	14	< LOD	8.57	157.85	13.39	2001.48	54.17	ppm	16.5	BSHIRLEY
256	11/11/2010 12:11	Soil	120	Final	1201	Manchester	Front	IDX	9	15	< LOD	8.92	106.9	11.86	1365.51	46.21	ppm	16.5	BSHIRLEY
257	11/11/2010 12:14	Soil	120	Final	1201	Manchester	Front	IDX	9	16	26.86	6.96	148.2	13.72	1915.31	55.61	ppm	16.5	BSHIRLEY
258	11/11/2010 12:17	Soil	120	Final	1201	Manchester	Front	IDX	9	17	< LOD	8.25	223.05	14.41	2508.48	56.54	ppm	16.5	BSHIRLEY
259	11/11/2010 12:20	Soil	120	Final	1201	Manchester	Front	IDX	9	18	12.18	6.36	75.74	10.2	807.94	35	ppm	16.5	BSHIRLEY
260	11/11/2010 12:23	Soil	120	Final	1201	Manchester	Front	IDX	9	19	< LOD	9	31.66	7.54	286.57	20.39	ppm	16.5	BSHIRLEY
261	11/11/2010 12:26	Soil	120	Final	1201	Manchester	Front	IDX	9	20	< LOD	9.35	59.43	9.38	430.94	26.06	ppm	16.5	BSHIRLEY
262	11/11/2010 12:31	Soil	120	Final	1201	Manchester	Front	ECX	9	1	17.67	6.03	236.52	14.9	2368.2	55.53	ppm	7	BSHIRLEY
263	11/11/2010 12:34	Soil	120	Final	1201	Manchester	Front	ECX	9	2	12.31	5.94	231.16	14.75	2345.57	55.14	ppm	7	BSHIRLEY
264	11/11/2010 12:37	Soil	120	Final	1201	Manchester	Front	ECX	9	3	16.98	6.12	249.16	15.32	2439.39	56.46	ppm	7	BSHIRLEY
265	11/11/2010 12:39	Soil	120	Final	1201	Manchester	Front	ECX	9	4	19.56	6.05	231.15	14.67	2352.5	55.07	ppm	7	BSHIRLEY
266	11/11/2010 12:42	Soil	120	Final	1201	Manchester	Front	ECX	9	5	15.09	6.03	226.53	14.68	2482.05	56.86	ppm	7	BSHIRLEY
272	11/11/2010 13:37	Soil	120	Final	1201	Manchester	Back	IDX	9	1	< LOD	8.62	20.86	6.96	150.97	15.5	ppm	21.1	BSHIRLEY
273	11/11/2010 13:40	Soil	120	Final	1201	Manchester	Back	IDX	9	2	< LOD	8.68	19.61	7.07	122.59	14.99	ppm	21.1	BSHIRLEY
274	11/11/2010 13:43	Soil	120	Final	1201	Manchester	Back	IDX	9	3	< LOD	8.63	< LOD	8.98	83.37	12.59	ppm	21.1	BSHIRLEY
275	11/11/2010 13:46	Soil	120	Final	1201	Manchester	Back	IDX	9	4	< LOD	8.83	16.87	6.94	168.95	16.82	ppm	21.1	BSHIRLEY
276	11/11/2010 13:49	Soil	120	Final	1201	Manchester	Back	IDX	9	5	< LOD	8.09	< LOD	8.62	94.67	12.56	ppm	21.1	BSHIRLEY
277	11/11/2010 13:52	Soil	120	Final	1201	Manchester	Back	IDX	9	6	< LOD	9.69	< LOD	9.47	60.99	12.07	ppm	21.1	BSHIRLEY
278	11/11/2010 13:55	Soil	120	Final	1201	Manchester	Back	IDX	9	7	< LOD	8.89	15.56	7.07	125.82	15.51	ppm	21.1	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
279	11/11/2010 13:58	Soil	120	Final	1201	Manchester	Back	IDX	9	8	< LOD	10.08	11.4	7.42	94.21	15.39	ppm	21.1	BSHIRLEY
280	11/11/2010 14:01	Soil	120	Final	1201	Manchester	Back	IDX	9	9	< LOD	9.28	< LOD	9.79	135.98	16.11	ppm	21.1	BSHIRLEY
281	11/11/2010 14:03	Soil	120	Final	1201	Manchester	Back	IDX	9	10	< LOD	8.79	20.23	7.18	178.92	17.23	ppm	21.1	BSHIRLEY
282	11/11/2010 14:06	Soil	120	Final	1201	Manchester	Back	IDX	9	11	< LOD	9.52	17.26	6.98	246.64	19.9	ppm	21.1	BSHIRLEY
283	11/11/2010 14:09	Soil	120	Final	1201	Manchester	Back	IDX	9	12	< LOD	9.35	< LOD	10.07	136.43	16.2	ppm	21.1	BSHIRLEY
284	11/11/2010 14:12	Soil	120	Final	1201	Manchester	Back	IDX	9	13	< LOD	8.3	16.26	6.83	237.79	19.34	ppm	21.1	BSHIRLEY
285	11/11/2010 14:15	Soil	120	Final	1201	Manchester	Back	IDX	9	14	< LOD	8.46	12.7	6.41	172.82	16.4	ppm	21.1	BSHIRLEY
286	11/11/2010 14:18	Soil	120	Final	1201	Manchester	Back	IDX	9	15	< LOD	9.46	15.06	7.33	150.89	17.31	ppm	21.1	BSHIRLEY
287	11/11/2010 14:21	Soil	120	Final	1201	Manchester	Back	IDX	9	16	< LOD	9.47	19.6	7.23	185.91	17.95	ppm	21.1	BSHIRLEY
288	11/11/2010 14:24	Soil	120	Final	1201	Manchester	Back	IDX	9	17	< LOD	9.32	20.13	7.43	219.52	19.73	ppm	21.1	BSHIRLEY
289	11/11/2010 14:26	Soil	120	Final	1201	Manchester	Back	IDX	9	18	< LOD	9.17	10.33	6.48	106.35	14.02	ppm	21.1	BSHIRLEY
290	11/11/2010 14:29	Soil	120	Final	1201	Manchester	Back	IDX	9	19	< LOD	8.62	10.3	6.42	177.64	17.1	ppm	21.1	BSHIRLEY
291	11/11/2010 14:32	Soil	120	Final	1201	Manchester	Back	IDX	9	20	< LOD	8.82	< LOD	9.26	156.2	16.08	ppm	21.1	BSHIRLEY
292	11/11/2010 14:38	Soil	120	Final	1201	Manchester	Back	ECX	9	1	< LOD	8.37	11.52	6.2	98.47	12.9	ppm	8.7	BSHIRLEY
293	11/11/2010 14:41	Soil	120	Final	1201	Manchester	Back	ECX	9	2	< LOD	8.33	14.04	6.35	102.89	13.19	ppm	8.7	BSHIRLEY
294	11/11/2010 14:44	Soil	120	Final	1201	Manchester	Back	ECX	9	3	< LOD	7.95	< LOD	8.85	102.55	13.06	ppm	8.7	BSHIRLEY
295	11/11/2010 14:46	Soil	120	Final	1201	Manchester	Back	ECX	9	4	< LOD	8.3	< LOD	8.63	107.04	13.31	ppm	8.7	BSHIRLEY
296	11/11/2010 14:49	Soil	120	Final	1201	Manchester	Back	ECX	9	5	< LOD	8.12	12.02	6.16	95.77	12.66	ppm	8.7	BSHIRLEY
53	11/11/2010 15:59	Soil	120	Final	1017	Manchester	Front	IDX	10	1	< LOD	8.42	68.13	8.63	422.77	24.24	ppm		cwolf
54	11/11/2010 16:01	Soil	120	Final	1017	Manchester	Front	IDX	10	2	< LOD	8.79	41.16	7.63	344.94	23.41	ppm		cwolf
55	11/11/2010 16:05	Soil	120	Final	1017	Manchester	Front	IDX	10	3	< LOD	9.04	63.44	9.21	823.61	36.49	ppm		cwolf
56	11/11/2010 16:08	Soil	120	Final	1017	Manchester	Front	IDX	10	4	< LOD	8.44	60.45	9.14	778.81	35.61	ppm		cwolf
57	11/11/2010 16:11	Soil	120	Final	1017	Manchester	Front	IDX	10	5	< LOD	9.84	51.79	8.99	453.59	28.78	ppm		cwolf
58	11/11/2010 16:15	Soil	120	Final	1017	Manchester	Front	IDX	10	6	< LOD	8.8	96.17	10.23	299.59	21.16	ppm		cwolf
59	11/11/2010 16:18	Soil	120	Final	1017	Manchester	Front	IDX	10	7	< LOD	10	94.31	11.01	480.95	28.56	ppm		cwolf
60	11/11/2010 16:22	Soil	120	Final	1017	Manchester	Front	IDX	10	8	< LOD	8.46	49.76	7.9	304.51	21.17	ppm		cwolf
61	11/11/2010 16:26	Soil	120	Final	1017	Manchester	Front	IDX	10	9	< LOD	9.34	28.06	7.31	182.11	19.17	ppm		cwolf
62	11/11/2010 16:31	Soil	120	Final	1017	Manchester	Front	IDX	10	10	< LOD	7.87	35.96	6.45	226.85	16.98	ppm		cwolf
63	11/11/2010 16:35	Soil	120	Final	1017	Manchester	Front	IDX	10	11	< LOD	7.74	28.74	6.1	237.46	17.61	ppm		cwolf
64	11/11/2010 16:37	Soil	120	Final	1017	Manchester	Front	IDX	10	12	< LOD	7.83	36.69	6.71	348.22	21.45	ppm		cwolf
65	11/11/2010 16:41	Soil	120	Final	1017	Manchester	Front	IDX	10	13	< LOD	9.27	92.86	10.18	538.28	28.15	ppm		cwolf
66	11/11/2010 16:44	Soil	120	Final	1017	Manchester	Front	IDX	10	14	< LOD	8.35	33.04	6.97	385.87	24.25	ppm		cwolf
67	11/11/2010 16:47	Soil	120	Final	1017	Manchester	Front	IDX	10	15	< LOD	8.9	47.13	8.4	460.02	27.93	ppm		cwolf
68	11/11/2010 16:50	Soil	120	Final	1017	Manchester	Front	IDX	10	16	< LOD	7.34	69.12	8.41	820.56	31.93	ppm		cwolf
69	11/11/2010 16:53	Soil	120	Final	1017	Manchester	Front	IDX	10	17	< LOD	10.87	103.6	12.39	560.85	33.37	ppm		cwolf
70	11/11/2010 16:56	Soil	120	Final	1017	Manchester	Front	IDX	10	18	< LOD	8.93	60.5	8.62	462.88	26.42	ppm		cwolf
71	11/11/2010 16:59	Soil	120	Final	1017	Manchester	Front	IDX	10	19	< LOD	7.9	41.04	7.5	969.87	37.33	ppm		cwolf
72	11/11/2010 17:02	Soil	120	Final	1017	Manchester	Front	IDX	10	20	< LOD	8.02	99.9	10.43	793.71	33.45	ppm		cwolf
75	11/11/2010 17:15	Soil	120	Final	1017	Manchester	Front	ECX	10	1	< LOD	8.36	65.67	8.01	424.85	22.63	ppm		cwolf
76	11/11/2010 17:18	Soil	120	Final	1017	Manchester	Front	ECX	10	2	< LOD	8.38	62.35	7.91	462.27	23.71	ppm		cwolf
77	11/11/2010 17:22	Soil	120	Final	1017	Manchester	Front	ECX	10	3	< LOD	8.2	116.12	10.04	471.67	23.74	ppm		cwolf
78	11/11/2010 17:25	Soil	120	Final	1017	Manchester	Front	ECX	10	4	< LOD	8.21	70.71	8.25	446.2	23.23	ppm		cwolf
79	11/11/2010 17:27	Soil	120	Final	1017	Manchester	Front	ECX	10	5	< LOD	8.16	68.17	8.06	429.49	22.67	ppm		cwolf
106	11/12/2010 8:10	Soil	120	Final	1017	Manchester	Back	IDX	10	1	< LOD	9.46	62.65	8.9	512.55	28.06	ppm	10.8	CWOLF
107	11/12/2010 8:14	Soil	120	Final	1017	Manchester	Back	IDX	10	2	< LOD	7.54	98.97	9.52	980.17	34.16	ppm	10.8	CWOLF
108	11/12/2010 8:17	Soil	120	Final	1017	Manchester	Back	IDX	10	3	< LOD	8.1	104.56	10.15	997.04	35.74	ppm	10.8	CWOLF
109	11/12/2010 8:20	Soil	120	Final	1017	Manchester	Back	IDX	10	4	< LOD	8.54	90.69	10.76	841.92	37.24	ppm	10.8	CWOLF
115	11/12/2010 8:24	Soil	120	Final	1017	Manchester	Back	IDX	10	5	< LOD	11.98	89.93	13.08	655.95	40.18	ppm	10.8	CWOLF
116	11/12/2010 8:27	Soil	120	Final	1017	Manchester	Back	IDX	10	6	< LOD	7.69	74.82	9.32	600.14	29.36	ppm	10.8	CWOLF

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
119	11/12/2010 8:31	Soil	120	Final	1017	Manchester	Back	IDX	10	7	< LOD	8.32	77.75	9.95	739.34	34.17	ppm	10.8	CWOLF
122	11/12/2010 8:35	Soil	120	Final	1017	Manchester	Back	IDX	10	8	< LOD	9.93	84.88	10.61	764.35	35.88	ppm	10.8	CWOLF
125	11/12/2010 8:38	Soil	120	Final	1017	Manchester	Back	IDX	10	9	< LOD	8.38	94.83	9.99	586.68	28.48	ppm	10.8	CWOLF
127	11/12/2010 8:42	Soil	120	Final	1017	Manchester	Back	IDX	10	10	< LOD	8.41	103.03	10.81	1103.46	40.13	ppm	10.8	CWOLF
129	11/12/2010 8:46	Soil	120	Final	1017	Manchester	Back	IDX	10	11	< LOD	9.3	136.08	13.42	1287.35	47.73	ppm	10.8	CWOLF
131	11/12/2010 8:50	Soil	120	Final	1017	Manchester	Back	IDX	10	12	< LOD	9.26	58.27	9.05	550.4	30.11	ppm	10.8	CWOLF
135	11/12/2010 8:53	Soil	120	Final	1017	Manchester	Back	IDX	10	13	< LOD	8.67	83.33	9.56	712.23	31.33	ppm	10.8	CWOLF
138	11/12/2010 8:57	Soil	120	Final	1017	Manchester	Back	IDX	10	14	< LOD	7.91	70.45	8.73	604.37	28.48	ppm	10.8	CWOLF
142	11/12/2010 9:01	Soil	120	Final	1017	Manchester	Back	IDX	10	15	< LOD	9	63.8	8.56	503.95	26.36	ppm	10.8	CWOLF
144	11/12/2010 9:04	Soil	120	Final	1017	Manchester	Back	IDX	10	16	< LOD	8.5	61.84	8.28	640.62	29.06	ppm	10.8	CWOLF
148	11/12/2010 9:08	Soil	120	Final	1017	Manchester	Back	IDX	10	17	< LOD	8.47	119.26	10.72	907.71	34.09	ppm	10.8	CWOLF
149	11/12/2010 9:11	Soil	120	Final	1017	Manchester	Back	IDX	10	18	< LOD	9.05	63.86	8.74	629.02	30.27	ppm	10.8	CWOLF
157	11/12/2010 9:16	Soil	120	Final	1017	Manchester	Back	IDX	10	19	< LOD	9.14	64.74	9.1	607.23	30.58	ppm	10.8	CWOLF
159	11/12/2010 9:20	Soil	120	Final	1017	Manchester	Back	IDX	10	20	< LOD	10.63	80.9	10.68	659.33	34.16	ppm	10.8	CWOLF
160	11/12/2010 9:54	Soil	120	Final	1017	Manchester	Back	ECX	10	1	< LOD	8.42	96.39	9.37	665.33	28.18	ppm	5.4	CWOLF
161	11/12/2010 9:57	Soil	120	Final	1017	Manchester	Back	ECX	10	2	< LOD	8.07	90.33	9.06	677.88	28.22	ppm	5.4	CWOLF
162	11/12/2010 9:59	Soil	120	Final	1017	Manchester	Back	ECX	10	3	< LOD	8.28	98.44	9.37	679.29	28.08	ppm	5.4	CWOLF
163	11/12/2010 10:02	Soil	120	Final	1017	Manchester	Back	ECX	10	4	< LOD	8.32	107.35	9.73	702.34	28.62	ppm	5.4	CWOLF
164	11/12/2010 10:05	Soil	120	Final	1017	Manchester	Back	ECX	10	5	< LOD	8.43	101.82	9.61	714.03	29.15	ppm	5.4	CWOLF
302	11/11/2010 15:18	Soil	120	Final	1050	Manchester	Front	IDX	11	1	< LOD	9.13	74.29	9.7	506.33	26.93	ppm	13.9	BSHIRLEY
303	11/11/2010 15:22	Soil	120	Final	1050	Manchester	Front	IDX	11	2	< LOD	8.56	46.2	8.16	345.72	21.98	ppm	13.9	BSHIRLEY
304	11/11/2010 15:25	Soil	120	Final	1050	Manchester	Front	IDX	11	3	< LOD	8.87	41.86	8.24	345.35	22.53	ppm	13.9	BSHIRLEY
305	11/11/2010 15:28	Soil	120	Final	1050	Manchester	Front	IDX	11	4	< LOD	8.59	103.26	10.89	630.19	29.87	ppm	13.9	BSHIRLEY
306	11/11/2010 15:31	Soil	120	Final	1050	Manchester	Front	IDX	11	5	< LOD	7.84	61.17	8.85	457.95	24.85	ppm	13.9	BSHIRLEY
307	11/11/2010 15:34	Soil	120	Final	1050	Manchester	Front	IDX	11	6	< LOD	7.17	34.79	7.15	279.73	18.71	ppm	13.9	BSHIRLEY
308	11/11/2010 15:37	Soil	120	Final	1050	Manchester	Front	IDX	11	7	< LOD	9.84	140.44	13.13	530.85	29.38	ppm	13.9	BSHIRLEY
309	11/11/2010 15:39	Soil	120	Final	1050	Manchester	Front	IDX	11	8	< LOD	8.48	74.74	9.74	433.25	25	ppm	13.9	BSHIRLEY
310	11/11/2010 15:43	Soil	120	Final	1050	Manchester	Front	IDX	11	9	< LOD	7.3	58.15	8.72	577.61	27.75	ppm	13.9	BSHIRLEY
311	11/11/2010 15:46	Soil	120	Final	1050	Manchester	Front	IDX	11	10	< LOD	9.94	55.74	10.01	336.73	24.95	ppm	13.9	BSHIRLEY
312	11/11/2010 15:50	Soil	120	Final	1050	Manchester	Front	IDX	11	11	21.59	7.26	179.65	15.12	555.41	31.42	ppm	13.9	BSHIRLEY
313	11/11/2010 15:53	Soil	120	Final	1050	Manchester	Front	IDX	11	12	< LOD	7.46	59.65	8.76	435.77	24.19	ppm	13.9	BSHIRLEY
314	11/11/2010 15:56	Soil	120	Final	1050	Manchester	Front	IDX	11	13	< LOD	6.82	45.53	7.6	457.59	23.44	ppm	13.9	BSHIRLEY
316	11/11/2010 16:01	Soil	120	Final	1050	Manchester	Front	IDX	11	14	< LOD	8.22	77.2	10.41	526.79	29.07	ppm	13.9	BSHIRLEY
317	11/11/2010 16:04	Soil	120	Final	1050	Manchester	Front	IDX	11	15	< LOD	8.68	77.54	9.92	624.67	29.94	ppm	13.9	BSHIRLEY
318	11/11/2010 16:07	Soil	120	Final	1050	Manchester	Front	IDX	11	16	< LOD	9.27	70.38	9.65	430.79	25.35	ppm	13.9	BSHIRLEY
319	11/11/2010 16:10	Soil	120	Final	1050	Manchester	Front	IDX	11	17	< LOD	9.01	67.17	11.16	624.17	35.24	ppm	13.9	BSHIRLEY
320	11/11/2010 16:13	Soil	120	Final	1050	Manchester	Front	IDX	11	18	< LOD	9.2	84.04	11.6	616.89	33.73	ppm	13.9	BSHIRLEY
322	11/11/2010 16:16	Soil	120	Final	1050	Manchester	Front	IDX	11	19	< LOD	9.31	72.98	9.9	468.17	26.43	ppm	13.9	BSHIRLEY
323	11/11/2010 16:19	Soil	120	Final	1050	Manchester	Front	IDX	11	20	< LOD	7.04	63.81	9.09	669.99	30.29	ppm	13.9	BSHIRLEY
377	11/12/2010 8:26	Soil	120	Final	1050	Manchester	Front	ECX	11	1	< LOD	8.62	92.12	10.23	515.51	26.43	ppm	6	BSHIRLEY
378	11/12/2010 8:29	Soil	120	Final	1050	Manchester	Front	ECX	11	2	< LOD	8.69	91.04	10.2	521.88	26.68	ppm	6	BSHIRLEY
379	11/12/2010 8:32	Soil	120	Final	1050	Manchester	Front	ECX	11	3	< LOD	8.64	92.87	10.29	518.95	26.66	ppm	6	BSHIRLEY
380	11/12/2010 8:35	Soil	120	Final	1050	Manchester	Front	ECX	11	4	< LOD	8.62	102.86	10.64	532.21	27.07	ppm	6	BSHIRLEY
381	11/12/2010 8:37	Soil	120	Final	1050	Manchester	Front	ECX	11	5	< LOD	8.79	106.99	11.02	594.82	28.95	ppm	6	BSHIRLEY
329	11/11/2010 17:00	Soil	120	Final	1050	Manchester	Back	IDX	11	1	10.36	6.46	51.8	9.1	373.18	24.44	ppm	11.7	BSHIRLEY
330	11/11/2010 17:03	Soil	120	Final	1050	Manchester	Back	IDX	11	2	< LOD	9.78	68.3	9.97	670.35	32.35	ppm	11.7	BSHIRLEY
331	11/11/2010 17:06	Soil	120	Final	1050	Manchester	Back	IDX	11	3	10.42	6.81	88.38	11.5	743.18	35.84	ppm	11.7	BSHIRLEY
332	11/11/2010 17:09	Soil	120	Final	1050	Manchester	Back	IDX	11	4	< LOD	10.31	110.14	12.84	648.49	34.8	ppm	11.7	BSHIRLEY
333	11/11/2010 17:12	Soil	120	Final	1050	Manchester	Back	IDX	11	5	< LOD	8.39	93.59	10.16	502.66	25.92	ppm	11.7	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
334	11/11/2010 17:15	Soil	120	Final	1050	Manchester	Back	IDX	11	6	10.32	6.71	41.7	8.84	212.94	19.6	ppm	11.7	BSHIRLEY
335	11/11/2010 17:17	Soil	120	Final	1050	Manchester	Back	IDX	11	7	10.27	6.45	75.38	10.1	205.87	18.61	ppm	11.7	BSHIRLEY
337	11/11/2010 17:20	Soil	120	Final	1050	Manchester	Back	IDX	11	8	< LOD	9.19	45.71	8.71	427.4	25.76	ppm	11.7	BSHIRLEY
338	11/11/2010 17:23	Soil	120	Final	1050	Manchester	Back	IDX	11	9	11.69	6.95	51.65	9.62	433.85	27.66	ppm	11.7	BSHIRLEY
339	11/11/2010 17:26	Soil	120	Final	1050	Manchester	Back	IDX	11	10	< LOD	7.23	80.02	9.1	542.72	25.34	ppm	11.7	BSHIRLEY
340	11/11/2010 17:28	Soil	120	Final	1050	Manchester	Back	IDX	11	11	< LOD	8.82	83.03	10.19	591.02	29.26	ppm	11.7	BSHIRLEY
341	11/11/2010 17:31	Soil	120	Final	1050	Manchester	Back	IDX	11	12	< LOD	8.49	133.92	12.12	895.15	35.44	ppm	11.7	BSHIRLEY
342	11/11/2010 17:34	Soil	120	Final	1050	Manchester	Back	IDX	11	13	< LOD	9.26	62.72	9.3	479.71	26.48	ppm	11.7	BSHIRLEY
343	11/11/2010 17:37	Soil	120	Final	1050	Manchester	Back	IDX	11	14	< LOD	8.66	71.79	9.5	581.11	28.25	ppm	11.7	BSHIRLEY
344	11/11/2010 17:40	Soil	120	Final	1050	Manchester	Back	IDX	11	15	< LOD	8.48	77.02	9.74	556.16	27.86	ppm	11.7	BSHIRLEY
345	11/11/2010 17:43	Soil	120	Final	1050	Manchester	Back	IDX	11	16	14.05	6.7	68.09	9.96	538.79	29.28	ppm	11.7	BSHIRLEY
346	11/11/2010 17:46	Soil	120	Final	1050	Manchester	Back	IDX	11	17	< LOD	8.77	71.97	9.55	542.37	27.59	ppm	11.7	BSHIRLEY
347	11/11/2010 17:49	Soil	120	Final	1050	Manchester	Back	IDX	11	18	< LOD	8.45	67.27	9.22	459.45	25.15	ppm	11.7	BSHIRLEY
348	11/11/2010 17:51	Soil	120	Final	1050	Manchester	Back	IDX	11	19	< LOD	7.88	75.46	9.25	502.86	25.39	ppm	11.7	BSHIRLEY
349	11/11/2010 17:54	Soil	120	Final	1050	Manchester	Back	IDX	11	20	12.3	6.82	51.75	9.38	291.48	22.53	ppm	11.7	BSHIRLEY
350	11/11/2010 18:02	Soil	120	Final	1050	Manchester	Back	ECX	11	1	< LOD	8.39	82.89	9.79	528.9	26.6	ppm		BSHIRLEY
351	11/11/2010 18:05	Soil	120	Final	1050	Manchester	Back	ECX	11	2	< LOD	8.59	89.76	10.04	557.9	27.22	ppm		BSHIRLEY
352	11/11/2010 18:07	Soil	120	Final	1050	Manchester	Back	ECX	11	3	< LOD	8.57	93.02	10.15	546.34	26.93	ppm		BSHIRLEY
353	11/11/2010 18:10	Soil	120	Final	1050	Manchester	Back	ECX	11	4	< LOD	8.56	78.27	9.51	527.54	26.47	ppm		BSHIRLEY
354	11/11/2010 18:13	Soil	120	Final	1050	Manchester	Back	ECX	11	5	< LOD	8.19	99.19	10.31	557.91	26.95	ppm		BSHIRLEY
386	11/12/2010 9:08	Soil	120	Final	1266	Golla	Front	IDX	12	1	< LOD	7.66	50.98	8.37	446.91	24.58	ppm	13.4	BSHIRLEY
387	11/12/2010 9:11	Soil	120	Final	1266	Golla	Front	IDX	12	2	< LOD	7.85	37.66	7.27	229.71	17.25	ppm	13.4	BSHIRLEY
388	11/12/2010 9:14	Soil	120	Final	1266	Golla	Front	IDX	12	3	< LOD	8.69	48.51	8.77	527.03	27.97	ppm	13.4	BSHIRLEY
389	11/12/2010 9:18	Soil	120	Final	1266	Golla	Front	IDX	12	4	< LOD	8.59	35.38	8.11	449.34	26.2	ppm	13.4	BSHIRLEY
390	11/12/2010 9:21	Soil	120	Final	1266	Golla	Front	IDX	12	5	< LOD	8.78	31.57	7.54	384.07	23.36	ppm	13.4	BSHIRLEY
391	11/12/2010 9:23	Soil	120	Final	1266	Golla	Front	IDX	12	6	< LOD	9.3	22.46	7.83	283.09	22.56	ppm	13.4	BSHIRLEY
392	11/12/2010 9:26	Soil	120	Final	1266	Golla	Front	IDX	12	7	< LOD	9.04	< LOD	9.88	24.34	9.93	ppm	13.4	BSHIRLEY
393	11/12/2010 9:29	Soil	120	Final	1266	Golla	Front	IDX	12	8	< LOD	8.22	55.96	8.66	484.87	25.75	ppm	13.4	BSHIRLEY
394	11/12/2010 9:32	Soil	120	Final	1266	Golla	Front	IDX	12	9	< LOD	8.25	42.06	7.95	307.56	20.71	ppm	13.4	BSHIRLEY
395	11/12/2010 9:34	Soil	120	Final	1266	Golla	Front	IDX	12	10	< LOD	9.16	37.95	8.41	403.61	25.48	ppm	13.4	BSHIRLEY
396	11/12/2010 9:37	Soil	120	Final	1266	Golla	Front	IDX	12	11	< LOD	9.52	21.18	7.53	264.28	21.11	ppm	13.4	BSHIRLEY
398	11/12/2010 9:41	Soil	120	Final	1266	Golla	Front	IDX	12	12	< LOD	10.76	14.66	7.68	118.98	16.84	ppm	13.4	BSHIRLEY
399	11/12/2010 9:43	Soil	120	Final	1266	Golla	Front	IDX	12	13	< LOD	9.16	19.93	7.4	202.08	18.69	ppm	13.4	BSHIRLEY
400	11/12/2010 9:46	Soil	120	Final	1266	Golla	Front	IDX	12	14	< LOD	10.23	26.76	8.38	254.09	22.66	ppm	13.4	BSHIRLEY
401	11/12/2010 9:49	Soil	120	Final	1266	Golla	Front	IDX	12	15	< LOD	9.52	26.19	7.74	235.31	20.23	ppm	13.4	BSHIRLEY
402	11/12/2010 9:52	Soil	120	Final	1266	Golla	Front	IDX	12	16	< LOD	9.47	38.96	8.42	371.04	24.36	ppm	13.4	BSHIRLEY
403	11/12/2010 9:55	Soil	120	Final	1266	Golla	Front	IDX	12	17	< LOD	9.82	49.16	9.53	507.3	30.01	ppm	13.4	BSHIRLEY
404	11/12/2010 9:58	Soil	120	Final	1266	Golla	Front	IDX	12	18	< LOD	9.2	30.13	8.12	289.03	22.22	ppm	13.4	BSHIRLEY
405	11/12/2010 10:01	Soil	120	Final	1266	Golla	Front	IDX	12	19	15.08	6.96	40.49	9.07	438.86	27.73	ppm	13.4	BSHIRLEY
406	11/12/2010 10:04	Soil	120	Final	1266	Golla	Front	IDX	12	20	< LOD	9.75	27.78	7.82	220.47	19.53	ppm	13.4	BSHIRLEY
407	11/12/2010 10:25	Soil	120	Final	1266	Golla	Front	ECX	12	1	< LOD	8.7	39.67	7.91	380.72	23	ppm	7.5	BSHIRLEY
408	11/12/2010 10:28	Soil	120	Final	1266	Golla	Front	ECX	12	2	< LOD	8.53	50.78	8.59	457.4	25.45	ppm	7.5	BSHIRLEY
409	11/12/2010 10:31	Soil	120	Final	1266	Golla	Front	ECX	12	3	< LOD	8.84	53.9	8.66	444.24	24.9	ppm	7.5	BSHIRLEY
410	11/12/2010 10:34	Soil	120	Final	1266	Golla	Front	ECX	12	4	< LOD	9.18	39.75	8.35	418.63	25.69	ppm	7.5	BSHIRLEY
411	11/12/2010 10:37	Soil	120	Final	1266	Golla	Front	ECX	12	5	< LOD	8.44	48.48	8.3	429.37	24.18	ppm	7.5	BSHIRLEY
429	11/12/2010 12:01	Soil	120	Final	1266	Golla	Back	ECX	12	1	< LOD	8.81	22.61	7.34	268.54	20.57	ppm	8.7	BSHIRLEY
430	11/12/2010 12:04	Soil	120	Final	1266	Golla	Back	ECX	12	2	< LOD	8.98	17.91	7.06	311.73	21.97	ppm	8.7	BSHIRLEY
431	11/12/2010 12:07	Soil	120	Final	1266	Golla	Back	ECX	12	3	< LOD	8.76	38.81	8.27	373.55	23.98	ppm	8.7	BSHIRLEY
432	11/12/2010 12:10	Soil	120	Final	1266	Golla	Back	ECX	12	4	< LOD	8.8	19.6	7.13	292.64	21.37	ppm	8.7	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
433	11/12/2010 12:13	Soil	120	Final	1266	Golla	Back	ECX	12	5	< LOD	8.76	27.09	7.53	316.97	21.94	ppm	8.7	BSHIRLEY
419	11/12/2010 11:33	Soil	120	Final	1265	Golla	Front	ECX	13	1	< LOD	8.42	24.13	6.99	222.84	17.98	ppm	8.3	BSHIRLEY
420	11/12/2010 11:36	Soil	120	Final	1265	Golla	Front	ECX	13	2	< LOD	8.4	23.15	7.05	212.34	17.83	ppm	8.3	BSHIRLEY
421	11/12/2010 11:39	Soil	120	Final	1265	Golla	Front	ECX	13	3	< LOD	8.33	41.75	7.93	236.94	18.53	ppm	8.3	BSHIRLEY
422	11/12/2010 11:41	Soil	120	Final	1265	Golla	Front	ECX	13	4	< LOD	8.53	18.79	6.72	206.82	17.55	ppm	8.3	BSHIRLEY
423	11/12/2010 11:44	Soil	120	Final	1265	Golla	Front	ECX	13	5	< LOD	8.52	26.16	7.18	229.95	18.54	ppm	8.3	BSHIRLEY
438	11/12/2010 12:27	Soil	120	Final	1265	Golla	Back	ECX	13	1	42.88	6.5	416.69	19.52	3646.12	69.92	ppm	10.6	BSHIRLEY
439	11/12/2010 12:30	Soil	120	Final	1265	Golla	Back	ECX	13	2	48.26	6.63	344	17.83	3386.27	67.03	ppm	10.6	BSHIRLEY
440	11/12/2010 12:32	Soil	120	Final	1265	Golla	Back	ECX	13	3	41.96	6.59	445.89	20.46	3811.86	72.44	ppm	10.6	BSHIRLEY
441	11/12/2010 12:35	Soil	120	Final	1265	Golla	Back	ECX	13	4	45.23	6.56	395.52	18.93	3585.8	68.71	ppm	10.6	BSHIRLEY
442	11/12/2010 12:37	Soil	120	Final	1265	Golla	Back	ECX	13	5	45.12	6.61	393.28	19.04	3456.55	68.07	ppm	10.6	BSHIRLEY
171	11/12/2010 11:22	Soil	120	Final	1257	Golla	Front	IDX	14	1	< LOD	10.39	28.61	7.62	214.04	21.13	ppm	13.9	CWOLF
174	11/12/2010 11:27	Soil	120	Final	1257	Golla	Front	IDX	14	2	< LOD	8.93	32.51	6.81	146.49	15.24	ppm	13.9	CWOLF
178	11/12/2010 11:32	Soil	120	Final	1257	Golla	Front	IDX	14	3	< LOD	10.56	23.36	7.33	182.07	20.19	ppm	13.9	CWOLF
183	11/12/2010 11:37	Soil	120	Final	1257	Golla	Front	IDX	14	4	< LOD	8.9	40.64	7.47	380.8	24.14	ppm	13.9	CWOLF
188	11/12/2010 11:41	Soil	120	Final	1257	Golla	Front	IDX	14	5	< LOD	7.67	48.62	7.56	605.12	28.41	ppm	13.9	CWOLF
189	11/12/2010 11:45	Soil	120	Final	1257	Golla	Front	IDX	14	6	< LOD	8.8	27.44	6.65	226.34	19.13	ppm	13.9	CWOLF
190	11/12/2010 11:49	Soil	120	Final	1257	Golla	Front	IDX	14	7	< LOD	8.3	23.74	6.06	248.62	18.8	ppm	13.9	CWOLF
191	11/12/2010 11:52	Soil	120	Final	1257	Golla	Front	IDX	14	8	< LOD	8.49	35.19	6.77	445.52	24.64	ppm	13.9	CWOLF
193	11/12/2010 11:55	Soil	120	Final	1257	Golla	Front	IDX	14	9	< LOD	7.36	30.7	6.31	345	21.11	ppm	13.9	CWOLF
195	11/12/2010 11:59	Soil	120	Final	1257	Golla	Front	IDX	14	10	< LOD	7.47	17.14	5.49	198.88	16.91	ppm	13.9	CWOLF
196	11/12/2010 12:02	Soil	120	Final	1257	Golla	Front	IDX	14	11	< LOD	9.19	20.06	6.22	187.52	17.82	ppm	13.9	CWOLF
197	11/12/2010 12:05	Soil	120	Final	1257	Golla	Front	IDX	14	12	< LOD	8.36	47.73	8.06	441.92	26.19	ppm	13.9	CWOLF
199	11/12/2010 12:08	Soil	120	Final	1257	Golla	Front	IDX	14	13	< LOD	7.51	41.78	7.27	314.8	21.33	ppm	13.9	CWOLF
201	11/12/2010 12:12	Soil	120	Final	1257	Golla	Front	IDX	14	14	< LOD	9.29	14.34	6.14	172.94	18.41	ppm	13.9	CWOLF
205	11/12/2010 12:16	Soil	120	Final	1257	Golla	Front	IDX	14	15	< LOD	8.19	45.13	7.33	428.11	23.87	ppm	13.9	CWOLF
207	11/12/2010 12:19	Soil	120	Final	1257	Golla	Front	IDX	14	16	< LOD	8.5	16.37	5.7	241.92	19.44	ppm	13.9	CWOLF
209	11/12/2010 12:23	Soil	120	Final	1257	Golla	Front	IDX	14	17	< LOD	9.32	25.79	6.49	143.71	15.59	ppm	13.9	CWOLF
211	11/12/2010 12:26	Soil	120	Final	1257	Golla	Front	IDX	14	18	< LOD	10.08	28.85	6.98	175.75	17.57	ppm	13.9	CWOLF
214	11/12/2010 12:29	Soil	120	Final	1257	Golla	Front	IDX	14	19	< LOD	9.22	26.9	6.43	309.41	21.33	ppm	13.9	CWOLF
216	11/12/2010 12:34	Soil	120	Final	1257	Golla	Front	IDX	14	20	< LOD	8.81	55.43	8	524.51	26.69	ppm	13.9	CWOLF
218	11/12/2010 14:13	Soil	120	Final	1257	Golla	Front	ECX	14	1	< LOD	8.39	45.26	7.07	272	18.67	ppm	7.3	CWOLF
219	11/12/2010 14:16	Soil	120	Final	1257	Golla	Front	ECX	14	2	< LOD	8.05	38.72	6.61	277.29	18.83	ppm	7.3	CWOLF
220	11/12/2010 14:19	Soil	120	Final	1257	Golla	Front	ECX	14	3	< LOD	8.32	32.08	6.32	308.73	19.86	ppm	7.3	CWOLF
221	11/12/2010 14:22	Soil	120	Final	1257	Golla	Front	ECX	14	4	< LOD	8.3	36.25	6.56	250.58	18.19	ppm	7.3	CWOLF
222	11/12/2010 14:25	Soil	120	Final	1257	Golla	Front	ECX	14	5	< LOD	8.11	41.43	6.83	264.01	18.21	ppm	7.3	CWOLF
234	11/12/2010 15:08	Soil	120	Final	1257	Golla	Back	IDX	14	1	10.12	6.24	168.12	12.94	1657.6	47.58	ppm	23.7	CWOLF
235	11/12/2010 15:12	Soil	120	Final	1257	Golla	Back	IDX	14	2	49.28	6.73	295.42	16.45	3563.74	67.96	ppm	23.7	CWOLF
237	11/12/2010 15:15	Soil	120	Final	1257	Golla	Back	IDX	14	3	12.19	6.02	327.77	18.31	4141.5	77.76	ppm	23.7	CWOLF
238	11/12/2010 15:19	Soil	120	Final	1257	Golla	Back	IDX	14	4	12.88	6.39	128.73	11.81	1540.9	47.08	ppm	23.7	CWOLF
241	11/12/2010 15:22	Soil	120	Final	1257	Golla	Back	IDX	14	5	31.68	7.13	180.13	13.75	2051.23	54.38	ppm	23.7	CWOLF
242	11/12/2010 15:26	Soil	120	Final	1257	Golla	Back	IDX	14	6	36.95	7.44	350.75	19.64	3146.3	70.4	ppm	23.7	CWOLF
243	11/12/2010 15:29	Soil	120	Final	1257	Golla	Back	IDX	14	7	49.09	8.46	208.69	16.86	2029.79	62.02	ppm	23.7	CWOLF
245	11/12/2010 15:32	Soil	120	Final	1257	Golla	Back	IDX	14	8	24.52	7.06	175.01	13.73	2139.4	56.17	ppm	23.7	CWOLF
247	11/12/2010 15:35	Soil	120	Final	1257	Golla	Back	IDX	14	9	49.01	7.43	314.26	18.15	3431.44	71.37	ppm	23.7	CWOLF
250	11/12/2010 15:39	Soil	120	Final	1257	Golla	Back	IDX	14	10	< LOD	10.22	78.55	10.23	949.88	39.5	ppm	23.7	CWOLF
253	11/12/2010 15:43	Soil	120	Final	1257	Golla	Back	IDX	14	11	10.63	6.89	172.31	14.63	2195.24	60.98	ppm	23.7	CWOLF
254	11/12/2010 15:46	Soil	120	Final	1257	Golla	Back	IDX	14	12	13.02	6.66	128.7	11.95	1456.61	46.17	ppm	23.7	CWOLF
255	11/12/2010 15:49	Soil	120	Final	1257	Golla	Back	IDX	14	13	11.09	6.32	115.65	10.78	1255.23	40.65	ppm	23.7	CWOLF

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
257	11/12/2010 15:52	Soil	120	Final	1257	Golla	Back	IDX	14	14	29.41	8.62	117.56	13.9	1435.99	55.46	ppm	23.7	CWOLF
259	11/12/2010 15:55	Soil	120	Final	1257	Golla	Back	IDX	14	15	< LOD	8.25	244.58	14.91	2745.95	59.14	ppm	23.7	CWOLF
260	11/12/2010 15:59	Soil	120	Final	1257	Golla	Back	IDX	14	16	< LOD	6.15	129.27	10.15	1923.81	45.29	ppm	23.7	CWOLF
261	11/12/2010 16:02	Soil	120	Final	1257	Golla	Back	IDX	14	17	< LOD	8.81	235.16	15.29	2567.49	59.83	ppm	23.7	CWOLF
262	11/12/2010 16:06	Soil	120	Final	1257	Golla	Back	IDX	14	18	13.08	7.14	153.2	13.93	1851.42	56.18	ppm	23.7	CWOLF
264	11/12/2010 16:09	Soil	120	Final	1257	Golla	Back	IDX	14	19	34.23	7.16	237.99	16.01	2561.62	62.16	ppm	23.7	CWOLF
265	11/12/2010 16:12	Soil	120	Final	1257	Golla	Back	IDX	14	20	26.5	6.85	197.6	14.73	2403.05	60.19	ppm	23.7	CWOLF
227	11/12/2010 14:41	Soil	120	Final	1257	Golla	Back	ECX	14	1	37.41	6.42	499.42	20.64	4364.05	73.46	ppm	7.9	CWOLF
228	11/12/2010 14:46	Soil	120	Final	1257	Golla	Back	ECX	14	2	34.67	6.25	522.66	20.89	3612.52	66.23	ppm	7.9	CWOLF
229	11/12/2010 14:49	Soil	120	Final	1257	Golla	Back	ECX	14	3	29.96	6.27	892.38	27.36	3888.58	69.37	ppm	7.9	CWOLF
230	11/12/2010 14:51	Soil	120	Final	1257	Golla	Back	ECX	14	4	26.44	6.11	512.78	20.64	3909.28	68.7	ppm	7.9	CWOLF
231	11/12/2010 14:54	Soil	120	Final	1257	Golla	Back	ECX	14	5	30.14	6.22	525.63	21.01	3911.15	69.1	ppm	7.9	CWOLF
17	11/15/2010 8:45	Soil	120	Final	1253	Golla	Front	ECX	15	1	< LOD	8.25	40.11	6.66	160.2	14.58	ppm	12.4	JSTONE
18	11/15/2010 8:48	Soil	120	Final	1253	Golla	Front	ECX	15	2	< LOD	8.3	27.92	6.03	173.04	15.13	ppm	12.4	JSTONE
19	11/15/2010 8:51	Soil	120	Final	1253	Golla	Front	ECX	15	3	< LOD	8.32	35.81	6.42	158.69	14.6	ppm	12.4	JSTONE
20	11/15/2010 8:54	Soil	120	Final	1253	Golla	Front	ECX	15	4	< LOD	8.39	27.48	5.95	163.67	14.74	ppm	12.4	JSTONE
21	11/15/2010 8:57	Soil	120	Final	1253	Golla	Front	ECX	15	5	< LOD	8.14	34.2	6.36	211.57	16.5	ppm	12.4	JSTONE
26	11/15/2010 9:23	Soil	120	Final	1253	Golla	Back	ECX	15	1	13.77	5.88	188.72	12.36	1833.65	45.27	ppm	9.5	JSTONE
27	11/15/2010 9:27	Soil	120	Final	1253	Golla	Back	ECX	15	2	12.26	5.92	159.18	11.5	1609.63	42.71	ppm	9.5	JSTONE
28	11/15/2010 9:30	Soil	120	Final	1253	Golla	Back	ECX	15	3	11.56	5.86	182.06	12.32	1772.52	45.06	ppm	9.5	JSTONE
29	11/15/2010 9:33	Soil	120	Final	1253	Golla	Back	ECX	15	4	10.51	5.87	160.26	11.49	1578.33	42.18	ppm	9.5	JSTONE
30	11/15/2010 9:36	Soil	120	Final	1253	Golla	Back	ECX	15	5	8.92	5.84	151.77	11.24	1511.23	41.34	ppm	9.5	JSTONE
450	11/12/2010 14:21	Soil	120	Final	1258	Golla	Front	IDX	16	1	< LOD	9.26	84.63	10.3	857.62	35.08	ppm	9.7	BSHIRLEY
452	11/12/2010 14:24	Soil	120	Final	1258	Golla	Front	IDX	16	2	15.4	6.52	125.71	12.37	1123.3	41.5	ppm	9.7	BSHIRLEY
453	11/12/2010 14:27	Soil	120	Final	1258	Golla	Front	IDX	16	3	12.45	6.63	184.83	15.35	1881.81	56.65	ppm	9.7	BSHIRLEY
454	11/12/2010 14:30	Soil	120	Final	1258	Golla	Front	IDX	16	4	18.05	6.15	136.55	12.02	1499.01	44.83	ppm	9.7	BSHIRLEY
456	11/12/2010 14:33	Soil	120	Final	1258	Golla	Front	IDX	16	5	33.47	7.47	119.52	12.64	782.17	35.98	ppm	9.7	BSHIRLEY
457	11/12/2010 14:36	Soil	120	Final	1258	Golla	Front	IDX	16	6	10.13	6.52	119	12.33	1030.49	40.35	ppm	9.7	BSHIRLEY
458	11/12/2010 14:39	Soil	120	Final	1258	Golla	Front	IDX	16	7	9.87	5.92	167.1	13.29	1659.86	48.07	ppm	9.7	BSHIRLEY
459	11/12/2010 14:42	Soil	120	Final	1258	Golla	Front	IDX	16	8	< LOD	8.11	201.8	14.69	2528.72	60.56	ppm	9.7	BSHIRLEY
460	11/12/2010 14:45	Soil	120	Final	1258	Golla	Front	IDX	16	9	38.5	7.98	160.97	15.16	1449.6	52.03	ppm	9.7	BSHIRLEY
461	11/12/2010 14:48	Soil	120	Final	1258	Golla	Front	IDX	16	10	< LOD	9.32	108.48	11.7	949.77	38.16	ppm	9.7	BSHIRLEY
462	11/12/2010 14:51	Soil	120	Final	1258	Golla	Front	IDX	16	11	< LOD	9.33	91.46	12.58	1260.09	50.12	ppm	9.7	BSHIRLEY
463	11/12/2010 14:54	Soil	120	Final	1258	Golla	Front	IDX	16	12	17.04	6.29	191.67	14.65	1940.35	53.86	ppm	9.7	BSHIRLEY
464	11/12/2010 14:58	Soil	120	Final	1258	Golla	Front	IDX	16	13	22.9	6.47	140.13	12.22	1338.77	42.68	ppm	9.7	BSHIRLEY
465	11/12/2010 15:01	Soil	120	Final	1258	Golla	Front	IDX	16	14	33.63	6.81	230.62	15.98	2020.65	55.71	ppm	9.7	BSHIRLEY
466	11/12/2010 15:04	Soil	120	Final	1258	Golla	Front	IDX	16	15	24.59	6.71	252.13	16.75	2522.75	62.53	ppm	9.7	BSHIRLEY
467	11/12/2010 15:06	Soil	120	Final	1258	Golla	Front	IDX	16	16	< LOD	9.3	89.33	10.89	1023.42	39.28	ppm	9.7	BSHIRLEY
468	11/12/2010 15:09	Soil	120	Final	1258	Golla	Front	IDX	16	17	20.14	6.53	178.88	13.89	1596.05	48.04	ppm	9.7	BSHIRLEY
469	11/12/2010 15:12	Soil	120	Final	1258	Golla	Front	IDX	16	18	20.88	6.51	205.98	14.83	1897.95	52.64	ppm	9.7	BSHIRLEY
470	11/12/2010 15:15	Soil	120	Final	1258	Golla	Front	IDX	16	19	31.11	7.14	225.87	16.56	2400.27	63.03	ppm	9.7	BSHIRLEY
471	11/12/2010 15:18	Soil	120	Final	1258	Golla	Front	IDX	16	20	17.01	7.1	87.52	11.68	772.83	37.15	ppm	9.7	BSHIRLEY
472	11/12/2010 15:25	Soil	120	Final	1258	Golla	Front	ECX	16	1	20.46	6.2	180.17	13.31	1636.62	46.43	ppm	7.3	BSHIRLEY
473	11/12/2010 15:28	Soil	120	Final	1258	Golla	Front	ECX	16	2	20.46	6.2	200.77	13.95	1708.46	47.44	ppm	7.3	BSHIRLEY
474	11/12/2010 15:31	Soil	120	Final	1258	Golla	Front	ECX	16	3	20.8	6.23	193.95	13.76	1654.65	46.66	ppm	7.3	BSHIRLEY
475	11/12/2010 15:34	Soil	120	Final	1258	Golla	Front	ECX	16	4	23.01	6.23	178.31	13.31	1576.99	45.76	ppm	7.3	BSHIRLEY
476	11/12/2010 15:37	Soil	120	Final	1258	Golla	Front	ECX	16	5	23.92	6.29	198.94	13.83	1775.65	48.13	ppm	7.3	BSHIRLEY
488	11/12/2010 16:23	Soil	120	Final	1258	Golla	Back	IDX	16	1	22.63	8.45	196.1	19.03	2231.32	74.58	ppm		BSHIRLEY
489	11/12/2010 16:28	Soil	120	Final	1258	Golla	Back	IDX	16	2	< LOD	9.23	238.82	16.44	2458.41	61.85	ppm	19.1	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
490	11/12/2010 16:31	Soil	120	Final	1258	Golla	Back	IDX	16	3	49.55	8.24	228.52	17.41	2162.59	62.82	ppm	19.1	BSHIRLEY
491	11/12/2010 16:33	Soil	120	Final	1258	Golla	Back	IDX	16	4	39.73	6.91	256.54	16.64	3014.5	67.17	ppm	19.1	BSHIRLEY
492	11/12/2010 16:37	Soil	120	Final	1258	Golla	Back	IDX	16	5	< LOD	8.89	179.12	13.78	1871.03	51.28	ppm	19.1	BSHIRLEY
493	11/12/2010 16:40	Soil	120	Final	1258	Golla	Back	IDX	16	6	12.69	5.98	254.23	16.17	2877.8	64.2	ppm	19.1	BSHIRLEY
494	11/12/2010 16:43	Soil	120	Final	1258	Golla	Back	IDX	16	7	23.05	6.62	283.04	17.8	3270.43	71.77	ppm	19.1	BSHIRLEY
495	11/12/2010 16:46	Soil	120	Final	1258	Golla	Back	IDX	16	8	27.43	7.31	206.35	16.41	1994.98	59.56	ppm	19.1	BSHIRLEY
496	11/12/2010 16:49	Soil	120	Final	1258	Golla	Back	IDX	16	9	19.37	6.81	137.59	13.22	1369.52	47.08	ppm	19.1	BSHIRLEY
497	11/12/2010 16:51	Soil	120	Final	1258	Golla	Back	IDX	16	10	17.1	6.18	155.36	12.71	1714.08	47.99	ppm	19.1	BSHIRLEY
499	11/12/2010 16:55	Soil	120	Final	1258	Golla	Back	IDX	16	11	16.75	6.96	254.45	18.28	3530.84	79.81	ppm	19.1	BSHIRLEY
500	11/12/2010 16:58	Soil	120	Final	1258	Golla	Back	IDX	16	12	22.74	6.36	253.39	16	2315.46	57.09	ppm	19.1	BSHIRLEY
501	11/12/2010 17:01	Soil	120	Final	1258	Golla	Back	IDX	16	13	15.06	6.04	278.77	17.16	3211.01	69.04	ppm	19.1	BSHIRLEY
502	11/12/2010 17:03	Soil	120	Final	1258	Golla	Back	IDX	16	14	41.71	6.62	365.93	19.13	4993.59	84.86	ppm	19.1	BSHIRLEY
503	11/12/2010 17:06	Soil	120	Final	1258	Golla	Back	IDX	16	15	12.75	5.54	250.58	15.09	4172.56	72.56	ppm	19.1	BSHIRLEY
504	11/12/2010 17:08	Soil	120	Final	1258	Golla	Back	IDX	16	16	23.35	5.96	231.31	14.67	3390.96	65.91	ppm	19.1	BSHIRLEY
505	11/12/2010 17:11	Soil	120	Final	1258	Golla	Back	IDX	16	17	36.53	7.5	251.98	18.1	3562.99	79.84	ppm	19.1	BSHIRLEY
507	11/12/2010 17:15	Soil	120	Final	1258	Golla	Back	IDX	16	18	23.28	6.38	337.66	19.28	3902.14	78.4	ppm	19.1	BSHIRLEY
508	11/12/2010 17:18	Soil	120	Final	1258	Golla	Back	IDX	16	19	28.15	6.62	228.83	15.75	2699.02	63.29	ppm	19.1	BSHIRLEY
509	11/12/2010 17:20	Soil	120	Final	1258	Golla	Back	IDX	16	20	32.38	6.93	320.64	18.64	2959.15	67.75	ppm	19.1	BSHIRLEY
482	11/12/2010 16:03	Soil	120	Final	1258	Golla	Back	ECX	16	1	41.99	6.65	293.02	16.61	3328.36	66.66	ppm	7.5	BSHIRLEY
483	11/12/2010 16:07	Soil	120	Final	1258	Golla	Back	ECX	16	2	34.47	6.55	287.38	16.79	3575.43	70.38	ppm	7.5	BSHIRLEY
484	11/12/2010 16:11	Soil	120	Final	1258	Golla	Back	ECX	16	3	35.7	6.56	256.68	15.75	3547.72	69.1	ppm	7.5	BSHIRLEY
485	11/12/2010 16:15	Soil	120	Final	1258	Golla	Back	ECX	16	4	48.86	6.91	278.44	16.37	3454.08	68.46	ppm	7.5	BSHIRLEY
486	11/12/2010 16:17	Soil	120	Final	1258	Golla	Back	ECX	16	5	37.21	6.54	250.29	15.64	3434.05	68.14	ppm	7.5	BSHIRLEY
36	11/15/2010 10:14	Soil	120	Final	1254	Golla	Front	ECX	17	1	< LOD	8.07	26.84	5.73	218.67	16.48	ppm	8.9	JSTONE
37	11/15/2010 10:17	Soil	120	Final	1254	Golla	Front	ECX	17	2	< LOD	8.16	33.1	6.19	248.29	17.54	ppm	8.9	JSTONE
38	11/15/2010 10:22	Soil	120	Final	1254	Golla	Front	ECX	17	3	< LOD	7.63	28.82	5.9	193.3	15.58	ppm	8.9	JSTONE
39	11/15/2010 10:26	Soil	120	Final	1254	Golla	Front	ECX	17	4	< LOD	8.04	28.09	5.83	219.37	16.63	ppm	8.9	JSTONE
40	11/15/2010 10:29	Soil	120	Final	1254	Golla	Front	ECX	17	5	< LOD	7.66	38.76	6.57	234.03	17.17	ppm	8.9	JSTONE
45	11/15/2010 11:30	Soil	120	Final	1254	Golla	Back	ECX	17	1	26.63	6.23	365.14	17.29	3800.61	66.66	ppm	7	JSTONE
46	11/15/2010 11:33	Soil	120	Final	1254	Golla	Back	ECX	17	2	25.56	6.12	372.34	17.54	3813.87	67.14	ppm	7	JSTONE
47	11/15/2010 11:37	Soil	120	Final	1254	Golla	Back	ECX	17	3	23.76	6.02	405.08	18.14	3920.34	67.65	ppm	7	JSTONE
48	11/15/2010 11:41	Soil	120	Final	1254	Golla	Back	ECX	17	4	21.53	6.06	401.88	18.1	4006.78	68.6	ppm	7	JSTONE
49	11/15/2010 11:44	Soil	120	Final	1254	Golla	Back	ECX	17	5	20.78	5.91	367.78	17.31	3753.8	66.22	ppm	7	JSTONE
55	11/15/2010 12:32	Soil	120	Final	1249	Golla	Front	ECX	18	1	10.55	5.78	175.48	12.07	1967.21	47.37	ppm	8.9	JSTONE
56	11/15/2010 12:35	Soil	120	Final	1249	Golla	Front	ECX	18	2	8.77	5.78	184.22	12.44	1835.41	46.07	ppm	8.9	JSTONE
57	11/15/2010 12:39	Soil	120	Final	1249	Golla	Front	ECX	18	3	12.84	5.87	185.38	12.48	2056.37	48.61	ppm	8.9	JSTONE
59	11/15/2010 12:42	Soil	120	Final	1249	Golla	Front	ECX	18	4	13.82	5.89	203.54	12.91	1841.19	45.69	ppm	8.9	JSTONE
60	11/15/2010 12:46	Soil	120	Final	1249	Golla	Front	ECX	18	5	11.08	5.87	184.92	12.43	1954.37	47.32	ppm	8.9	JSTONE
17	11/15/2010 10:45	Soil	120	Final	1249	Golla	Back	IDX	18	1	< LOD	9.02	< LOD	9.13	118.32	14.03	ppm	20.8	BSHIRLEY
18	11/15/2010 11:15	Soil	120	Final	1249	Golla	Back	IDX	18	2	< LOD	8.58	< LOD	9.36	187.6	17.15	ppm	20.8	BSHIRLEY
19	11/15/2010 11:18	Soil	120	Final	1249	Golla	Back	IDX	18	3	< LOD	8.4	11.44	6.1	139.8	14.74	ppm	20.8	BSHIRLEY
20	11/15/2010 11:21	Soil	120	Final	1249	Golla	Back	IDX	18	4	< LOD	7.07	< LOD	7.79	88.65	11.99	ppm	20.8	BSHIRLEY
21	11/15/2010 11:25	Soil	120	Final	1249	Golla	Back	IDX	18	5	< LOD	8.57	19.1	7.27	186.7	18.15	ppm	20.8	BSHIRLEY
22	11/15/2010 11:28	Soil	120	Final	1249	Golla	Back	IDX	18	6	< LOD	10.44	13.81	7.74	121.02	17.01	ppm	20.8	BSHIRLEY
23	11/15/2010 11:31	Soil	120	Final	1249	Golla	Back	IDX	18	7	< LOD	9.08	21.96	7.8	154.33	17.39	ppm	20.8	BSHIRLEY
24	11/15/2010 11:33	Soil	120	Final	1249	Golla	Back	IDX	18	8	< LOD	10.95	35.17	9.61	173.68	20.67	ppm	20.8	BSHIRLEY
25	11/15/2010 11:36	Soil	120	Final	1249	Golla	Back	IDX	18	9	< LOD	8.21	9.96	6.11	112.81	13.53	ppm	20.8	BSHIRLEY
26	11/15/2010 11:39	Soil	120	Final	1249	Golla	Back	IDX	18	10	< LOD	8.47	17.91	6.8	376.65	23.43	ppm	20.8	BSHIRLEY
27	11/15/2010 11:43	Soil	120	Final	1249	Golla	Back	IDX	18	11	< LOD	8.39	13.9	6.87	283.26	21.11	ppm	20.8	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
28	11/15/2010 11:46	Soil	120	Final	1249	Golla	Back	IDX	18	12	< LOD	8.82	15.34	7.14	164.47	17.38	ppm	20.8	BSHIRLEY
29	11/15/2010 11:49	Soil	120	Final	1249	Golla	Back	IDX	18	13	< LOD	8.5	< LOD	8.76	104.33	13.59	ppm	20.8	BSHIRLEY
30	11/15/2010 11:52	Soil	120	Final	1249	Golla	Back	IDX	18	14	< LOD	8.98	11.22	6.51	131.57	15.37	ppm	20.8	BSHIRLEY
31	11/15/2010 11:55	Soil	120	Final	1249	Golla	Back	IDX	18	15	< LOD	8.42	17.4	7.17	281.32	21.88	ppm	20.8	BSHIRLEY
32	11/15/2010 11:58	Soil	120	Final	1249	Golla	Back	IDX	18	16	< LOD	9.52	< LOD	10.37	82.98	14.03	ppm	20.8	BSHIRLEY
33	11/15/2010 12:01	Soil	120	Final	1249	Golla	Back	IDX	18	17	< LOD	9.04	12.92	6.56	100.66	13.4	ppm	20.8	BSHIRLEY
34	11/15/2010 12:05	Soil	120	Final	1249	Golla	Back	IDX	18	18	< LOD	8.32	25.65	7.1	151.05	15.4	ppm	20.8	BSHIRLEY
35	11/15/2010 12:08	Soil	120	Final	1249	Golla	Back	IDX	18	19	< LOD	7.68	32.6	7.43	322.53	20.97	ppm	20.8	BSHIRLEY
36	11/15/2010 12:11	Soil	120	Final	1249	Golla	Back	IDX	18	20	< LOD	8.35	17.46	6.81	145.19	15.44	ppm	20.8	BSHIRLEY
37	11/15/2010 12:30	Soil	120	Final	1249	Golla	Back	ECX	18	1	< LOD	8.26	16.08	6.27	100.12	12.66	ppm	9.1	BSHIRLEY
38	11/15/2010 12:35	Soil	120	Final	1249	Golla	Back	ECX	18	2	< LOD	8.25	12.38	6.18	97.3	12.58	ppm	9.1	BSHIRLEY
39	11/15/2010 12:37	Soil	120	Final	1249	Golla	Back	ECX	18	3	< LOD	8.33	10.65	6.03	110.34	13.21	ppm	9.1	BSHIRLEY
40	11/15/2010 12:40	Soil	120	Final	1249	Golla	Back	ECX	18	4	< LOD	8.02	9.98	6.02	109.23	13.08	ppm	9.1	BSHIRLEY
41	11/15/2010 12:42	Soil	120	Final	1249	Golla	Back	ECX	18	5	< LOD	8.19	13.67	6.25	113	13.47	ppm	9.1	BSHIRLEY
53	11/15/2010 14:54	Soil	120	Final	1250	Golla	Front	ECX	19	1	< LOD	7.8	14.58	6.22	184.52	16.1	ppm	12	BSHIRLEY
54	11/15/2010 14:57	Soil	120	Final	1250	Golla	Front	ECX	19	2	< LOD	7.99	12.12	6.14	147.3	14.85	ppm	12	BSHIRLEY
55	11/15/2010 15:00	Soil	120	Final	1250	Golla	Front	ECX	19	3	< LOD	7.83	9.19	5.95	123.79	13.66	ppm	12	BSHIRLEY
56	11/15/2010 15:03	Soil	120	Final	1250	Golla	Front	ECX	19	4	< LOD	7.87	22.62	6.76	170.89	15.85	ppm	12	BSHIRLEY
57	11/15/2010 15:09	Soil	120	Final	1250	Golla	Front	ECX	19	5	< LOD	7.87	8.95	5.87	147.64	14.87	ppm	12	BSHIRLEY
62	11/15/2010 15:29	Soil	120	Final	1250	Golla	Back	ECX	19	1	< LOD	7.66	24.55	6.81	335.14	20.85	ppm	10.4	BSHIRLEY
63	11/15/2010 15:32	Soil	120	Final	1250	Golla	Back	ECX	19	2	< LOD	7.8	20.47	6.56	354.54	21.17	ppm	10.4	BSHIRLEY
64	11/15/2010 15:34	Soil	120	Final	1250	Golla	Back	ECX	19	3	< LOD	7.64	22.9	6.69	320.53	20.29	ppm	10.4	BSHIRLEY
65	11/15/2010 15:37	Soil	120	Final	1250	Golla	Back	ECX	19	4	< LOD	7.48	26.67	6.86	355.29	21.28	ppm	10.4	BSHIRLEY
66	11/15/2010 15:40	Soil	120	Final	1250	Golla	Back	ECX	19	5	< LOD	7.75	26.77	6.9	337.69	20.92	ppm	10.4	BSHIRLEY
73	11/15/2010 14:26	Soil	120	Final	1241	Golla	Front	IDX	20	1	< LOD	11.15	17.31	6.54	81.17	14.11	ppm	19.0	JSTONE
74	11/15/2010 14:29	Soil	120	Final	1241	Golla	Front	IDX	20	2	17.99	8.78	20.02	7.56	42.92	13.32	ppm	19.0	JSTONE
75	11/15/2010 14:32	Soil	120	Final	1241	Golla	Front	IDX	20	3	< LOD	19.2	21.3	11.68	44.86	23.06	ppm	19.0	JSTONE
76	11/15/2010 14:36	Soil	120	Final	1241	Golla	Front	IDX	20	4	< LOD	10.54	23.53	6.61	64.03	12.28	ppm	19.0	JSTONE
81	11/15/2010 14:51	Soil	120	Final	1241	Golla	Front	IDX	20	5	< LOD	9.72	18.17	6.24	134.49	16.02	ppm	19	JSTONE
82	11/15/2010 14:54	Soil	120	Final	1241	Golla	Front	IDX	20	6	< LOD	18.01	29.42	11.93	83.08	24.94	ppm	19	JSTONE
92	11/15/2010 15:02	Soil	120	Final	1241	Golla	Front	IDX	20	7	< LOD	12.06	17.99	7.24	41.75	12.16	ppm	19	JSTONE
94	11/15/2010 15:05	Soil	120	Final	1241	Golla	Front	IDX	20	8	< LOD	8.04	18.37	5.35	83.26	11.12	ppm	19	JSTONE
95	11/15/2010 15:09	Soil	120	Final	1241	Golla	Front	IDX	20	9	< LOD	8.5	14.65	5.56	79.48	12.14	ppm	19	JSTONE
97	11/15/2010 15:13	Soil	120	Final	1241	Golla	Front	IDX	20	10	< LOD	9.01	15.29	5.62	61.35	11.22	ppm	19	JSTONE
98	11/15/2010 15:16	Soil	120	Final	1241	Golla	Front	IDX	20	11	< LOD	9.73	18.99	6.57	89.87	14.04	ppm	19	JSTONE
99	11/15/2010 15:19	Soil	120	Final	1241	Golla	Front	IDX	20	12	< LOD	8.5	32.25	6.61	151.51	15.09	ppm	19	JSTONE
100	11/15/2010 15:23	Soil	120	Final	1241	Golla	Front	IDX	20	13	< LOD	7.12	15.49	4.95	114.32	12.55	ppm	19	JSTONE
101	11/15/2010 15:26	Soil	120	Final	1241	Golla	Front	IDX	20	14	< LOD	9.26	13.6	5.54	47.76	10.7	ppm	19	JSTONE
102	11/15/2010 15:30	Soil	120	Final	1241	Golla	Front	IDX	20	15	< LOD	8.55	13.72	5.32	52.41	10.23	ppm	19	JSTONE
105	11/15/2010 15:36	Soil	120	Final	1241	Golla	Front	IDX	20	16	< LOD	9.74	18.09	6.46	92.38	14.57	ppm	19	JSTONE
107	11/15/2010 15:39	Soil	120	Final	1241	Golla	Front	IDX	20	17	< LOD	7.97	30.43	6.05	279.49	18.35	ppm	19	JSTONE
109	11/15/2010 15:43	Soil	120	Final	1241	Golla	Front	IDX	20	18	< LOD	10.17	19.81	6.45	122.27	15.73	ppm	19	JSTONE
112	11/15/2010 15:49	Soil	120	Final	1241	Golla	Front	IDX	20	19	< LOD	9.93	20.65	6.27	74.16	12.37	ppm	19	JSTONE
114	11/15/2010 15:52	Soil	120	Final	1241	Golla	Front	IDX	20	20	< LOD	10.37	31.06	7.57	151.82	17.71	ppm	19	JSTONE
116	11/15/2010 16:02	Soil	120	Final	1241	Golla	Front	ECX	20	1	< LOD	8.33	18.72	5.29	95.17	11.89	ppm	3.7	JSTONE
117	11/15/2010 16:05	Soil	120	Final	1241	Golla	Front	ECX	20	2	< LOD	8.23	18.79	5.36	103.37	12.29	ppm	3.7	JSTONE
118	11/15/2010 16:08	Soil	120	Final	1241	Golla	Front	ECX	20	3	< LOD	8.24	22.37	5.6	103.86	12.36	ppm	3.7	JSTONE
119	11/15/2010 16:11	Soil	120	Final	1241	Golla	Front	ECX	20	4	< LOD	8.37	22.12	5.59	102.75	12.18	ppm	3.7	JSTONE
120	11/15/2010 16:15	Soil	120	Final	1241	Golla	Front	ECX	20	5	< LOD	8.13	16.39	5.18	96.1	11.88	ppm	3.7	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
126	11/15/2010 16:38	Soil	120	Final	1241	Golla	Back	ECX	20	1	< LOD	9.85	43.15	8.11	347.36	24.94	ppm	7.3	JSTONE
127	11/15/2010 16:41	Soil	120	Final	1241	Golla	Back	ECX	20	2	< LOD	9.9	36.9	7.56	330.17	23.83	ppm	7.3	JSTONE
128	11/15/2010 16:44	Soil	120	Final	1241	Golla	Back	ECX	20	3	< LOD	9.51	38.06	7.85	289.1	22.91	ppm	7.3	JSTONE
129	11/15/2010 16:47	Soil	120	Final	1241	Golla	Back	ECX	20	4	< LOD	9.55	33.07	7.26	377.27	24.9	ppm	7.3	JSTONE
130	11/15/2010 16:49	Soil	120	Final	1241	Golla	Back	ECX	20	5	< LOD	9.93	36.7	7.63	342.87	24.44	ppm	7.3	JSTONE
72	11/15/2010 17:16	Soil	120	Final	1234	Golla	Front	ECX	21	1	< LOD	8.54	11.71	6.34	120.9	14.31	ppm	9.7	BSHIRLEY
73	11/15/2010 17:18	Soil	120	Final	1234	Golla	Front	ECX	21	2	< LOD	8.54	13.89	6.52	113.65	14.1	ppm	9.7	BSHIRLEY
74	11/15/2010 17:21	Soil	120	Final	1234	Golla	Front	ECX	21	3	< LOD	8.48	< LOD	9.2	139.14	14.93	ppm	9.7	BSHIRLEY
75	11/15/2010 17:23	Soil	120	Final	1234	Golla	Front	ECX	21	4	< LOD	8.44	10.44	6.23	118.11	14.16	ppm	9.7	BSHIRLEY
76	11/15/2010 17:26	Soil	120	Final	1234	Golla	Front	ECX	21	5	< LOD	8.54	< LOD	9.17	109.33	13.58	ppm	9.7	BSHIRLEY
81	11/15/2010 17:42	Soil	120	Final	1234	Golla	Back	ECX	21	1	< LOD	8.63	61.75	8.69	816.14	32.07	ppm	12.6	BSHIRLEY
82	11/15/2010 17:44	Soil	120	Final	1234	Golla	Back	ECX	21	2	< LOD	8.48	88.62	9.94	937.83	34.72	ppm	12.6	BSHIRLEY
83	11/15/2010 17:47	Soil	120	Final	1234	Golla	Back	ECX	21	3	< LOD	8.61	79.46	9.47	896.58	33.57	ppm	12.6	BSHIRLEY
84	11/15/2010 17:49	Soil	120	Final	1234	Golla	Back	ECX	21	4	< LOD	8.57	79.2	9.43	948.15	34.39	ppm	12.6	BSHIRLEY
85	11/15/2010 17:52	Soil	120	Final	1234	Golla	Back	ECX	21	5	< LOD	8.6	72.35	9.17	912.05	33.98	ppm	12.6	BSHIRLEY
136	11/15/2010 17:47	Soil	120	Final	1229	Golla	Front	ECX	22	1	12.45	5.94	163.74	11.82	2046.34	48.62	ppm	8.9	JSTONE
137	11/15/2010 17:49	Soil	120	Final	1229	Golla	Front	ECX	22	2	16.11	6.03	166.94	11.85	2069.88	48.56	ppm	8.9	JSTONE
138	11/15/2010 17:52	Soil	120	Final	1229	Golla	Front	ECX	22	3	13.72	6.06	165.65	11.95	1986.62	48.21	ppm	8.9	JSTONE
139	11/15/2010 17:54	Soil	120	Final	1229	Golla	Front	ECX	22	4	17.47	6.13	177.8	12.29	1976.96	48.08	ppm	8.9	JSTONE
140	11/15/2010 17:56	Soil	120	Final	1229	Golla	Front	ECX	22	5	17.22	6.12	177.6	12.41	2137.49	50.44	ppm	8.9	JSTONE
111	11/22/2010 15:49	Soil	120	Final	1229	Golla	Back	ECX	22	1	< LOD	9.07	226.42	15.4	1513.42	47.07	ppm		BBRAND
112	11/22/2010 15:52	Soil	120	Final	1229	Golla	Back	ECX	22	2	9.44	6.06	178.84	13.88	1501.55	46.64	ppm		BBRAND
113	11/22/2010 15:54	Soil	120	Final	1229	Golla	Back	ECX	22	3	16.25	6.35	160.32	13.5	1541.68	47.8	ppm		BBRAND
114	11/22/2010 15:57	Soil	120	Final	1229	Golla	Back	ECX	22	4	< LOD	9.22	180.22	14	1473.78	46.43	ppm		BBRAND
115	11/22/2010 16:00	Soil	120	Final	1229	Golla	Back	ECX	22	5	< LOD	9.11	171.95	13.77	1502.27	46.96	ppm		BBRAND
18	11/16/2010 8:16	Soil	120	Final	1118	Vernon	Front	IDX	23	1	< LOD	10.85	27.96	8.92	393.42	28.71	ppm	13.7	BSHIRLEY
19	11/16/2010 8:20	Soil	120	Final	1118	Vernon	Front	IDX	23	2	< LOD	6.68	35.49	7.5	679.26	29.57	ppm	13.7	BSHIRLEY
20	11/16/2010 8:23	Soil	120	Final	1118	Vernon	Front	IDX	23	3	< LOD	7.84	46.07	8.49	807.93	33.96	ppm	13.7	BSHIRLEY
21	11/16/2010 8:26	Soil	120	Final	1118	Vernon	Front	IDX	23	4	< LOD	6.98	44.58	8.18	894.42	34.76	ppm	13.7	BSHIRLEY
22	11/16/2010 8:29	Soil	120	Final	1118	Vernon	Front	IDX	23	5	< LOD	6.89	92.06	9.76	735.39	29.97	ppm	13.7	BSHIRLEY
23	11/16/2010 8:32	Soil	120	Final	1118	Vernon	Front	IDX	23	6	< LOD	8.11	61	9.02	844.07	33.88	ppm	13.7	BSHIRLEY
24	11/16/2010 8:35	Soil	120	Final	1118	Vernon	Front	IDX	23	7	< LOD	9.07	79.26	10.14	969.57	37.44	ppm	13.7	BSHIRLEY
25	11/16/2010 8:38	Soil	120	Final	1118	Vernon	Front	IDX	23	8	< LOD	9.22	52.74	9.02	536.53	28.33	ppm	13.7	BSHIRLEY
26	11/16/2010 8:41	Soil	120	Final	1118	Vernon	Front	IDX	23	9	< LOD	9.19	54.32	9.11	631.71	30.85	ppm	13.7	BSHIRLEY
27	11/16/2010 8:44	Soil	120	Final	1118	Vernon	Front	IDX	23	10	< LOD	9.22	27.12	7.89	339.17	23.74	ppm	13.7	BSHIRLEY
28	11/16/2010 8:47	Soil	120	Final	1118	Vernon	Front	IDX	23	11	< LOD	8.13	50.13	8.34	565.16	27.59	ppm	13.7	BSHIRLEY
29	11/16/2010 8:51	Soil	120	Final	1118	Vernon	Front	IDX	23	12	< LOD	8.91	62.65	9.36	587.07	29.14	ppm	13.7	BSHIRLEY
30	11/16/2010 8:54	Soil	120	Final	1118	Vernon	Front	IDX	23	13	< LOD	7.51	90.07	10.51	1632.84	47.85	ppm	13.7	BSHIRLEY
31	11/16/2010 8:59	Soil	120	Final	1118	Vernon	Front	IDX	23	14	< LOD	8.56	32.45	7.62	461.65	25.59	ppm	13.7	BSHIRLEY
32	11/16/2010 9:02	Soil	120	Final	1118	Vernon	Front	IDX	23	15	< LOD	8.6	48.95	8.35	578.49	28.09	ppm	13.7	BSHIRLEY
33	11/16/2010 9:05	Soil	120	Final	1118	Vernon	Front	IDX	23	16	< LOD	10.82	48.06	10.27	708.12	38.03	ppm	13.7	BSHIRLEY
34	11/16/2010 9:08	Soil	120	Final	1118	Vernon	Front	IDX	23	17	< LOD	8.01	66.61	9.48	1133.56	39.97	ppm	13.7	BSHIRLEY
35	11/16/2010 9:11	Soil	120	Final	1118	Vernon	Front	IDX	23	18	< LOD	8.75	142.46	12.75	1672.36	49.37	ppm	13.7	BSHIRLEY
36	11/16/2010 9:14	Soil	120	Final	1118	Vernon	Front	IDX	23	19	< LOD	8.99	178.8	14	1638.3	48.8	ppm	13.7	BSHIRLEY
37	11/16/2010 9:18	Soil	120	Final	1118	Vernon	Front	IDX	23	20	< LOD	8.4	76.96	10.24	1234.79	42.67	ppm	13.7	BSHIRLEY
40	11/16/2010 9:33	Soil	120	Final	1118	Vernon	Front	ECX	23	1	< LOD	8.73	73.25	9.54	698.7	31.01	ppm	5.8	BSHIRLEY
41	11/16/2010 9:36	Soil	120	Final	1118	Vernon	Front	ECX	23	1	< LOD	9.1	76.7	9.81	705.34	31.46	ppm	5.8	BSHIRLEY
42	11/16/2010 9:38	Soil	120	Final	1118	Vernon	Front	ECX	23	3	< LOD	8.43	71.39	9.22	732.69	30.72	ppm	5.8	BSHIRLEY
43	11/16/2010 9:41	Soil	120	Final	1118	Vernon	Front	ECX	23	4	< LOD	8.32	71.48	9.2	726.69	30.69	ppm	5.8	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
44	11/16/2010 9:43	Soil	120	Final	1118	Vernon	Front	ECX	23	5	< LOD	8.43	77.35	9.63	748.52	31.76	ppm	5.8	BSHIRLEY
17	11/16/2010 8:38	Soil	120	Final	1118	Vernon	Back	IDX	23	1	< LOD	9.1	36.1	6.74	343.44	21.45	ppm	10.9	JSTONE
24	11/16/2010 8:56	Soil	120	Final	1118	Vernon	Back	IDX	23	2	< LOD	9.87	68.41	9.58	614.21	32.13	ppm	10.9	JSTONE
25	11/16/2010 9:01	Soil	120	Final	1118	Vernon	Back	IDX	23	3	< LOD	10.59	90.36	10.74	777.65	35.84	ppm	10.9	JSTONE
26	11/16/2010 9:04	Soil	120	Final	1118	Vernon	Back	IDX	23	4	< LOD	8.68	84.37	9.34	999.7	36.06	ppm	10.9	JSTONE
28	11/16/2010 9:09	Soil	120	Final	1118	Vernon	Back	IDX	23	5	< LOD	10.74	66.83	10.09	698.88	35.83	ppm	10.9	JSTONE
29	11/16/2010 9:12	Soil	120	Final	1118	Vernon	Back	IDX	23	6	< LOD	10.95	57.98	10.23	494.69	32.89	ppm	10.9	JSTONE
30	11/16/2010 9:15	Soil	120	Final	1118	Vernon	Back	IDX	23	7	< LOD	9.67	56.87	8.53	524.02	28.33	ppm	10.9	JSTONE
31	11/16/2010 9:18	Soil	120	Final	1118	Vernon	Back	IDX	23	8	< LOD	8.07	40.03	7.13	533.74	27.12	ppm	10.9	JSTONE
34	11/16/2010 9:21	Soil	120	Final	1118	Vernon	Back	IDX	23	9	< LOD	8.29	47.27	7.71	459.92	25.61	ppm	10.9	JSTONE
35	11/16/2010 9:24	Soil	120	Final	1118	Vernon	Back	IDX	23	10	< LOD	9.3	63.97	8.88	391.21	24.49	ppm	10.9	JSTONE
36	11/16/2010 9:27	Soil	120	Final	1118	Vernon	Back	IDX	23	11	< LOD	8.94	66.74	8.66	535.87	27.48	ppm	10.9	JSTONE
37	11/16/2010 9:30	Soil	120	Final	1118	Vernon	Back	IDX	23	12	< LOD	9.02	46.3	7.79	454.22	25.94	ppm	10.9	JSTONE
39	11/16/2010 9:32	Soil	120	Final	1118	Vernon	Back	IDX	23	13	< LOD	10.34	52.1	9.07	546.79	31.65	ppm	10.9	JSTONE
40	11/16/2010 9:37	Soil	120	Final	1118	Vernon	Back	IDX	23	14	< LOD	7.67	31.37	7.05	631.49	31.09	ppm	10.9	JSTONE
41	11/16/2010 9:41	Soil	120	Final	1118	Vernon	Back	IDX	23	15	< LOD	9.03	36.36	7.46	1334.17	45.21	ppm	10.9	JSTONE
42	11/16/2010 9:44	Soil	120	Final	1118	Vernon	Back	IDX	23	16	< LOD	8.67	47.97	7.62	534.58	27.35	ppm	10.9	JSTONE
43	11/16/2010 9:46	Soil	120	Final	1118	Vernon	Back	IDX	23	17	< LOD	8.49	46.59	7.86	567.11	29.1	ppm	10.9	JSTONE
44	11/16/2010 9:49	Soil	120	Final	1118	Vernon	Back	IDX	23	18	< LOD	8.35	53.44	8.65	706.81	33.58	ppm	10.9	JSTONE
45	11/16/2010 9:51	Soil	120	Final	1118	Vernon	Back	IDX	23	19	< LOD	8.66	60.99	8.86	727.75	33.7	ppm	10.9	JSTONE
47	11/16/2010 9:54	Soil	120	Final	1118	Vernon	Back	IDX	23	20	< LOD	9.45	67.2	9.01	631.62	30.56	ppm	10.9	JSTONE
48	11/16/2010 10:34	Soil	120	Final	1118	Vernon	Back	ECX	23	1	< LOD	8.03	68.34	8.07	673.58	28.06	ppm	7.3	JSTONE
49	11/16/2010 10:37	Soil	120	Final	1118	Vernon	Back	ECX	23	2	< LOD	8.11	61.54	7.71	676.44	27.96	ppm	7.3	JSTONE
50	11/16/2010 10:41	Soil	120	Final	1118	Vernon	Back	ECX	23	3	< LOD	7.92	76.7	8.43	680	28.22	ppm	7.3	JSTONE
51	11/16/2010 10:43	Soil	120	Final	1118	Vernon	Back	ECX	23	4	< LOD	8.25	62.44	7.76	650.55	27.62	ppm	7.3	JSTONE
52	11/16/2010 10:46	Soil	120	Final	1118	Vernon	Back	ECX	23	5	< LOD	8.28	70.09	8.14	716.52	28.95	ppm	7.3	JSTONE
58	11/16/2010 11:09	Soil	120	Final	1117	Vernon	Front	ECX	24	1	< LOD	8.25	148.1	11.26	1157.61	36.65	ppm	7	JSTONE
59	11/16/2010 11:12	Soil	120	Final	1117	Vernon	Front	ECX	24	2	< LOD	8.31	172.67	12.21	1310.99	39.6	ppm	7	JSTONE
60	11/16/2010 11:17	Soil	120	Final	1117	Vernon	Front	ECX	24	3	< LOD	8.48	160.65	11.96	1292.29	39.76	ppm	7	JSTONE
61	11/16/2010 11:20	Soil	120	Final	1117	Vernon	Front	ECX	24	4	< LOD	8.39	147.45	11.37	1225.5	38.11	ppm	7	JSTONE
62	11/16/2010 11:22	Soil	120	Final	1117	Vernon	Front	ECX	24	5	< LOD	8.3	145.96	11.33	1260.64	38.68	ppm	7	JSTONE
71	11/16/2010 12:02	Soil	120	Final	1117	Vernon	Back	IDX	24	1	< LOD	9.77	29.19	6.61	282.53	20.59	ppm	18.4	JSTONE
73	11/16/2010 12:08	Soil	120	Final	1117	Vernon	Back	IDX	24	2	< LOD	9.42	56.9	8.42	703.89	31.96	ppm	18.4	JSTONE
74	11/16/2010 12:13	Soil	120	Final	1117	Vernon	Back	IDX	24	3	< LOD	9.97	47.46	8.12	436.83	26.19	ppm	18.4	JSTONE
75	11/16/2010 12:16	Soil	120	Final	1117	Vernon	Back	IDX	24	4	< LOD	8.58	183.45	14.02	2078.55	55.27	ppm	18.4	JSTONE
76	11/16/2010 12:19	Soil	120	Final	1117	Vernon	Back	IDX	24	5	< LOD	9.44	48.16	9.77	690.02	39.15	ppm	18.4	JSTONE
78	11/16/2010 12:21	Soil	120	Final	1117	Vernon	Back	IDX	24	6	< LOD	8.81	87.17	9.93	1466.75	45.74	ppm	18.4	JSTONE
80	11/16/2010 12:24	Soil	120	Final	1117	Vernon	Back	IDX	24	7	< LOD	9.3	75.25	9.2	514.14	27.08	ppm	18.4	JSTONE
81	11/16/2010 12:27	Soil	120	Final	1117	Vernon	Back	IDX	24	8	< LOD	10.14	50.91	9	469.58	29.39	ppm	18.4	JSTONE
82	11/16/2010 12:30	Soil	120	Final	1117	Vernon	Back	IDX	24	9	< LOD	10.13	41.07	7.92	286.71	22.47	ppm	18.4	JSTONE
83	11/16/2010 12:34	Soil	120	Final	1117	Vernon	Back	IDX	24	10	< LOD	8.96	65.84	8.67	735.96	31.96	ppm	18.4	JSTONE
84	11/16/2010 12:37	Soil	120	Final	1117	Vernon	Back	IDX	24	11	< LOD	9.22	83.91	10.18	645.97	32.04	ppm	18.4	JSTONE
85	11/16/2010 12:40	Soil	120	Final	1117	Vernon	Back	IDX	24	12	< LOD	8.97	93.64	10.02	638.19	30.03	ppm	18.4	JSTONE
86	11/16/2010 12:42	Soil	120	Final	1117	Vernon	Back	IDX	24	13	< LOD	9.44	80.7	10.37	702.38	34.46	ppm	18.4	JSTONE
87	11/16/2010 12:45	Soil	120	Final	1117	Vernon	Back	IDX	24	14	< LOD	9.07	92.73	10.58	801.05	35.48	ppm	18.4	JSTONE
88	11/16/2010 12:48	Soil	120	Final	1117	Vernon	Back	IDX	24	15	< LOD	7.14	76.77	8.7	740.41	30.39	ppm	18.4	JSTONE
89	11/16/2010 12:50	Soil	120	Final	1117	Vernon	Back	IDX	24	16	< LOD	8.23	59.14	8.56	749.79	33.17	ppm	18.4	JSTONE
90	11/16/2010 12:53	Soil	120	Final	1117	Vernon	Back	IDX	24	17	< LOD	8.86	59.86	8.42	680.27	30.89	ppm	18.4	JSTONE
91	11/16/2010 12:56	Soil	120	Final	1117	Vernon	Back	IDX	24	18	< LOD	8.33	60.99	8.63	1021.97	38.34	ppm	18.4	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
92	11/16/2010 12:59	Soil	120	Final	1117	Vernon	Back	IDX	24	19	< LOD	9.16	96.53	10.49	1269.91	43.1	ppm	18.4	JSTONE
93	11/16/2010 13:01	Soil	120	Final	1117	Vernon	Back	IDX	24	20	< LOD	8.54	65.96	8.55	615.74	28.78	ppm	18.4	JSTONE
95	11/16/2010 13:50	Soil	120	Final	1117	Vernon	Back	ECX	24	1	< LOD	8.24	86.7	8.95	734.28	29.51	ppm	8.1	JSTONE
96	11/16/2010 13:53	Soil	120	Final	1117	Vernon	Back	ECX	24	2	< LOD	8.28	90.85	9.1	719.71	29.11	ppm	8.1	JSTONE
97	11/16/2010 13:55	Soil	120	Final	1117	Vernon	Back	ECX	24	3	< LOD	8.31	77.98	8.45	635.8	27.15	ppm	8.1	JSTONE
98	11/16/2010 13:58	Soil	120	Final	1117	Vernon	Back	ECX	24	4	< LOD	8.23	92.67	9.3	763.34	30.4	ppm	8.1	JSTONE
99	11/16/2010 14:00	Soil	120	Final	1117	Vernon	Back	ECX	24	5	< LOD	8.51	94.12	9.26	753.14	29.8	ppm	8.1	JSTONE
80	11/16/2010 12:44	Soil	120	Final	1214	Vernon	Front	ECX	25	1	< LOD	7.68	107.52	10.12	631.97	27.24	ppm	12.7	BSHIRLEY
81	11/16/2010 12:47	Soil	120	Final	1214	Vernon	Front	ECX	25	2	< LOD	7.76	110.45	10.26	561.42	25.99	ppm	12.7	BSHIRLEY
82	11/16/2010 12:50	Soil	120	Final	1214	Vernon	Front	ECX	25	3	< LOD	7.69	100.83	9.8	561.69	25.63	ppm	12.7	BSHIRLEY
83	11/16/2010 12:53	Soil	120	Final	1214	Vernon	Front	ECX	25	4	< LOD	7.73	121.37	10.65	637.82	27.62	ppm	12.7	BSHIRLEY
84	11/16/2010 12:56	Soil	120	Final	1214	Vernon	Front	ECX	25	5	< LOD	7.52	105.99	10.04	635.96	27.38	ppm	12.7	BSHIRLEY
49	11/16/2010 11:06	Soil	120	Final	1214	Vernon	Back	IDX	25	1	< LOD	8.35	29.82	7.28	268.05	19.5	ppm	12.7	BSHIRLEY
50	11/16/2010 11:08	Soil	120	Final	1214	Vernon	Back	IDX	25	2	14.73	7.14	44.36	9.34	415.23	27.49	ppm	12.7	BSHIRLEY
51	11/16/2010 11:11	Soil	120	Final	1214	Vernon	Back	IDX	25	3	< LOD	9.39	38.78	8.43	392.22	25.02	ppm	12.7	BSHIRLEY
52	11/16/2010 11:14	Soil	120	Final	1214	Vernon	Back	IDX	25	4	< LOD	8.99	38.39	8.03	333.42	22	ppm	12.7	BSHIRLEY
53	11/16/2010 11:17	Soil	120	Final	1214	Vernon	Back	IDX	25	5	< LOD	8.17	107.79	10.89	1150.95	39.32	ppm	12.7	BSHIRLEY
54	11/16/2010 11:20	Soil	120	Final	1214	Vernon	Back	IDX	25	6	< LOD	9.67	46.6	9.08	253.82	21.08	ppm	12.7	BSHIRLEY
55	11/16/2010 11:24	Soil	120	Final	1214	Vernon	Back	IDX	25	7	< LOD	9.15	31.72	7.58	320.11	21.6	ppm	12.7	BSHIRLEY
56	11/16/2010 11:27	Soil	120	Final	1214	Vernon	Back	IDX	25	8	13.92	6.86	32.75	8.3	167.88	17.66	ppm	12.7	BSHIRLEY
57	11/16/2010 11:29	Soil	120	Final	1214	Vernon	Back	IDX	25	9	10.19	6.34	37.66	8.17	347.62	23.15	ppm	12.7	BSHIRLEY
58	11/16/2010 11:32	Soil	120	Final	1214	Vernon	Back	IDX	25	10	< LOD	9.14	51.1	8.78	356.19	23.17	ppm	12.7	BSHIRLEY
59	11/16/2010 11:35	Soil	120	Final	1214	Vernon	Back	IDX	25	11	< LOD	9.29	39.22	8.18	330.02	22.31	ppm	12.7	BSHIRLEY
60	11/16/2010 11:38	Soil	120	Final	1214	Vernon	Back	IDX	25	12	< LOD	9.55	32.26	7.93	293.72	21.47	ppm	12.7	BSHIRLEY
61	11/16/2010 11:41	Soil	120	Final	1214	Vernon	Back	IDX	25	13	14.78	6.77	53.99	9.44	315.9	23.1	ppm	12.7	BSHIRLEY
62	11/16/2010 11:44	Soil	120	Final	1214	Vernon	Back	IDX	25	14	< LOD	9.42	36.05	8.07	240.34	19.53	ppm	12.7	BSHIRLEY
63	11/16/2010 11:46	Soil	120	Final	1214	Vernon	Back	IDX	25	15	< LOD	9.56	47.37	8.76	485.44	27.21	ppm	12.7	BSHIRLEY
64	11/16/2010 11:49	Soil	120	Final	1214	Vernon	Back	IDX	25	16	14.47	7.02	47.63	9.27	510.45	29.55	ppm	12.7	BSHIRLEY
65	11/16/2010 11:52	Soil	120	Final	1214	Vernon	Back	IDX	25	17	< LOD	9.94	60.36	9.71	366.7	24.77	ppm	12.7	BSHIRLEY
66	11/16/2010 11:55	Soil	120	Final	1214	Vernon	Back	IDX	25	18	< LOD	9.54	46.52	8.83	364.9	24.19	ppm	12.7	BSHIRLEY
67	11/16/2010 11:58	Soil	102.58	Final	1214	Vernon	Back	IDX	25	19	15.68	7.99	141.65	13.16	1353.74	45.91	ppm	12.7	BSHIRLEY
75	11/16/2010 12:16	Soil	120	Final	1214	Vernon	Back	IDX	25	20	10.94	6.18	66.84	9.38	715.64	31.75	ppm	12.7	BSHIRLEY
104	11/16/2010 14:44	Soil	120	Final	1214	Vernon	Back	ECX	25	1	< LOD	8.11	79.32	8.35	486.65	23.44	ppm	6.6	JSTONE
105	11/16/2010 14:48	Soil	120	Final	1214	Vernon	Back	ECX	25	2	< LOD	7.99	86.42	8.58	494.96	23.57	ppm	6.6	JSTONE
106	11/16/2010 14:52	Soil	120	Final	1214	Vernon	Back	ECX	25	3	< LOD	8.02	100.67	9.25	618.35	26.34	ppm	6.6	JSTONE
107	11/16/2010 14:54	Soil	120	Final	1214	Vernon	Back	ECX	25	4	< LOD	8.14	80.48	8.47	578.72	25.6	ppm	6.6	JSTONE
108	11/16/2010 14:56	Soil	120	Final	1214	Vernon	Back	ECX	25	5	< LOD	7.87	88.74	8.71	562.22	25.06	ppm	6.6	JSTONE
90	11/16/2010 13:52	Soil	120	Final	1209	Vernon	Front	IDX	26	1	< LOD	10.3	91.8	13.06	1062.39	47.89	ppm	18.7	BSHIRLEY
91	11/16/2010 13:55	Soil	120	Final	1209	Vernon	Front	IDX	26	2	< LOD	8.54	100.9	11.03	1056.94	38.91	ppm	18.7	BSHIRLEY
92	11/16/2010 13:58	Soil	120	Final	1209	Vernon	Front	IDX	26	3	< LOD	8.25	110.6	11.34	1256.1	42.17	ppm	18.7	BSHIRLEY
93	11/16/2010 14:02	Soil	120	Final	1209	Vernon	Front	IDX	26	4	< LOD	9.45	72.95	10.78	946.57	40.39	ppm	18.7	BSHIRLEY
94	11/16/2010 14:05	Soil	120	Final	1209	Vernon	Front	IDX	26	5	16.66	6.91	61.03	9.86	746.95	34.97	ppm	18.7	BSHIRLEY
95	11/16/2010 14:07	Soil	120	Final	1209	Vernon	Front	IDX	26	6	< LOD	9.49	64.28	10.69	897.9	40.64	ppm	18.7	BSHIRLEY
96	11/16/2010 14:10	Soil	120	Final	1209	Vernon	Front	IDX	26	7	< LOD	12.86	76.46	14.14	946.44	51.87	ppm	18.7	BSHIRLEY
97	11/16/2010 14:14	Soil	120	Final	1209	Vernon	Front	IDX	26	8	< LOD	10.3	< LOD	10.91	340.56	25.33	ppm	18.7	BSHIRLEY
98	11/16/2010 14:17	Soil	120	Final	1209	Vernon	Front	IDX	26	9	< LOD	9.01	113.56	11.83	1312.59	44.42	ppm	18.7	BSHIRLEY
99	11/16/2010 14:20	Soil	120	Final	1209	Vernon	Front	IDX	26	10	< LOD	8.86	119.94	12.64	1165.66	43.93	ppm	18.7	BSHIRLEY
100	11/16/2010 14:23	Soil	120	Final	1209	Vernon	Front	IDX	26	11	< LOD	6.15	11.28	6.33	356.54	22.6	ppm	18.7	BSHIRLEY
101	11/16/2010 14:26	Soil	120	Final	1209	Vernon	Front	IDX	26	12	< LOD	7.36	89.46	10.71	1549.68	47.61	ppm	18.7	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
102	11/16/2010 14:29	Soil	120	Final	1209	Vernon	Front	IDX	26	13	< LOD	8.22	142.78	12.33	1420.69	44.12	ppm	18.7	BSHIRLEY
104	11/16/2010 14:32	Soil	120	Final	1209	Vernon	Front	IDX	26	14	< LOD	8.03	55.94	10.18	687.99	35.51	ppm	18.7	BSHIRLEY
106	11/16/2010 14:37	Soil	120	Final	1209	Vernon	Front	IDX	26	15	< LOD	9.63	99.03	12.51	1090.43	45.1	ppm	18.7	BSHIRLEY
107	11/16/2010 14:40	Soil	120	Final	1209	Vernon	Front	IDX	26	16	< LOD	10.08	132.89	15.85	1599.4	61.37	ppm	18.7	BSHIRLEY
108	11/16/2010 14:43	Soil	120	Final	1209	Vernon	Front	IDX	26	17	< LOD	7.43	104.15	11.29	1467.11	46.17	ppm	18.7	BSHIRLEY
109	11/16/2010 14:46	Soil	120	Final	1209	Vernon	Front	IDX	26	18	< LOD	10.52	113.74	13.6	926.85	42.89	ppm	18.7	BSHIRLEY
111	11/16/2010 14:50	Soil	120	Final	1209	Vernon	Front	IDX	26	19	< LOD	7.7	120.36	12.26	1333.07	45.42	ppm	18.7	BSHIRLEY
112	11/16/2010 14:53	Soil	120	Final	1209	Vernon	Front	IDX	26	20	< LOD	7.71	95.91	10.27	901.82	34.44	ppm	18.7	BSHIRLEY
116	11/16/2010 15:38	Soil	120	Final	1209	Vernon	Front	ECX	26	1	< LOD	8.2	144.04	11.07	1236.5	37.78	ppm	7.1	JSTONE
117	11/16/2010 15:40	Soil	120	Final	1209	Vernon	Front	ECX	26	2	< LOD	8.26	152.23	11.37	1240.53	37.93	ppm	7.1	JSTONE
118	11/16/2010 15:43	Soil	120	Final	1209	Vernon	Front	ECX	26	3	< LOD	8.16	139.48	10.97	1277.04	38.59	ppm	7.1	JSTONE
119	11/16/2010 15:45	Soil	120	Final	1209	Vernon	Front	ECX	26	4	< LOD	8.09	154.8	11.43	1248.19	37.97	ppm	7.1	JSTONE
121	11/16/2010 15:48	Soil	120	Final	1209	Vernon	Front	ECX	26	5	< LOD	8.2	150	11.29	1211.51	37.53	ppm	7.1	JSTONE
116	11/16/2010 15:25	Soil	120	Final	1209	Vernon	Back	IDX	26	1	10.56	6.67	72.65	10.48	739.26	34.68	ppm	11.4	BSHIRLEY
117	11/16/2010 15:28	Soil	120	Final	1209	Vernon	Back	IDX	26	2	< LOD	8.82	32.75	8.46	560.75	30.73	ppm	11.4	BSHIRLEY
118	11/16/2010 15:30	Soil	120	Final	1209	Vernon	Back	IDX	26	3	< LOD	7.85	25.72	7.77	666.55	32.71	ppm	11.4	BSHIRLEY
119	11/16/2010 15:34	Soil	120	Final	1209	Vernon	Back	IDX	26	4	< LOD	5.74	19.51	6	736.79	28.07	ppm	11.4	BSHIRLEY
120	11/16/2010 15:37	Soil	120	Final	1209	Vernon	Back	IDX	26	5	< LOD	9.97	30.44	9.49	753.49	39.66	ppm	11.4	BSHIRLEY
121	11/16/2010 15:39	Soil	120	Final	1209	Vernon	Back	IDX	26	6	< LOD	9.44	52.21	9.85	786.54	37.51	ppm	11.4	BSHIRLEY
122	11/16/2010 15:42	Soil	120	Final	1209	Vernon	Back	IDX	26	7	< LOD	9.32	47.4	8.84	457.4	26.88	ppm	11.4	BSHIRLEY
123	11/16/2010 15:45	Soil	120	Final	1209	Vernon	Back	IDX	26	8	< LOD	9.11	36.89	8.47	541.81	29.2	ppm	11.4	BSHIRLEY
124	11/16/2010 15:47	Soil	120	Final	1209	Vernon	Back	IDX	26	9	13.11	6.86	49.98	9.81	646.91	34.41	ppm	11.4	BSHIRLEY
125	11/16/2010 15:50	Soil	120	Final	1209	Vernon	Back	IDX	26	10	< LOD	10.47	31.61	9.36	447.24	31.37	ppm	11.4	BSHIRLEY
126	11/16/2010 15:53	Soil	120	Final	1209	Vernon	Back	IDX	26	11	< LOD	9.17	47.7	8.73	546.65	28.64	ppm	11.4	BSHIRLEY
127	11/16/2010 15:56	Soil	120	Final	1209	Vernon	Back	IDX	26	12	17.22	7.91	45.86	10.22	510.57	32.69	ppm	11.4	BSHIRLEY
128	11/16/2010 15:59	Soil	120	Final	1209	Vernon	Back	IDX	26	13	< LOD	9.58	49.74	9.44	735.51	35.16	ppm	11.4	BSHIRLEY
129	11/16/2010 16:02	Soil	120	Final	1209	Vernon	Back	IDX	26	14	21.76	6.94	13.53	6.67	239	19.75	ppm	11.4	BSHIRLEY
130	11/16/2010 16:05	Soil	120	Final	1209	Vernon	Back	IDX	26	15	14.89	8.18	29.46	9.85	379.7	30.79	ppm	11.4	BSHIRLEY
131	11/16/2010 16:07	Soil	120	Final	1209	Vernon	Back	IDX	26	16	< LOD	8.79	47.59	9.67	552.19	32.01	ppm	11.4	BSHIRLEY
132	11/16/2010 16:10	Soil	120	Final	1209	Vernon	Back	IDX	26	17	< LOD	8.16	36.32	9.21	777.65	38.53	ppm	11.4	BSHIRLEY
133	11/16/2010 16:13	Soil	120	Final	1209	Vernon	Back	IDX	26	18	< LOD	9.84	43.52	9.89	952.28	43.4	ppm	11.4	BSHIRLEY
134	11/16/2010 16:15	Soil	120	Final	1209	Vernon	Back	IDX	26	19	< LOD	9.62	38.52	9.65	796.11	39.84	ppm	11.4	BSHIRLEY
135	11/16/2010 16:18	Soil	120	Final	1209	Vernon	Back	IDX	26	20	< LOD	9.26	44.91	10.13	915.31	43.37	ppm	11.4	BSHIRLEY
126	11/16/2010 16:41	Soil	120	Final	1209	Vernon	Back	ECX	26	1	< LOD	8.16	63.05	7.81	605.81	26.52	ppm	8.3	JSTONE
127	11/16/2010 16:44	Soil	120	Final	1209	Vernon	Back	ECX	26	2	< LOD	8.38	82.05	8.72	647.5	27.68	ppm	8.3	JSTONE
128	11/16/2010 16:46	Soil	120	Final	1209	Vernon	Back	ECX	26	3	< LOD	8.12	75.56	8.43	615.1	27.01	ppm	8.3	JSTONE
129	11/16/2010 16:48	Soil	120	Final	1209	Vernon	Back	ECX	26	4	< LOD	8.08	74.2	8.39	638.13	27.46	ppm	8.3	JSTONE
130	11/16/2010 16:51	Soil	120	Final	1209	Vernon	Back	ECX	26	5	< LOD	8.42	70.92	8.22	599.53	26.65	ppm	8.3	JSTONE
139	11/16/2010 17:08	Soil	120	Final	1237	Vernon	Front	ECX	27	1	< LOD	8.64	168.7	12.82	2292.44	54.18	ppm	8.1	BSHIRLEY
140	11/16/2010 17:11	Soil	120	Final	1237	Vernon	Front	ECX	27	2	12.06	5.93	160.88	12.54	2241.08	53.31	ppm	8.1	BSHIRLEY
141	11/16/2010 17:13	Soil	120	Final	1237	Vernon	Front	ECX	27	3	< LOD	8.55	185.91	13.24	2268.42	53.43	ppm	8.1	BSHIRLEY
142	11/16/2010 17:16	Soil	120	Final	1237	Vernon	Front	ECX	27	4	< LOD	8.53	176.58	13.06	2314.86	54.41	ppm	8.1	BSHIRLEY
143	11/16/2010 17:18	Soil	120	Final	1237	Vernon	Front	ECX	27	5	10.22	5.76	179.58	13.06	2274.37	53.7	ppm	8.1	BSHIRLEY
136	11/16/2010 17:12	Soil	120	Final	1237	Vernon	Back	ECX	27	1	< LOD	8.3	176.42	12.1	1349.48	39.44	ppm	6.6	JSTONE
137	11/16/2010 17:15	Soil	120	Final	1237	Vernon	Back	ECX	27	2	< LOD	8.77	144.86	11.55	1253.85	39.56	ppm	6.6	JSTONE
138	11/16/2010 17:17	Soil	120	Final	1237	Vernon	Back	ECX	27	3	< LOD	8.24	179.62	12.42	1376.17	40.44	ppm	6.6	JSTONE
139	11/16/2010 17:19	Soil	120	Final	1237	Vernon	Back	ECX	27	4	< LOD	8.53	161.54	12.08	1280.03	39.99	ppm	6.6	JSTONE
140	11/16/2010 17:22	Soil	120	Final	1237	Vernon	Back	ECX	27	5	< LOD	8.42	157.38	11.68	1288.88	39.19	ppm	6.6	JSTONE
17	11/17/2010 9:02	Soil	120	Final	1142	Vernon	Front	ECX	28	1	< LOD	8.28	100.39	9.52	639.81	27.6	ppm	10.2	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
18	11/17/2010 9:04	Soil	120	Final	1142	Vernon	Front	ECX	28	2	< LOD	8.46	93.03	9.29	638.8	27.82	ppm	10.2	JSTONE
19	11/17/2010 9:07	Soil	120	Final	1142	Vernon	Front	ECX	28	3	< LOD	8.12	114.41	10.14	695.82	28.85	ppm	10.2	JSTONE
20	11/17/2010 9:09	Soil	120	Final	1142	Vernon	Front	ECX	28	4	< LOD	8.29	98.76	9.49	636.53	27.64	ppm	10.2	JSTONE
21	11/17/2010 9:12	Soil	120	Final	1142	Vernon	Front	ECX	28	5	< LOD	8.19	98.98	9.46	653.87	27.93	ppm	10.2	JSTONE
26	11/17/2010 9:32	Soil	120	Final	1142	Vernon	Back	ECX	28	1	< LOD	8.19	100.05	9.4	828.28	30.91	ppm	7.1	JSTONE
27	11/17/2010 9:34	Soil	120	Final	1142	Vernon	Back	ECX	28	2	< LOD	8.06	83.85	8.65	823.47	30.57	ppm	7.1	JSTONE
28	11/17/2010 9:38	Soil	120	Final	1142	Vernon	Back	ECX	28	3	< LOD	8.18	94.71	9.14	798.72	30.12	ppm	7.1	JSTONE
29	11/17/2010 9:40	Soil	120	Final	1142	Vernon	Back	ECX	28	4	< LOD	8.27	93.6	9.1	858.2	31.2	ppm	7.1	JSTONE
30	11/17/2010 9:43	Soil	120	Final	1142	Vernon	Back	ECX	28	5	< LOD	8.08	93.91	9.08	797.96	30.11	ppm	7.1	JSTONE
35	11/17/2010 10:54	Soil	120	Final	1142	Dona	Front	ECX	29	1	< LOD	8.39	130.65	10.62	1161.43	36.7	ppm	6.6	JSTONE
36	11/17/2010 10:57	Soil	120	Final	1142	Dona	Front	ECX	29	2	< LOD	8.24	127.66	10.45	1048.65	34.69	ppm	6.6	JSTONE
37	11/17/2010 11:00	Soil	120	Final	1142	Dona	Front	ECX	29	3	< LOD	8.41	138.48	10.94	1124.43	36.25	ppm	6.6	JSTONE
38	11/17/2010 11:03	Soil	120	Final	1142	Dona	Front	ECX	29	4	< LOD	8.28	148.76	11.19	1318.21	38.84	ppm	6.6	JSTONE
39	11/17/2010 11:05	Soil	120	Final	1142	Dona	Front	ECX	29	5	< LOD	8.29	132.04	10.57	1179.58	36.49	ppm	6.6	JSTONE
44	11/17/2010 11:25	Soil	120	Final	1142	Dona	Back	ECX	29	1	< LOD	8.17	58.07	7.52	572.64	25.79	ppm	8.7	JSTONE
45	11/17/2010 11:27	Soil	120	Final	1142	Dona	Back	ECX	29	2	< LOD	8.16	61.32	7.68	553.48	25.32	ppm	8.7	JSTONE
46	11/17/2010 11:30	Soil	120	Final	1142	Dona	Back	ECX	29	3	< LOD	7.97	64.94	7.84	568.42	25.71	ppm	8.7	JSTONE
47	11/17/2010 11:34	Soil	120	Final	1142	Dona	Back	ECX	29	4	< LOD	8.31	58.68	7.65	556.44	25.77	ppm	8.7	JSTONE
48	11/17/2010 11:37	Soil	120	Final	1142	Dona	Back	ECX	29	5	< LOD	8.04	65.3	7.95	566.52	25.84	ppm	8.7	JSTONE
54	11/17/2010 12:00	Soil	120	Final	1009	Dona	Front	ECX	30	1	< LOD	7.8	99.5	9.41	784.13	30.12	ppm	8	JSTONE
55	11/17/2010 13:11	Soil	120	Final	1009	Dona	Front	ECX	30	2	< LOD	8.07	104.68	9.56	831.21	30.89	ppm	8	JSTONE
56	11/17/2010 13:15	Soil	120	Final	1009	Dona	Front	ECX	30	3	< LOD	8.19	111.48	9.89	776.22	30	ppm	8	JSTONE
57	11/17/2010 13:17	Soil	120	Final	1009	Dona	Front	ECX	30	4	< LOD	8.14	98.31	9.3	802.65	30.4	ppm	8	JSTONE
58	11/17/2010 13:20	Soil	120	Final	1009	Dona	Front	ECX	30	5	< LOD	8.22	99.7	9.45	756.51	29.84	ppm	8	JSTONE
188	11/17/2010 11:03	Soil	120	Final	1009	Dona	Back	IDX	30	1	< LOD	8.57	62.5	9.11	817.03	33.52	ppm	17.8	BSHIRLEY
189	11/17/2010 11:06	Soil	120	Final	1009	Dona	Back	IDX	30	2	< LOD	7.96	68.01	9.51	1082.06	39.01	ppm	17.8	BSHIRLEY
190	11/17/2010 11:08	Soil	120	Final	1009	Dona	Back	IDX	30	3	< LOD	8.6	35.6	8.37	722.47	33.99	ppm	17.8	BSHIRLEY
191	11/17/2010 11:11	Soil	120	Final	1009	Dona	Back	IDX	30	4	< LOD	9.42	49.25	9.14	705.97	33.36	ppm	17.8	BSHIRLEY
192	11/17/2010 11:14	Soil	120	Final	1009	Dona	Back	IDX	30	5	< LOD	9.13	43.42	8.72	543.91	29.23	ppm	17.8	BSHIRLEY
193	11/17/2010 11:17	Soil	120	Final	1009	Dona	Back	IDX	30	6	< LOD	7.74	43.63	7.83	541.31	26.29	ppm	17.8	BSHIRLEY
194	11/17/2010 11:20	Soil	120	Final	1009	Dona	Back	IDX	30	7	< LOD	8.16	16.77	7.54	185.79	18.91	ppm	17.8	BSHIRLEY
195	11/17/2010 11:23	Soil	120	Final	1009	Dona	Back	IDX	30	8	< LOD	8	48.01	8.37	497.53	26.22	ppm	17.8	BSHIRLEY
196	11/17/2010 11:27	Soil	120	Final	1009	Dona	Back	IDX	30	9	< LOD	9.02	51.1	9.09	567.36	29.87	ppm	17.8	BSHIRLEY
197	11/17/2010 11:30	Soil	120	Final	1009	Dona	Back	IDX	30	10	< LOD	7.82	39.52	8.07	705.6	31.45	ppm	17.8	BSHIRLEY
198	11/17/2010 11:32	Soil	120	Final	1009	Dona	Back	IDX	30	11	22.06	7.03	43.6	8.94	339.65	24.22	ppm	17.8	BSHIRLEY
199	11/17/2010 11:35	Soil	120	Final	1009	Dona	Back	IDX	30	12	< LOD	9.69	37.53	8.47	478.05	27.76	ppm	17.8	BSHIRLEY
200	11/17/2010 11:38	Soil	120	Final	1009	Dona	Back	IDX	30	13	< LOD	9.36	42.64	8.73	596.21	30.81	ppm	17.8	BSHIRLEY
201	11/17/2010 11:42	Soil	120	Final	1009	Dona	Back	IDX	30	14	< LOD	10.12	42.34	9.03	402.73	26.51	ppm	17.8	BSHIRLEY
202	11/17/2010 11:44	Soil	120	Final	1009	Dona	Back	IDX	30	15	< LOD	9.67	35.28	8.25	331.62	23.19	ppm	17.8	BSHIRLEY
203	11/17/2010 11:47	Soil	120	Final	1009	Dona	Back	IDX	30	16	< LOD	10.85	36.09	9.27	372.6	27.19	ppm	17.8	BSHIRLEY
204	11/17/2010 11:50	Soil	120	Final	1009	Dona	Back	IDX	30	17	18.46	7.31	34.63	9	480.8	30.1	ppm	17.8	BSHIRLEY
205	11/17/2010 11:53	Soil	120	Final	1009	Dona	Back	IDX	30	18	11.1	6.46	23.06	7.46	253.23	20.42	ppm	17.8	BSHIRLEY
206	11/17/2010 11:56	Soil	120	Final	1009	Dona	Back	IDX	30	19	< LOD	9.45	34.61	8.45	398.36	25.98	ppm	17.8	BSHIRLEY
207	11/17/2010 11:59	Soil	120	Final	1009	Dona	Back	IDX	30	20	< LOD	9.33	74.16	10.36	502.81	28.53	ppm	17.8	BSHIRLEY
63	11/17/2010 13:39	Soil	120	Final	1009	Dona	Back	ECX	30	1	< LOD	8.1	64.65	8	694.43	28.7	ppm	6.2	JSTONE
64	11/17/2010 13:42	Soil	120	Final	1009	Dona	Back	ECX	30	2	< LOD	7.91	60.32	7.78	733.5	29.51	ppm	6.2	JSTONE
65	11/17/2010 13:44	Soil	120	Final	1009	Dona	Back	ECX	30	3	< LOD	8.13	62.05	7.82	626.73	27.21	ppm	6.2	JSTONE
66	11/17/2010 13:47	Soil	120	Final	1009	Dona	Back	ECX	30	4	< LOD	8.3	69.43	8.21	654.54	27.91	ppm	6.2	JSTONE
68	11/17/2010 13:50	Soil	120	Final	1009	Dona	Back	ECX	30	5	< LOD	7.89	71.05	8.21	661.07	27.87	ppm	6.2	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
212	11/17/2010 14:07	Soil	120	Final	1018	Vernon	Front	ECX	31	1	< LOD	8.33	64.86	8.97	557.16	27.02	ppm	8.3	BSHIRLEY
213	11/17/2010 14:10	Soil	120	Final	1018	Vernon	Front	ECX	31	2	< LOD	8.37	65.97	8.95	587.52	27.63	ppm	8.3	BSHIRLEY
214	11/17/2010 14:12	Soil	120	Final	1018	Vernon	Front	ECX	31	3	< LOD	8.13	53.9	8.43	559.23	27.09	ppm	8.3	BSHIRLEY
215	11/17/2010 14:15	Soil	120	Final	1018	Vernon	Front	ECX	31	4	< LOD	8.32	65.16	8.99	586.9	27.94	ppm	8.3	BSHIRLEY
216	11/17/2010 14:18	Soil	120	Final	1018	Vernon	Front	ECX	31	5	< LOD	8.24	66.43	8.97	581.12	27.51	ppm	8.3	BSHIRLEY
247	11/17/2010 16:22	Soil	120	Final	1018	Vernon	Back	ECX	31	1	< LOD	8.47	63.93	9.15	597.39	28.61	ppm	8.5	BSHIRLEY
248	11/17/2010 16:25	Soil	120	Final	1018	Vernon	Back	ECX	31	2	< LOD	8.21	58.41	8.6	621.8	28.43	ppm	8.5	BSHIRLEY
249	11/17/2010 16:27	Soil	120	Final	1018	Vernon	Back	ECX	31	3	< LOD	8.28	57.09	8.63	597.02	28.03	ppm	8.5	BSHIRLEY
250	11/17/2010 16:30	Soil	120	Final	1018	Vernon	Back	ECX	31	4	< LOD	8.32	65.25	9.06	615.16	28.57	ppm	8.5	BSHIRLEY
251	11/17/2010 16:33	Soil	120	Final	1018	Vernon	Back	ECX	31	5	< LOD	8.32	69.65	9.19	641.63	29.1	ppm	8.5	BSHIRLEY
73	11/17/2010 14:57	Soil	120	Final	1034	Vernon	Front	ECX	32	1	< LOD	8.04	77.04	8.54	468.04	23.79	ppm	6	JSTONE
74	11/17/2010 15:00	Soil	120	Final	1034	Vernon	Front	ECX	32	2	< LOD	8.1	74	8.27	423.11	22.42	ppm	6	JSTONE
75	11/17/2010 15:02	Soil	120	Final	1034	Vernon	Front	ECX	32	3	< LOD	8.03	74.67	8.29	471.99	23.52	ppm	6	JSTONE
77	11/17/2010 15:06	Soil	120	Final	1034	Vernon	Front	ECX	32	4	< LOD	7.97	80.09	8.52	463.9	23.32	ppm	6	JSTONE
78	11/17/2010 15:08	Soil	120	Final	1034	Vernon	Front	ECX	32	5	< LOD	8.01	75.61	8.41	448.94	23.08	ppm	6	JSTONE
163	11/17/2010 9:16	Soil	120	Final	1034	Vernon	Back	IDX	32	1	< LOD	8.39	48.05	8.34	523.86	27.07	ppm	16.8	BSHIRLEY
164	11/17/2010 9:20	Soil	120	Final	1034	Vernon	Back	IDX	32	2	< LOD	7.26	63.61	9.43	1090.67	39.3	ppm	16.8	BSHIRLEY
165	11/17/2010 9:26	Soil	120	Final	1034	Vernon	Back	IDX	32	3	< LOD	9.83	106.27	12.85	960.48	42.39	ppm	16.8	BSHIRLEY
166	11/17/2010 9:32	Soil	120	Final	1034	Vernon	Back	IDX	32	4	< LOD	8.17	25.9	8.01	648.45	32.71	ppm	16.8	BSHIRLEY
167	11/17/2010 9:35	Soil	120	Final	1034	Vernon	Back	IDX	32	5	< LOD	9.69	43.5	8.99	605.47	31.69	ppm	16.8	BSHIRLEY
168	11/17/2010 9:37	Soil	120	Final	1034	Vernon	Back	IDX	32	6	< LOD	9.39	21.96	7.25	283.85	21.1	ppm	16.8	BSHIRLEY
170	11/17/2010 9:41	Soil	120	Final	1034	Vernon	Back	IDX	32	7	< LOD	8.67	50.61	9.34	558.89	30.53	ppm	16.8	BSHIRLEY
171	11/17/2010 9:44	Soil	120	Final	1034	Vernon	Back	IDX	32	8	< LOD	7.7	105.31	11.28	1012.11	38.18	ppm	16.8	BSHIRLEY
172	11/17/2010 9:47	Soil	120	Final	1034	Vernon	Back	IDX	32	9	< LOD	9.14	14.74	7.46	177.38	18.94	ppm	16.8	BSHIRLEY
173	11/17/2010 9:49	Soil	120	Final	1034	Vernon	Back	IDX	32	10	< LOD	7.99	112.03	11.52	929.84	36.77	ppm	16.8	BSHIRLEY
174	11/17/2010 9:52	Soil	120	Final	1034	Vernon	Back	IDX	32	11	< LOD	8.68	169.75	14.24	1297.83	45.26	ppm	16.8	BSHIRLEY
175	11/17/2010 9:56	Soil	120	Final	1034	Vernon	Back	IDX	32	12	< LOD	8.72	52.34	9.1	587.92	30.16	ppm	16.8	BSHIRLEY
176	11/17/2010 9:59	Soil	120	Final	1034	Vernon	Back	IDX	32	13	< LOD	7.91	15.98	6.46	332.97	21.29	ppm	16.8	BSHIRLEY
177	11/17/2010 10:02	Soil	120	Final	1034	Vernon	Back	IDX	32	14	< LOD	10.87	38.7	10.1	449.06	31.55	ppm	16.8	BSHIRLEY
178	11/17/2010 10:05	Soil	120	Final	1034	Vernon	Back	IDX	32	15	< LOD	7.17	70.22	9.34	722.75	31.07	ppm	16.8	BSHIRLEY
179	11/17/2010 10:08	Soil	120	Final	1034	Vernon	Back	IDX	32	16	< LOD	8.75	132.94	12.79	1120.05	41.78	ppm	16.8	BSHIRLEY
180	11/17/2010 10:11	Soil	120	Final	1034	Vernon	Back	IDX	32	17	< LOD	9.62	100.84	12.32	1120.72	44.52	ppm	16.8	BSHIRLEY
181	11/17/2010 10:14	Soil	120	Final	1034	Vernon	Back	IDX	32	18	< LOD	7.95	90.28	10.52	1191.76	40.92	ppm	16.8	BSHIRLEY
182	11/17/2010 10:16	Soil	120	Final	1034	Vernon	Back	IDX	32	19	< LOD	8.26	32.79	8.15	406.45	25.59	ppm	16.8	BSHIRLEY
183	11/17/2010 10:19	Soil	120	Final	1034	Vernon	Back	IDX	32	20	< LOD	7.47	36.43	7.57	583.83	27.55	ppm	16.8	BSHIRLEY
83	11/17/2010 15:29	Soil	120	Final	1034	Vernon	Back	ECX	32	1	< LOD	8.1	93.28	9	588.66	25.86	ppm	4.8	JSTONE
84	11/17/2010 15:32	Soil	120	Final	1034	Vernon	Back	ECX	32	2	< LOD	8.02	99.91	9.39	586.46	26.08	ppm	4.8	JSTONE
85	11/17/2010 15:35	Soil	120	Final	1034	Vernon	Back	ECX	32	3	< LOD	7.99	97.12	9.3	563.14	25.75	ppm	4.8	JSTONE
86	11/17/2010 15:37	Soil	120	Final	1034	Vernon	Back	ECX	32	4	< LOD	7.91	89.95	9.03	594.39	26.32	ppm	4.8	JSTONE
87	11/17/2010 15:40	Soil	120	Final	1034	Vernon	Back	ECX	32	5	< LOD	8.07	89.37	8.9	561.62	25.59	ppm	4.8	JSTONE
222	11/17/2010 14:54	Soil	120	Final	1238	Vernon	Front	IDX	33	1	< LOD	8.32	97.95	10.68	1216.57	40.83	ppm	13.9	BSHIRLEY
223	11/17/2010 14:58	Soil	120	Final	1238	Vernon	Front	IDX	33	2	< LOD	7.39	37.22	8.69	704.45	34.39	ppm	13.9	BSHIRLEY
224	11/17/2010 15:01	Soil	120	Final	1238	Vernon	Front	IDX	33	3	< LOD	8.99	87.83	11.52	1212.98	45.74	ppm	13.9	BSHIRLEY
225	11/17/2010 15:04	Soil	120	Final	1238	Vernon	Front	IDX	33	4	< LOD	8.39	82.61	10.07	1180.94	40.13	ppm	13.9	BSHIRLEY
226	11/17/2010 15:07	Soil	120	Final	1238	Vernon	Front	IDX	33	5	< LOD	9.34	38.1	9.64	654.12	36.22	ppm	13.9	BSHIRLEY
227	11/17/2010 15:10	Soil	120	Final	1238	Vernon	Front	IDX	33	6	< LOD	7.94	117.26	12.22	1661.86	50.72	ppm	13.9	BSHIRLEY
228	11/17/2010 15:13	Soil	120	Final	1238	Vernon	Front	IDX	33	7	< LOD	9.38	121.96	12.6	1765.74	53.23	ppm	13.9	BSHIRLEY
229	11/17/2010 15:17	Soil	120	Final	1238	Vernon	Front	IDX	33	8	< LOD	8.58	78.18	10.07	1030.33	38.4	ppm	13.9	BSHIRLEY
230	11/17/2010 15:20	Soil	120	Final	1238	Vernon	Front	IDX	33	9	< LOD	9.49	140.85	13.19	1732.99	52.05	ppm	13.9	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
231	11/17/2010 15:23	Soil	120	Final	1238	Vernon	Front	IDX	33	10	< LOD	9.09	62.66	10.3	883.22	38.8	ppm	13.9	BSHIRLEY
232	11/17/2010 15:26	Soil	120	Final	1238	Vernon	Front	IDX	33	11	< LOD	7.44	54.89	8.54	643.25	28.96	ppm	13.9	BSHIRLEY
233	11/17/2010 15:29	Soil	120	Final	1238	Vernon	Front	IDX	33	12	< LOD	8.69	93.64	10.97	1580.68	48.44	ppm	13.9	BSHIRLEY
234	11/17/2010 15:31	Soil	120	Final	1238	Vernon	Front	IDX	33	13	< LOD	8.04	55.46	9.2	951.83	37.59	ppm	13.9	BSHIRLEY
235	11/17/2010 15:34	Soil	120	Final	1238	Vernon	Front	IDX	33	14	< LOD	7.94	64.75	9.7	1003.04	38.83	ppm	13.9	BSHIRLEY
236	11/17/2010 15:37	Soil	120	Final	1238	Vernon	Front	IDX	33	15	< LOD	8.08	35.46	8.05	702.05	32.01	ppm	13.9	BSHIRLEY
238	11/17/2010 15:40	Soil	120	Final	1238	Vernon	Front	IDX	33	16	< LOD	10.52	248.04	18.64	1349.34	51.38	ppm	13.9	BSHIRLEY
239	11/17/2010 15:43	Soil	120	Final	1238	Vernon	Front	IDX	33	17	< LOD	8.21	113.37	11.36	1275.39	42.1	ppm	13.9	BSHIRLEY
240	11/17/2010 15:46	Soil	120	Final	1238	Vernon	Front	IDX	33	18	< LOD	8.7	52.71	9.19	648.51	31.63	ppm	13.9	BSHIRLEY
241	11/17/2010 15:49	Soil	120	Final	1238	Vernon	Front	IDX	33	19	< LOD	8.47	33.95	7.89	628.39	30.12	ppm	13.9	BSHIRLEY
242	11/17/2010 15:52	Soil	120	Final	1238	Vernon	Front	IDX	33	20	< LOD	9.45	76.17	10.84	992.11	40.83	ppm	13.9	BSHIRLEY
92	11/17/2010 16:47	Soil	120	Final	1238	Vernon	Front	ECX	33	1	< LOD	8.03	145.41	10.87	1336.17	38.43	ppm	8.1	JSTONE
93	11/17/2010 16:49	Soil	120	Final	1238	Vernon	Front	ECX	33	2	< LOD	8.26	121.41	10.17	1141.72	36.12	ppm	8.1	JSTONE
94	11/17/2010 16:52	Soil	120	Final	1238	Vernon	Front	ECX	33	3	< LOD	8	110.79	9.75	1240.53	37.38	ppm	8.1	JSTONE
95	11/17/2010 16:54	Soil	120	Final	1238	Vernon	Front	ECX	33	4	< LOD	7.87	100.47	9.33	1124.08	35.43	ppm	8.1	JSTONE
96	11/17/2010 16:57	Soil	120	Final	1238	Vernon	Front	ECX	33	5	< LOD	7.79	114.05	9.78	1173.34	36.09	ppm	8.1	JSTONE
256	11/17/2010 17:10	Soil	120	Final	1238	Vernon	Back	ECX	33	1	< LOD	8.49	67.82	9.08	797.37	32.02	ppm	8.7	BSHIRLEY
257	11/17/2010 17:13	Soil	120	Final	1238	Vernon	Back	ECX	33	2	< LOD	8.55	76.67	9.4	841.05	32.82	ppm	8.7	BSHIRLEY
258	11/17/2010 17:15	Soil	120	Final	1238	Vernon	Back	ECX	33	3	< LOD	8.35	73.55	9.34	873.49	33.59	ppm	8.7	BSHIRLEY
259	11/17/2010 17:18	Soil	120	Final	1238	Vernon	Back	ECX	33	4	< LOD	8.42	75.55	9.35	850.24	32.94	ppm	8.7	BSHIRLEY
260	11/17/2010 17:21	Soil	120	Final	1238	Vernon	Back	ECX	33	5	< LOD	8.23	65.93	8.96	804.33	32.04	ppm	8.7	BSHIRLEY
17	11/18/2010 8:11	Soil	120	Final	1153	Dona	Front	IDX	34	1	24.7	12.03	224.79	26.18	1432.62	78.66	ppm	7.8	JSTONE
18	11/18/2010 8:15	Soil	120	Final	1153	Dona	Front	IDX	34	2	< LOD	17.75	174.95	25.39	1345.15	83.37	ppm	7.8	JSTONE
19	11/18/2010 8:18	Soil	120	Final	1153	Dona	Front	IDX	34	3	< LOD	9.38	265.51	19.57	3246.64	81.21	ppm	7.8	JSTONE
20	11/18/2010 8:21	Soil	120	Final	1153	Dona	Front	IDX	34	4	< LOD	6.39	150.5	12.14	2425.02	56.56	ppm	7.8	JSTONE
21	11/18/2010 8:25	Soil	120	Final	1153	Dona	Front	IDX	34	5	< LOD	8.96	252.27	17.33	2867.14	69.41	ppm	7.8	JSTONE
22	11/18/2010 8:27	Soil	120	Final	1153	Dona	Front	IDX	34	6	< LOD	8.87	268.88	17.15	3375.98	72.1	ppm	7.8	JSTONE
23	11/18/2010 8:30	Soil	120	Final	1153	Dona	Front	IDX	34	7	< LOD	12.83	203.18	24.02	2765.19	103.98	ppm	7.8	JSTONE
24	11/18/2010 8:33	Soil	120	Final	1153	Dona	Front	IDX	34	8	< LOD	9.56	221.86	17.69	3472.77	82.33	ppm	7.8	JSTONE
25	11/18/2010 8:37	Soil	120	Final	1153	Dona	Front	IDX	34	9	< LOD	8.88	172.34	13.97	2415.39	61.07	ppm	7.8	JSTONE
26	11/18/2010 8:40	Soil	120	Final	1153	Dona	Front	IDX	34	10	< LOD	9.46	215.51	14.82	2546.74	60.01	ppm	7.8	JSTONE
27	11/18/2010 8:43	Soil	120	Final	1153	Dona	Front	IDX	34	11	< LOD	13.66	195.39	21.07	1966.64	78.7	ppm	7.8	JSTONE
28	11/18/2010 8:45	Soil	120	Final	1153	Dona	Front	IDX	34	12	< LOD	8.78	356.38	19.17	3322	70.13	ppm	7.8	JSTONE
29	11/18/2010 8:49	Soil	120	Final	1153	Dona	Front	IDX	34	13	< LOD	9.84	365.1	21.2	4353.02	87.52	ppm	7.8	JSTONE
30	11/18/2010 8:52	Soil	120	Final	1153	Dona	Front	IDX	34	14	< LOD	9.55	190.58	15.48	2260.17	62.54	ppm	7.8	JSTONE
31	11/18/2010 8:56	Soil	120	Final	1153	Dona	Front	IDX	34	15	13.79	8.94	299.94	23.41	3056.28	89.01	ppm	7.8	JSTONE
32	11/18/2010 8:59	Soil	120	Final	1153	Dona	Front	IDX	34	16	< LOD	9.99	146.87	14.22	1828.15	58.17	ppm	7.8	JSTONE
33	11/18/2010 9:01	Soil	120	Final	1153	Dona	Front	IDX	34	17	< LOD	9.06	203.11	14.42	2180.19	55.48	ppm	7.8	JSTONE
34	11/18/2010 9:04	Soil	120	Final	1153	Dona	Front	IDX	34	18	< LOD	10.24	121.76	16.54	1903	74.96	ppm	7.8	JSTONE
35	11/18/2010 9:07	Soil	120	Final	1153	Dona	Front	IDX	34	19	< LOD	8.95	222.91	15.82	2069.8	56.99	ppm	7.8	JSTONE
36	11/18/2010 9:10	Soil	120	Final	1153	Dona	Front	IDX	34	20	< LOD	8.39	187.06	14.7	2161.71	58.7	ppm	7.8	JSTONE
37	11/18/2010 9:19	Soil	120	Final	1153	Dona	Front	ECX	34	1	< LOD	8.56	281.98	15.37	2993.62	59.66	ppm	3.7	JSTONE
38	11/18/2010 9:23	Soil	120	Final	1153	Dona	Front	ECX	34	2	< LOD	8.61	337.32	16.74	3431.58	63.73	ppm	3.7	JSTONE
39	11/18/2010 9:26	Soil	120	Final	1153	Dona	Front	ECX	34	3	< LOD	8.62	344.98	17.01	3155.08	61.49	ppm	3.7	JSTONE
40	11/18/2010 9:29	Soil	120	Final	1153	Dona	Front	ECX	34	4	< LOD	8.65	312.76	16.18	2944.76	59.26	ppm	3.7	JSTONE
41	11/18/2010 9:32	Soil	120	Final	1153	Dona	Front	ECX	34	5	< LOD	8.68	346.32	16.95	3213.2	61.85	ppm	3.7	JSTONE
17	11/18/2010 8:09	Soil	120	Final	1253	Dona	Back	IDX	34	1	28.18	7.85	387.61	23.76	4741.09	100.56	ppm	20.2	BSHIRLEY
18	11/18/2010 8:12	Soil	120	Final	1253	Dona	Back	IDX	34	2	< LOD	9.36	150.84	16.05	3636.43	88.6	ppm	20.2	BSHIRLEY
19	11/18/2010 8:15	Soil	120	Final	1253	Dona	Back	IDX	34	3	< LOD	7.52	135.78	13.02	3263.06	71.52	ppm	20.2	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
20	11/18/2010 8:18	Soil	120	Final	1253	Dona	Back	IDX	34	4	< LOD	6.95	113.49	10.79	2315.33	53.66	ppm	20.2	BSHIRLEY
21	11/18/2010 8:20	Soil	120	Final	1253	Dona	Back	IDX	34	5	< LOD	7.65	112.03	11.09	1485.21	44.7	ppm	20.2	BSHIRLEY
22	11/18/2010 8:24	Soil	120	Final	1253	Dona	Back	IDX	34	6	< LOD	9.71	237.05	17.49	3177.09	75.09	ppm	20.2	BSHIRLEY
23	11/18/2010 8:28	Soil	120	Final	1253	Dona	Back	IDX	34	7	< LOD	6.98	178.31	14.8	3235.2	72.56	ppm	20.2	BSHIRLEY
24	11/18/2010 8:31	Soil	120	Final	1253	Dona	Back	IDX	34	8	< LOD	10.44	188.16	17.02	2840.31	76.28	ppm	20.2	BSHIRLEY
25	11/18/2010 8:33	Soil	120	Final	1253	Dona	Back	IDX	34	9	20.54	5.96	943.94	30.77	12956.2	140.93	ppm	20.2	BSHIRLEY
26	11/18/2010 8:36	Soil	120	Final	1253	Dona	Back	IDX	34	10	28.16	6.38	447.35	21.7	5111.98	88.83	ppm	20.2	BSHIRLEY
27	11/18/2010 8:39	Soil	120	Final	1253	Dona	Back	IDX	34	11	< LOD	10.17	354.68	22.87	4218.71	94.5	ppm	20.2	BSHIRLEY
28	11/18/2010 8:42	Soil	120	Final	1253	Dona	Back	IDX	34	12	< LOD	7.77	160.67	13.14	3980.52	74.27	ppm	20.2	BSHIRLEY
29	11/18/2010 8:45	Soil	120	Final	1253	Dona	Back	IDX	34	13	< LOD	9.52	203.87	16.04	2751.89	68.51	ppm	20.2	BSHIRLEY
30	11/18/2010 8:47	Soil	120	Final	1253	Dona	Back	IDX	34	14	11.05	6.89	406.42	21.97	1419.38	50.09	ppm	20.2	BSHIRLEY
31	11/18/2010 8:50	Soil	120	Final	1253	Dona	Back	IDX	34	15	17.12	6.48	354.51	19.11	4809.04	84.34	ppm	20.2	BSHIRLEY
32	11/18/2010 8:53	Soil	120	Final	1253	Dona	Back	IDX	34	16	14.66	6.13	194.75	14	2639.26	59.72	ppm	20.2	BSHIRLEY
33	11/18/2010 8:56	Soil	120	Final	1253	Dona	Back	IDX	34	17	< LOD	7.38	42.38	7.73	874.87	32.69	ppm	20.2	BSHIRLEY
34	11/18/2010 8:59	Soil	120	Final	1253	Dona	Back	IDX	34	18	16.35	6.71	158.52	13.89	1980.23	55.84	ppm	20.2	BSHIRLEY
35	11/18/2010 9:03	Soil	120	Final	1253	Dona	Back	IDX	34	19	16.75	7.12	180.32	15.57	2738.7	69.79	ppm	20.2	BSHIRLEY
36	11/18/2010 9:06	Soil	120	Final	1253	Dona	Back	IDX	34	20	< LOD	8.77	171.1	13.56	2252.58	56.54	ppm	20.2	BSHIRLEY
37	11/18/2010 9:15	Soil	120	Final	1253	Dona	Back	ECX	34	1	15.52	5.87	717.31	24.92	4256.09	74.64	ppm	6.2	BSHIRLEY
38	11/18/2010 9:17	Soil	120	Final	1253	Dona	Back	ECX	34	2	19.51	6.01	793.78	26.15	4077.19	73.14	ppm	6.2	BSHIRLEY
39	11/18/2010 9:20	Soil	120	Final	1253	Dona	Back	ECX	34	3	14.46	5.96	589.19	22.99	4124.93	74.41	ppm	6.2	BSHIRLEY
40	11/18/2010 9:22	Soil	120	Final	1253	Dona	Back	ECX	34	4	13.91	5.78	577.25	22.54	4510.42	77.05	ppm	6.2	BSHIRLEY
41	11/18/2010 9:25	Soil	120	Final	1253	Dona	Back	ECX	34	5	21.55	6.06	628.39	23.65	4501.85	77.62	ppm	6.2	BSHIRLEY
46	11/18/2010 9:52	Soil	120	Final	1245	Dona	Front	IDX	35	1	28.29	7.46	171.84	15.1	1548.74	52.19	ppm	13	BSHIRLEY
47	11/18/2010 9:54	Soil	120	Final	1245	Dona	Front	IDX	35	2	< LOD	9.13	55.21	9.14	907.74	36.39	ppm	13	BSHIRLEY
48	11/18/2010 9:57	Soil	120	Final	1245	Dona	Front	IDX	35	3	< LOD	7.3	78.16	9.56	1406.62	42.68	ppm	13	BSHIRLEY
49	11/18/2010 10:00	Soil	120	Final	1245	Dona	Front	IDX	35	4	57.52	7.63	985.25	33.34	12864.3	148.79	ppm	13	BSHIRLEY
50	11/18/2010 10:03	Soil	120	Final	1245	Dona	Front	IDX	35	5	14.26	6.58	139.8	13.55	2114.94	59.19	ppm	13	BSHIRLEY
51	11/18/2010 10:06	Soil	120	Final	1245	Dona	Front	IDX	35	6	< LOD	8.2	132.18	11.52	2170.32	52.22	ppm	13	BSHIRLEY
52	11/18/2010 10:09	Soil	120	Final	1245	Dona	Front	IDX	35	7	< LOD	8.55	107.57	11.56	2239.17	57.31	ppm	13	BSHIRLEY
53	11/18/2010 10:11	Soil	120	Final	1245	Dona	Front	IDX	35	8	< LOD	9.03	112.29	12.36	1973.81	56.66	ppm	13	BSHIRLEY
54	11/18/2010 10:14	Soil	120	Final	1245	Dona	Front	IDX	35	9	< LOD	8.49	102.31	10.84	1448.19	44.43	ppm	13	BSHIRLEY
55	11/18/2010 10:18	Soil	120	Final	1245	Dona	Front	IDX	35	10	< LOD	8.77	116.05	11.58	2018.19	53.04	ppm	13	BSHIRLEY
56	11/18/2010 10:21	Soil	120	Final	1245	Dona	Front	IDX	35	11	< LOD	7.93	257.8	16.44	3298.01	69.47	ppm	13	BSHIRLEY
57	11/18/2010 10:24	Soil	120	Final	1245	Dona	Front	IDX	35	12	< LOD	8.53	283.1	17.48	4104.48	78.84	ppm	13	BSHIRLEY
58	11/18/2010 10:27	Soil	120	Final	1245	Dona	Front	IDX	35	13	< LOD	9.07	102.76	12.16	1937.3	57.18	ppm	13	BSHIRLEY
59	11/18/2010 10:32	Soil	120	Final	1245	Dona	Front	IDX	35	14	< LOD	8.08	89.58	10.17	1793.79	48.54	ppm	13	BSHIRLEY
60	11/18/2010 10:34	Soil	120	Final	1245	Dona	Front	IDX	35	15	< LOD	7.98	101.1	10.75	1939.83	51.11	ppm	13	BSHIRLEY
61	11/18/2010 10:37	Soil	120	Final	1245	Dona	Front	IDX	35	16	< LOD	9.56	115.96	13.28	1485.75	52.62	ppm	13	BSHIRLEY
62	11/18/2010 10:40	Soil	120	Final	1245	Dona	Front	IDX	35	17	< LOD	9.46	116.81	12.08	1081.57	40.8	ppm	13	BSHIRLEY
63	11/18/2010 10:42	Soil	120	Final	1245	Dona	Front	IDX	35	18	20.77	8.04	86.12	12.61	1099.85	48.17	ppm	13	BSHIRLEY
64	11/18/2010 10:45	Soil	120	Final	1245	Dona	Front	IDX	35	19	12.87	6.85	107.97	12.32	1248.78	45.82	ppm	13	BSHIRLEY
65	11/18/2010 10:48	Soil	120	Final	1245	Dona	Front	IDX	35	20	< LOD	8.09	73.35	10.17	1454.8	46.9	ppm	13	BSHIRLEY
66	11/18/2010 10:55	Soil	120	Final	1245	Dona	Front	ECX	35	1	< LOD	8.38	297.87	16.3	4136.31	72.22	ppm	5.8	BSHIRLEY
67	11/18/2010 10:58	Soil	120	Final	1245	Dona	Front	ECX	35	2	< LOD	8.59	288.71	16.41	4219.1	74.39	ppm	5.8	BSHIRLEY
68	11/18/2010 11:00	Soil	120	Final	1245	Dona	Front	ECX	35	3	10.77	5.72	279.29	15.96	3729.66	69.12	ppm	5.8	BSHIRLEY
69	11/18/2010 11:03	Soil	120	Final	1245	Dona	Front	ECX	35	4	11.42	5.77	253.59	15.2	3432.96	65.98	ppm	5.8	BSHIRLEY
70	11/18/2010 11:05	Soil	120	Final	1245	Dona	Front	ECX	35	5	14.46	5.85	285.71	16.03	3817.89	69.37	ppm	5.8	BSHIRLEY
47	11/18/2010 10:32	Soil	120	Final	1245	Dona	Back	IDX	35	1	< LOD	10.72	33.99	7.52	296.62	22.73	ppm	23.5	JSTONE
48	11/18/2010 10:37	Soil	120	Final	1245	Dona	Back	IDX	35	2	< LOD	9.02	36.94	7.44	433.72	26.45	ppm	23.5	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
49	11/18/2010 10:40	Soil	120	Final	1245	Dona	Back	IDX	35	3	< LOD	8.52	54.63	7.8	702.06	30.13	ppm	23.5	JSTONE
50	11/18/2010 10:43	Soil	120	Final	1245	Dona	Back	IDX	35	4	< LOD	10.14	82.51	9.85	749.12	33.58	ppm	23.5	JSTONE
51	11/18/2010 10:46	Soil	120	Final	1245	Dona	Back	IDX	35	5	< LOD	9.18	100.57	10.38	1422.05	44.35	ppm	23.5	JSTONE
52	11/18/2010 10:48	Soil	120	Final	1245	Dona	Back	IDX	35	6	< LOD	8.45	64.46	8.27	1083.24	37.16	ppm	23.5	JSTONE
53	11/18/2010 10:51	Soil	120	Final	1245	Dona	Back	IDX	35	7	< LOD	13.5	68.94	13.45	745.83	49.59	ppm	23.5	JSTONE
54	11/18/2010 10:54	Soil	120	Final	1245	Dona	Back	IDX	35	8	< LOD	10.08	45.96	8.03	506.51	28.23	ppm	23.5	JSTONE
55	11/18/2010 10:57	Soil	120	Final	1245	Dona	Back	IDX	35	9	< LOD	8.43	120.59	10.53	1640.26	44.66	ppm	23.5	JSTONE
56	11/18/2010 11:00	Soil	120	Final	1245	Dona	Back	IDX	35	10	< LOD	9.48	134.71	12.54	1643.05	50.63	ppm	23.5	JSTONE
57	11/18/2010 11:03	Soil	120	Final	1245	Dona	Back	IDX	35	11	< LOD	10.03	93.7	10.37	1070.17	39.44	ppm	23.5	JSTONE
58	11/18/2010 11:05	Soil	120	Final	1245	Dona	Back	IDX	35	12	13.96	7.28	118.37	12.3	794.02	36.88	ppm	23.5	JSTONE
59	11/18/2010 11:08	Soil	120	Final	1245	Dona	Back	IDX	35	13	< LOD	9.56	101.25	10.64	1098.59	39.88	ppm	23.5	JSTONE
60	11/18/2010 11:10	Soil	120	Final	1245	Dona	Back	IDX	35	14	< LOD	10.33	30.09	7.85	340.53	26.31	ppm	23.5	JSTONE
61	11/18/2010 11:13	Soil	120	Final	1245	Dona	Back	IDX	35	15	< LOD	10.46	9.22	5.87	65.27	13.8	ppm	23.5	JSTONE
62	11/18/2010 11:15	Soil	120	Final	1245	Dona	Back	IDX	35	16	< LOD	10.07	22.3	7.12	219.07	21.25	ppm	23.5	JSTONE
64	11/18/2010 11:20	Soil	120	Final	1245	Dona	Back	IDX	35	17	< LOD	11.26	29.68	8.32	295.35	26.8	ppm	23.5	JSTONE
65	11/18/2010 11:23	Soil	120	Final	1245	Dona	Back	IDX	35	18	< LOD	10.44	84.86	11.37	951.9	42.79	ppm	23.5	JSTONE
66	11/18/2010 11:27	Soil	120	Final	1245	Dona	Back	IDX	35	19	< LOD	9.74	73.1	9.26	864.2	35.32	ppm	23.5	JSTONE
67	11/18/2010 11:30	Soil	120	Final	1245	Dona	Back	IDX	35	20	< LOD	9.45	75.45	9.47	868.4	35.83	ppm	23.5	JSTONE
68	11/18/2010 11:43	Soil	120	Final	1245	Dona	Back	ECX	35	1	< LOD	8.21	119.19	10.19	1155.35	36.45	ppm	5.6	JSTONE
69	11/18/2010 11:45	Soil	120	Final	1245	Dona	Back	ECX	35	2	< LOD	8.16	136.84	10.87	1224.79	37.71	ppm	5.6	JSTONE
70	11/18/2010 11:48	Soil	120	Final	1245	Dona	Back	ECX	35	3	< LOD	8.17	144.78	11.07	1195.07	37.08	ppm	5.6	JSTONE
71	11/18/2010 11:52	Soil	120	Final	1245	Dona	Back	ECX	35	3	< LOD	8.36	136.37	10.74	1146.82	36.2	ppm	5.6	JSTONE
72	11/18/2010 11:55	Soil	120	Final	1245	Dona	Back	ECX	35	5	< LOD	7.48	108.41	9.33	1096.63	34.01	ppm	5.6	JSTONE
76	11/18/2010 12:15	Soil	120	Final	1242	Dona	Front	ECX	36	1	< LOD	8.26	100.55	9.66	887.29	32.75	ppm	8.1	JSTONE
77	11/18/2010 12:17	Soil	120	Final	1242	Dona	Front	ECX	36	2	< LOD	8.26	116.69	10.31	1070.96	35.9	ppm	8.1	JSTONE
78	11/18/2010 12:20	Soil	120	Final	1242	Dona	Front	ECX	36	3	< LOD	8.17	113.11	10.06	978.47	34.17	ppm	8.1	JSTONE
79	11/18/2010 12:23	Soil	120	Final	1242	Dona	Front	ECX	36	4	< LOD	8.03	101.64	9.86	933.24	34.17	ppm	8.1	JSTONE
80	11/18/2010 12:25	Soil	120	Final	1242	Dona	Front	ECX	36	5	< LOD	7.82	139.27	11.05	1163.04	37.31	ppm	8.1	JSTONE
76	11/18/2010 11:25	Soil	120	Final	1242	Dona	Back	IDX	36	1	< LOD	8.33	117	11.57	1456.72	44.92	ppm	18.9	BSHIRLEY
77	11/18/2010 11:27	Soil	120	Final	1242	Dona	Back	IDX	36	2	< LOD	9.29	61.53	10.62	775.92	38.36	ppm	18.9	BSHIRLEY
78	11/18/2010 11:31	Soil	120	Final	1242	Dona	Back	IDX	36	3	< LOD	11.65	72.5	13.41	997.51	51.59	ppm	18.9	BSHIRLEY
79	11/18/2010 11:34	Soil	120	Final	1242	Dona	Back	IDX	36	4	< LOD	9.57	44.37	9.07	756.87	35.36	ppm	18.9	BSHIRLEY
80	11/18/2010 11:36	Soil	120	Final	1242	Dona	Back	IDX	36	5	< LOD	10.05	24.88	8.16	568.44	31.73	ppm	18.9	BSHIRLEY
81	11/18/2010 11:39	Soil	120	Final	1242	Dona	Back	IDX	36	6	< LOD	8.6	110.28	10.83	1417.03	42.77	ppm	18.9	BSHIRLEY
82	11/18/2010 11:42	Soil	120	Final	1242	Dona	Back	IDX	36	7	38.55	8.17	164.63	16.16	2138.59	66.55	ppm	18.9	BSHIRLEY
83	11/18/2010 11:45	Soil	120	Final	1242	Dona	Back	IDX	36	8	< LOD	6.55	63.83	9.72	2079.24	56.26	ppm	18.9	BSHIRLEY
84	11/18/2010 11:49	Soil	120	Final	1242	Dona	Back	IDX	36	9	20.09	8.1	81.14	12.48	692.05	38.84	ppm	18.9	BSHIRLEY
85	11/18/2010 11:52	Soil	120	Final	1242	Dona	Back	IDX	36	10	15.86	7.11	79.14	10.97	654.61	33.44	ppm	18.9	BSHIRLEY
86	11/18/2010 11:56	Soil	120	Final	1242	Dona	Back	IDX	36	11	9.81	6.08	226.42	15.58	2380.64	59.1	ppm	18.9	BSHIRLEY
87	11/18/2010 11:58	Soil	120	Final	1242	Dona	Back	IDX	36	12	< LOD	9.15	147.47	12.81	1579.42	47.58	ppm	18.9	BSHIRLEY
88	11/18/2010 12:01	Soil	120	Final	1242	Dona	Back	IDX	36	13	16.56	6.56	208.35	15.94	2366.82	62.4	ppm	18.9	BSHIRLEY
89	11/18/2010 12:04	Soil	120	Final	1242	Dona	Back	IDX	36	14	< LOD	9.01	188.38	14.39	2127.76	55.99	ppm	18.9	BSHIRLEY
90	11/18/2010 12:07	Soil	120	Final	1242	Dona	Back	IDX	36	15	< LOD	8.27	122.46	12.07	2194.58	56.57	ppm	18.9	BSHIRLEY
91	11/18/2010 12:10	Soil	120	Final	1242	Dona	Back	IDX	36	16	17.71	6.5	95.46	10.96	1211.17	42.2	ppm	18.9	BSHIRLEY
92	11/18/2010 12:13	Soil	120	Final	1242	Dona	Back	IDX	36	17	16.57	6.37	113.7	11.48	1031.21	38.18	ppm	18.9	BSHIRLEY
93	11/18/2010 12:16	Soil	120	Final	1242	Dona	Back	IDX	36	18	13.32	5.91	217.7	14.33	2231.3	53.71	ppm	18.9	BSHIRLEY
94	11/18/2010 12:19	Soil	120	Final	1242	Dona	Back	IDX	36	19	16.62	6.39	121.12	11.9	919.22	36.71	ppm	18.9	BSHIRLEY
95	11/18/2010 12:21	Soil	120	Final	1242	Dona	Back	IDX	36	20	< LOD	11.29	172.89	16.86	1855.54	63.59	ppm	18.9	BSHIRLEY
96	11/18/2010 12:28	Soil	120	Final	1242	Dona	Back	ECX	36	1	< LOD	8.31	250.6	15.04	1693.82	46.37	ppm	7.9	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
97	11/18/2010 12:31	Soil	120	Final	1242	Dona	Back	ECX	36	2	< LOD	8.18	231.26	14.43	1762.8	46.94	ppm	7.9	BSHIRLEY
98	11/18/2010 12:34	Soil	120	Final	1242	Dona	Back	ECX	36	3	< LOD	8.03	221.2	13.98	1688.55	45.39	ppm	7.9	BSHIRLEY
99	11/18/2010 12:37	Soil	120	Final	1242	Dona	Back	ECX	36	4	< LOD	8.28	228.27	14.41	1750.52	46.83	ppm	7.9	BSHIRLEY
100	11/18/2010 12:40	Soil	120	Final	1242	Dona	Back	ECX	36	5	< LOD	8.28	211.6	13.88	1801.51	47.35	ppm	7.9	BSHIRLEY
86	11/18/2010 13:53	Soil	120	Final	1233	Dona	Front	IDX	37	1	< LOD	7.98	212.37	14.33	3148.48	64.92	ppm	20.7	JSTONE
87	11/18/2010 13:57	Soil	120	Final	1233	Dona	Front	IDX	37	2	< LOD	10.52	166.21	15.17	1855.24	59.35	ppm	20.7	JSTONE
88	11/18/2010 13:59	Soil	120	Final	1233	Dona	Front	IDX	37	3	< LOD	9.66	118.46	12.87	1449.09	51.76	ppm	20.7	JSTONE
89	11/18/2010 14:02	Soil	120	Final	1233	Dona	Front	IDX	37	4	< LOD	9.02	84.14	9.8	1230.61	41.83	ppm	20.7	JSTONE
90	11/18/2010 14:05	Soil	120	Final	1233	Dona	Front	IDX	37	5	< LOD	9.44	290.01	18.2	4675.93	86.84	ppm	20.7	JSTONE
91	11/18/2010 14:08	Soil	120	Final	1233	Dona	Front	IDX	37	6	< LOD	8.96	130.2	11.56	1834.84	49.95	ppm	20.7	JSTONE
92	11/18/2010 14:12	Soil	120	Final	1233	Dona	Front	IDX	37	7	< LOD	10.14	95.29	11.01	1082.51	41.98	ppm	20.7	JSTONE
93	11/18/2010 14:15	Soil	120	Final	1233	Dona	Front	IDX	37	8	< LOD	8.32	98.95	10.72	1470.17	46.91	ppm	20.7	JSTONE
94	11/18/2010 14:18	Soil	120	Final	1233	Dona	Front	IDX	37	9	< LOD	7.98	196.39	13.32	2832.25	59.49	ppm	20.7	JSTONE
95	11/18/2010 14:28	Soil	120	Final	1233	Dona	Front	IDX	37	10	< LOD	10.03	13.89	5.91	210.7	19.7	ppm	20.7	JSTONE
96	11/18/2010 14:31	Soil	120	Final	1233	Dona	Front	IDX	37	11	< LOD	10.25	24.89	6.8	286.91	22.51	ppm	20.7	JSTONE
97	11/18/2010 14:34	Soil	120	Final	1233	Dona	Front	IDX	37	12	< LOD	9.48	144.39	13.42	2386.25	63.01	ppm	20.7	JSTONE
98	11/18/2010 14:37	Soil	120	Final	1233	Dona	Front	IDX	37	13	< LOD	8.26	129.22	11.94	2154.27	55.87	ppm	20.7	JSTONE
99	11/18/2010 14:39	Soil	120	Final	1233	Dona	Front	IDX	37	14	< LOD	9.68	86.72	10.98	1409.27	49.39	ppm	20.7	JSTONE
100	11/18/2010 14:42	Soil	120	Final	1233	Dona	Front	IDX	37	15	< LOD	9.26	43.35	8.65	555.61	32.18	ppm	20.7	JSTONE
101	11/18/2010 14:46	Soil	120	Final	1233	Dona	Front	IDX	37	16	< LOD	8.54	147.33	11.92	1689.42	47.19	ppm	20.7	JSTONE
102	11/18/2010 14:49	Soil	120	Final	1233	Dona	Front	IDX	37	17	< LOD	9.56	105.93	11.67	1314.93	46.76	ppm	20.7	JSTONE
103	11/18/2010 14:53	Soil	120	Final	1233	Dona	Front	IDX	37	18	< LOD	12.06	95.86	13.66	1037.41	51.04	ppm	20.7	JSTONE
104	11/18/2010 14:56	Soil	120	Final	1233	Dona	Front	IDX	37	19	< LOD	9.66	153.28	13.34	1420.08	47.21	ppm	20.7	JSTONE
105	11/18/2010 14:59	Soil	120	Final	1233	Dona	Front	IDX	37	20	11.05	6.74	203.73	14.92	2455.36	60.77	ppm	20.7	JSTONE
106	11/18/2010 15:07	Soil	120	Final	1233	Dona	Front	ECX	37	1	< LOD	8.65	259.85	14.78	3577.15	64.97	ppm	5.8	JSTONE
107	11/18/2010 15:10	Soil	120	Final	1233	Dona	Front	ECX	37	2	< LOD	8.47	240.51	14.15	3208.36	60.99	ppm	5.8	JSTONE
108	11/18/2010 15:14	Soil	120	Final	1233	Dona	Front	ECX	37	3	< LOD	8.57	229.5	13.96	3060.35	60.21	ppm	5.8	JSTONE
109	11/18/2010 15:18	Soil	120	Final	1233	Dona	Front	ECX	37	4	< LOD	8.62	245.51	14.36	3182.54	61.37	ppm	5.8	JSTONE
110	11/18/2010 15:20	Soil	120	Final	1233	Dona	Front	ECX	37	5	< LOD	8.27	254.05	14.5	3397.19	62.86	ppm	5.8	JSTONE
106	11/18/2010 13:58	Soil	120	Final	1233	Dona	Back	IDX	37	1	19.18	7.06	71.6	10.84	1241.26	46.29	ppm	16.8	BSHIRLEY
107	11/18/2010 14:01	Soil	120	Final	1233	Dona	Back	IDX	37	2	< LOD	8.35	83.69	10.39	1316.22	43.47	ppm	16.8	BSHIRLEY
108	11/18/2010 14:04	Soil	120	Final	1233	Dona	Back	IDX	37	3	< LOD	7.03	131.09	11.69	2208.96	53.62	ppm	16.8	BSHIRLEY
109	11/18/2010 14:08	Soil	120	Final	1233	Dona	Back	IDX	37	4	< LOD	6.86	118.72	10.39	2232.9	49.85	ppm	16.8	BSHIRLEY
110	11/18/2010 14:10	Soil	120	Final	1233	Dona	Back	IDX	37	5	< LOD	9.47	162.66	15.33	1871.46	59.24	ppm	16.8	BSHIRLEY
111	11/18/2010 14:13	Soil	120	Final	1233	Dona	Back	IDX	37	6	< LOD	9.27	53.07	9.46	1057.85	41.04	ppm	16.8	BSHIRLEY
112	11/18/2010 14:16	Soil	120	Final	1233	Dona	Back	IDX	37	7	21.59	6.37	119.52	11.72	1587.24	47.22	ppm	16.8	BSHIRLEY
113	11/18/2010 14:19	Soil	120	Final	1233	Dona	Back	IDX	37	8	< LOD	8.27	59.04	9.22	1300.65	43.04	ppm	16.8	BSHIRLEY
114	11/18/2010 14:22	Soil	120	Final	1233	Dona	Back	IDX	37	9	< LOD	9.23	67.83	10.36	716.94	34.59	ppm	16.8	BSHIRLEY
115	11/18/2010 14:27	Soil	120	Final	1233	Dona	Back	IDX	37	10	14.08	6.23	128.1	12.12	1579.58	47.47	ppm	16.8	BSHIRLEY
116	11/18/2010 14:29	Soil	120	Final	1233	Dona	Back	IDX	37	11	< LOD	8.47	79.79	10.59	1452.16	47.37	ppm	16.8	BSHIRLEY
117	11/18/2010 14:32	Soil	120	Final	1233	Dona	Back	IDX	37	12	< LOD	7.49	54.81	8.51	1206.08	39.05	ppm	16.8	BSHIRLEY
118	11/18/2010 14:35	Soil	120	Final	1233	Dona	Back	IDX	37	13	< LOD	9.21	71.62	10.38	1216.81	44.08	ppm	16.8	BSHIRLEY
119	11/18/2010 14:38	Soil	120	Final	1233	Dona	Back	IDX	37	14	22.76	6.64	253.59	17.24	2736.98	66.64	ppm	16.8	BSHIRLEY
120	11/18/2010 14:40	Soil	120	Final	1233	Dona	Back	IDX	37	15	< LOD	8.52	124.56	11.79	1619.09	47.31	ppm	16.8	BSHIRLEY
121	11/18/2010 14:43	Soil	120	Final	1233	Dona	Back	IDX	37	16	< LOD	9.49	64.09	9.94	507.84	28.91	ppm	16.8	BSHIRLEY
123	11/18/2010 14:49	Soil	120	Final	1233	Dona	Back	IDX	37	17	< LOD	10.65	12.2	7.54	209.99	20.77	ppm	16.8	BSHIRLEY
125	11/18/2010 14:52	Soil	120	Final	1233	Dona	Back	IDX	37	18	16.59	6.46	153.45	13.3	2403.22	59.82	ppm	16.8	BSHIRLEY
126	11/18/2010 14:55	Soil	120	Final	1233	Dona	Back	IDX	37	19	< LOD	8.42	107.12	10.74	2075.47	51.58	ppm	16.8	BSHIRLEY
127	11/18/2010 14:59	Soil	120	Final	1233	Dona	Back	IDX	37	20	< LOD	7.68	145.94	11.83	2276.06	52.75	ppm	16.8	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
128	11/18/2010 15:10	Soil	120	Final	1233	Dona	Back	ECX	37	1	8.78	5.62	287.37	16.05	4172.68	72.53	ppm	4.2	BSHIRLEY
129	11/18/2010 15:13	Soil	120	Final	1233	Dona	Back	ECX	37	2	15.18	5.74	335.15	17.39	4217.87	73.91	ppm	4.2	BSHIRLEY
130	11/18/2010 15:16	Soil	120	Final	1233	Dona	Back	ECX	37	3	15.61	5.76	341.99	17.66	4505.78	76.68	ppm	4.2	BSHIRLEY
131	11/18/2010 15:19	Soil	120	Final	1233	Dona	Back	ECX	37	4	16.35	5.87	379.34	18.64	4479.16	77.09	ppm	4.2	BSHIRLEY
132	11/18/2010 15:21	Soil	120	Final	1233	Dona	Back	ECX	37	5	14.18	5.67	377.14	18.03	4474.16	74.87	ppm	4.2	BSHIRLEY
116	11/18/2010 16:16	Soil	120	Final	1025	Golla	Front	IDX	38	1	< LOD	14.02	80.19	13.05	429.33	34.89	ppm	18.9	JSTONE
117	11/18/2010 16:19	Soil	120	Final	1025	Golla	Front	IDX	38	2	< LOD	9.62	70.72	9.22	406.36	25.12	ppm	18.9	JSTONE
118	11/18/2010 16:22	Soil	120	Final	1025	Golla	Front	IDX	38	3	< LOD	9.76	99.83	10.74	526.6	28.46	ppm	18.9	JSTONE
119	11/18/2010 16:24	Soil	120	Final	1025	Golla	Front	IDX	38	4	< LOD	9.57	53.83	8.85	517.42	29.56	ppm	18.9	JSTONE
120	11/18/2010 16:27	Soil	120	Final	1025	Golla	Front	IDX	38	5	14.72	7.85	62.14	9.91	426.63	28.69	ppm	18.9	JSTONE
121	11/18/2010 16:31	Soil	120	Final	1025	Golla	Front	IDX	38	6	< LOD	13.13	49.82	9.24	352.35	26.84	ppm	18.9	JSTONE
122	11/18/2010 16:34	Soil	120	Final	1025	Golla	Front	IDX	38	7	< LOD	9.96	57.02	8.5	490.15	27.28	ppm	18.9	JSTONE
124	11/18/2010 16:37	Soil	120	Final	1025	Golla	Front	IDX	38	8	< LOD	10.63	94.06	12.28	672.31	38.09	ppm	18.9	JSTONE
125	11/18/2010 16:39	Soil	120	Final	1025	Golla	Front	IDX	38	9	< LOD	12.82	112.72	16.31	793.55	50.27	ppm	18.9	JSTONE
126	11/18/2010 16:42	Soil	120	Final	1025	Golla	Front	IDX	38	10	< LOD	9.42	99.71	11.17	893.2	38.12	ppm	18.9	JSTONE
127	11/18/2010 16:45	Soil	120	Final	1025	Golla	Front	IDX	38	11	< LOD	10.81	79.47	10.95	628.34	34.9	ppm	18.9	JSTONE
128	11/18/2010 16:47	Soil	120	Final	1025	Golla	Front	IDX	38	12	17.03	7.37	105.63	11.51	741.61	34.75	ppm	18.9	JSTONE
129	11/18/2010 16:50	Soil	120	Final	1025	Golla	Front	IDX	38	13	< LOD	17.99	86.93	17.35	591.75	52.25	ppm	18.9	JSTONE
130	11/18/2010 16:53	Soil	120	Final	1025	Golla	Front	IDX	38	14	< LOD	9.01	84.23	9.7	626.05	29.84	ppm	18.9	JSTONE
131	11/18/2010 16:56	Soil	120	Final	1025	Golla	Front	IDX	38	15	< LOD	14.34	75.58	15.23	469.62	42.98	ppm	18.9	JSTONE
132	11/18/2010 16:59	Soil	120	Final	1025	Golla	Front	IDX	38	16	< LOD	9.25	142.98	12.17	1054.29	38.41	ppm	18.9	JSTONE
133	11/18/2010 17:02	Soil	120	Final	1025	Golla	Front	IDX	38	17	16.16	6.07	158.31	12.21	2042.95	51.15	ppm	18.9	JSTONE
134	11/18/2010 17:04	Soil	120	Final	1025	Golla	Front	IDX	38	18	< LOD	9.07	181.82	14.74	1176.36	44.16	ppm	18.9	JSTONE
135	11/18/2010 17:07	Soil	120	Final	1025	Golla	Front	IDX	38	19	< LOD	8.22	95.17	9.94	921.72	35.18	ppm	18.9	JSTONE
136	11/18/2010 17:10	Soil	120	Final	1025	Golla	Front	IDX	38	20	< LOD	12.35	54.53	10.77	293.79	27.53	ppm	18.9	JSTONE
137	11/18/2010 17:19	Soil	120	Final	1025	Golla	Front	ECX	38	1	< LOD	8.38	118.98	10.21	764.76	29.99	ppm	5.1	JSTONE
138	11/18/2010 17:22	Soil	120	Final	1025	Golla	Front	ECX	38	2	< LOD	8.59	113.36	10.03	780.25	30.28	ppm	5.1	JSTONE
139	11/18/2010 17:25	Soil	120	Final	1025	Golla	Front	ECX	38	3	< LOD	8.08	115.06	10.08	720.63	29.17	ppm	5.1	JSTONE
140	11/18/2010 17:27	Soil	120	Final	1025	Golla	Front	ECX	38	4	< LOD	8.39	125.34	10.37	749.31	29.56	ppm	5.1	JSTONE
141	11/18/2010 17:30	Soil	120	Final	1025	Golla	Front	ECX	38	5	< LOD	8.33	116.25	10.17	772.86	30.3	ppm	5.1	JSTONE
138	11/18/2010 16:19	Soil	120	Final	1025	Golla	Back	IDX	38	1	< LOD	9.75	25.92	7.83	397.88	25.6	ppm	17.8	BSHIRLEY
139	11/18/2010 16:22	Soil	120	Final	1025	Golla	Back	IDX	38	2	< LOD	8.45	70.65	9.63	577.02	28.7	ppm	17.8	BSHIRLEY
140	11/18/2010 16:25	Soil	120	Final	1025	Golla	Back	IDX	38	3	< LOD	9.94	56.12	9.31	337.53	23.34	ppm	17.8	BSHIRLEY
141	11/18/2010 16:28	Soil	120	Final	1025	Golla	Back	IDX	38	4	< LOD	9.4	79.53	10.22	336.67	22.88	ppm	17.8	BSHIRLEY
142	11/18/2010 16:30	Soil	120	Final	1025	Golla	Back	IDX	38	5	20.2	7.58	64.06	10.68	438.79	29.02	ppm	17.8	BSHIRLEY
143	11/18/2010 16:33	Soil	120	Final	1025	Golla	Back	IDX	38	6	< LOD	9.42	97.89	11.84	785.35	36.61	ppm	17.8	BSHIRLEY
144	11/18/2010 16:36	Soil	120	Final	1025	Golla	Back	IDX	38	7	< LOD	8.97	68.17	9.44	549.38	28.04	ppm	17.8	BSHIRLEY
145	11/18/2010 16:39	Soil	120	Final	1025	Golla	Back	IDX	38	8	11.54	6.78	52.22	9.71	598.39	32.39	ppm	17.8	BSHIRLEY
146	11/18/2010 16:42	Soil	120	Final	1025	Golla	Back	IDX	38	9	< LOD	8.96	72.79	9.99	847.54	35.21	ppm	17.8	BSHIRLEY
147	11/18/2010 16:45	Soil	120	Final	1025	Golla	Back	IDX	38	10	< LOD	9.54	94.33	10.85	493.93	27.31	ppm	17.8	BSHIRLEY
148	11/18/2010 16:49	Soil	120	Final	1025	Golla	Back	IDX	38	11	< LOD	8.32	73.54	9.49	408.05	23.85	ppm	17.8	BSHIRLEY
149	11/18/2010 16:52	Soil	120	Final	1025	Golla	Back	IDX	38	12	< LOD	8.65	80.3	10.09	865.95	35.03	ppm	17.8	BSHIRLEY
150	11/18/2010 16:55	Soil	120	Final	1025	Golla	Back	IDX	38	13	< LOD	9.2	126.47	12.57	863.67	37	ppm	17.8	BSHIRLEY
151	11/18/2010 16:58	Soil	120	Final	1025	Golla	Back	IDX	38	14	< LOD	9.01	99.99	11.11	584.32	29.58	ppm	17.8	BSHIRLEY
152	11/18/2010 17:02	Soil	120	Final	1025	Golla	Back	IDX	38	15	< LOD	8.87	119.37	11.41	642.6	29.8	ppm	17.8	BSHIRLEY
153	11/18/2010 17:04	Soil	120	Final	1025	Golla	Back	IDX	38	16	< LOD	9.27	55.13	9.13	497.8	27.47	ppm	17.8	BSHIRLEY
154	11/18/2010 17:07	Soil	120	Final	1025	Golla	Back	IDX	38	17	< LOD	7.8	60.2	9.2	615.26	29.91	ppm	17.8	BSHIRLEY
155	11/18/2010 17:10	Soil	120	Final	1025	Golla	Back	IDX	38	18	< LOD	9.05	52.49	8.63	715.69	31.41	ppm	17.8	BSHIRLEY
156	11/18/2010 17:13	Soil	120	Final	1025	Golla	Back	IDX	38	19	23.93	8.46	30.81	9.34	187.01	21.28	ppm	17.8	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
157	11/18/2010 17:15	Soil	120	Final	1025	Golla	Back	IDX	38	20	< LOD	9	64.45	9.36	338.45	22.51	ppm	17.8	BSHIRLEY
162	11/18/2010 17:22	Soil	120	Final	1025	Golla	Back	ECX	38	1	< LOD	8.44	88.51	9.86	552.04	26.7	ppm	6.6	BSHIRLEY
163	11/18/2010 17:25	Soil	120	Final	1025	Golla	Back	ECX	38	2	< LOD	8.14	83.84	9.6	572.39	26.99	ppm	6.6	BSHIRLEY
164	11/18/2010 17:27	Soil	120	Final	1025	Golla	Back	ECX	38	3	< LOD	8.37	88.68	9.72	551.38	26.29	ppm	6.6	BSHIRLEY
165	11/18/2010 17:30	Soil	120	Final	1025	Golla	Back	ECX	38	4	< LOD	8.57	87.17	9.81	603.77	28.01	ppm	6.6	BSHIRLEY
166	11/18/2010 17:32	Soil	120	Final	1025	Golla	Back	ECX	38	5	< LOD	8.38	86.8	9.66	595.42	27.31	ppm	6.6	BSHIRLEY
17	11/19/2010 8:03	Soil	120	Final	1234	Dona	Front	IDX	39	1	< LOD	8.91	226.88	16.34	2082.13	58.26	ppm	21.4	BSHIRLEY
18	11/19/2010 8:07	Soil	120	Final	1234	Dona	Front	IDX	39	2	< LOD	5.87	90.78	9.84	1829.95	47.44	ppm	21.4	BSHIRLEY
19	11/19/2010 8:10	Soil	120	Final	1234	Dona	Front	IDX	39	3	< LOD	8.08	182.79	14.62	2268.5	59.45	ppm	21.4	BSHIRLEY
20	11/19/2010 8:13	Soil	120	Final	1234	Dona	Front	IDX	39	4	19.84	7.65	111.23	13.25	659.18	36.05	ppm	21.4	BSHIRLEY
21	11/19/2010 8:16	Soil	120	Final	1234	Dona	Front	IDX	39	5	< LOD	7.38	255.77	15.33	3001.39	61.83	ppm	21.4	BSHIRLEY
22	11/19/2010 8:18	Soil	120	Final	1234	Dona	Front	IDX	39	6	< LOD	7.68	240.07	14.92	2479.41	56.52	ppm	21.4	BSHIRLEY
23	11/19/2010 8:21	Soil	120	Final	1234	Dona	Front	IDX	39	7	< LOD	5.96	150.15	11.1	2597.29	52.45	ppm	21.4	BSHIRLEY
24	11/19/2010 8:24	Soil	120	Final	1234	Dona	Front	IDX	39	8	< LOD	7.61	223.04	14.94	3094.27	65.21	ppm	21.4	BSHIRLEY
25	11/19/2010 8:27	Soil	120	Final	1234	Dona	Front	IDX	39	9	< LOD	7.36	228.56	14.81	3680.47	69.61	ppm	21.4	BSHIRLEY
26	11/19/2010 8:30	Soil	120	Final	1234	Dona	Front	IDX	39	10	< LOD	7.05	193.93	14.03	3225.49	66.35	ppm	21.4	BSHIRLEY
27	11/19/2010 8:33	Soil	120	Final	1234	Dona	Front	IDX	39	11	< LOD	9.84	257.48	18.09	2544.73	67.23	ppm	21.4	BSHIRLEY
28	11/19/2010 8:36	Soil	120	Final	1234	Dona	Front	IDX	39	12	< LOD	7.76	163.45	12.33	1478.24	42.62	ppm	21.4	BSHIRLEY
29	11/19/2010 8:38	Soil	120	Final	1234	Dona	Front	IDX	39	13	< LOD	7.69	142.68	11.41	1914.71	47.22	ppm	21.4	BSHIRLEY
30	11/19/2010 8:42	Soil	120	Final	1234	Dona	Front	IDX	39	14	< LOD	7.08	114.84	11.93	2004.59	54.67	ppm	21.4	BSHIRLEY
31	11/19/2010 8:45	Soil	120	Final	1234	Dona	Front	IDX	39	15	< LOD	6.46	156.99	12.26	3355.35	64.23	ppm	21.4	BSHIRLEY
32	11/19/2010 8:49	Soil	120	Final	1234	Dona	Front	IDX	39	16	8.57	5.58	403.97	19.14	3193.07	65.09	ppm	21.4	BSHIRLEY
33	11/19/2010 8:52	Soil	120	Final	1234	Dona	Front	IDX	39	17	< LOD	7.8	275.38	16.98	3151.42	68.19	ppm	21.4	BSHIRLEY
34	11/19/2010 8:55	Soil	120	Final	1234	Dona	Front	IDX	39	18	< LOD	6.44	124.63	11.28	2261.18	53.52	ppm	21.4	BSHIRLEY
35	11/19/2010 8:58	Soil	120	Final	1234	Dona	Front	IDX	39	19	< LOD	10.8	251.99	18.67	2705.92	72.07	ppm	21.4	BSHIRLEY
36	11/19/2010 9:01	Soil	120	Final	1234	Dona	Front	IDX	39	20	< LOD	7.34	198.53	13.83	2048.34	51.74	ppm	21.4	BSHIRLEY
37	11/19/2010 9:08	Soil	120	Final	1234	Dona	Front	ECX	39	1	20.93	5.97	329.49	17.05	2507.81	56.42	ppm	5.8	BSHIRLEY
38	11/19/2010 9:10	Soil	120	Final	1234	Dona	Front	ECX	39	2	22.04	5.9	353.02	17.74	2881.15	60.85	ppm	5.8	BSHIRLEY
39	11/19/2010 9:13	Soil	120	Final	1234	Dona	Front	ECX	39	3	19.97	5.97	345.34	17.5	2631.9	58.1	ppm	5.8	BSHIRLEY
40	11/19/2010 9:16	Soil	120	Final	1234	Dona	Front	ECX	39	4	16.64	5.8	329.33	17.12	2541.43	56.95	ppm	5.8	BSHIRLEY
41	11/19/2010 9:18	Soil	120	Final	1234	Dona	Front	ECX	39	5	17.11	5.87	384.67	18.64	2841.95	61.1	ppm	5.8	BSHIRLEY
18	11/19/2010 8:19	Soil	120	Final	1234	Dona	Back	IDX	39	1	< LOD	11.38	192.06	16.51	941.85	43.61	ppm	12.6	JSTONE
19	11/19/2010 8:22	Soil	120	Final	1234	Dona	Back	IDX	39	2	< LOD	9.8	153.66	13.37	1144.27	42.69	ppm	12.6	JSTONE
20	11/19/2010 8:26	Soil	120	Final	1234	Dona	Back	IDX	39	3	< LOD	11.51	65.67	10.67	846.27	41.94	ppm	12.6	JSTONE
21	11/19/2010 8:29	Soil	120	Final	1234	Dona	Back	IDX	39	4	< LOD	8.41	157.46	13.14	1425.76	46.21	ppm	12.6	JSTONE
22	11/19/2010 8:32	Soil	120	Final	1234	Dona	Back	IDX	39	5	< LOD	11	94.5	12.77	1003.2	47.23	ppm	12.6	JSTONE
23	11/19/2010 8:34	Soil	120	Final	1234	Dona	Back	IDX	39	6	< LOD	8.72	120.19	13.76	1176.42	49.57	ppm	12.6	JSTONE
24	11/19/2010 8:37	Soil	120	Final	1234	Dona	Back	IDX	39	7	< LOD	9.28	121.31	11.49	1340.99	43.96	ppm	12.6	JSTONE
25	11/19/2010 8:40	Soil	120	Final	1234	Dona	Back	IDX	39	8	10.87	6.48	194.93	14.13	1611.33	47.83	ppm	12.6	JSTONE
26	11/19/2010 8:43	Soil	120	Final	1234	Dona	Back	IDX	39	9	< LOD	10.96	201.51	16.95	1150.32	48	ppm	12.6	JSTONE
27	11/19/2010 8:46	Soil	120	Final	1234	Dona	Back	IDX	39	10	< LOD	7.21	112.63	9.94	1411.06	40.33	ppm	12.6	JSTONE
28	11/19/2010 8:49	Soil	120	Final	1234	Dona	Back	IDX	39	11	< LOD	7.09	113.1	10.05	940.41	33.33	ppm	12.6	JSTONE
29	11/19/2010 8:52	Soil	120	Final	1234	Dona	Back	IDX	39	12	< LOD	7.96	88.01	9.92	1016.77	37.95	ppm	12.6	JSTONE
30	11/19/2010 8:56	Soil	120	Final	1234	Dona	Back	IDX	39	13	< LOD	9.62	94.44	12.29	1256.9	50.85	ppm	12.6	JSTONE
31	11/19/2010 8:59	Soil	120	Final	1234	Dona	Back	IDX	39	14	< LOD	10.35	151.38	13.9	989.2	41.68	ppm	12.6	JSTONE
32	11/19/2010 9:02	Soil	120	Final	1234	Dona	Back	IDX	39	15	< LOD	10.12	69.2	9.57	483.84	28.35	ppm	12.6	JSTONE
33	11/19/2010 9:06	Soil	120	Final	1234	Dona	Back	IDX	39	16	< LOD	9.21	128.15	12.12	1306.42	44.59	ppm	12.6	JSTONE
34	11/19/2010 9:09	Soil	120	Final	1234	Dona	Back	IDX	39	17	< LOD	9.87	84.81	12.89	957.83	48.38	ppm	12.6	JSTONE
35	11/19/2010 9:12	Soil	120	Final	1234	Dona	Back	IDX	39	18	< LOD	7.07	58.08	7.82	761.88	31	ppm	12.6	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
37	11/19/2010 9:15	Soil	120	Final	1234	Dona	Back	IDX	39	19	< LOD	9.97	46.55	7.85	506.04	27.4	ppm	12.6	JSTONE
38	11/19/2010 9:18	Soil	120	Final	1234	Dona	Back	IDX	39	20	< LOD	9.49	45.74	7.73	403.25	24.54	ppm	12.6	JSTONE
40	11/19/2010 10:05	Soil	120	Final	1234	Dona	Back	ECX	39	1	< LOD	8.17	214.13	13.5	1046.47	35.5	ppm	6.2	JSTONE
41	11/19/2010 10:07	Soil	120	Final	1234	Dona	Back	ECX	39	2	< LOD	8.24	165.57	11.83	1000.24	34.22	ppm	6.2	JSTONE
42	11/19/2010 10:09	Soil	120	Final	1234	Dona	Back	ECX	39	3	< LOD	8.32	158.34	11.66	922.26	33.04	ppm	6.2	JSTONE
44	11/19/2010 10:12	Soil	120	Final	1234	Dona	Back	ECX	39	4	< LOD	8.28	167.92	11.91	1030.54	34.71	ppm	6.2	JSTONE
45	11/19/2010 10:14	Soil	120	Final	1234	Dona	Back	ECX	39	5	< LOD	8.18	162.22	11.77	1042.5	35.08	ppm	6.2	JSTONE
51	11/19/2010 10:43	Soil	120	Final	1117	Dona	Front	IDX	40	1	< LOD	10.7	84.83	10.77	520.45	30.26	ppm	13.5	JSTONE
52	11/19/2010 10:47	Soil	120	Final	1117	Dona	Front	IDX	40	2	< LOD	8.99	82.59	9.77	571.83	28.97	ppm	13.5	JSTONE
53	11/19/2010 10:49	Soil	120	Final	1117	Dona	Front	IDX	40	3	< LOD	9.05	88.66	9.74	388.21	23.39	ppm	13.5	JSTONE
54	11/19/2010 10:53	Soil	120	Final	1117	Dona	Front	IDX	40	4	13.89	8.06	53.51	9.69	226.74	22.57	ppm	13.5	JSTONE
55	11/19/2010 10:56	Soil	120	Final	1117	Dona	Front	IDX	40	5	< LOD	8.59	66.54	8.57	606.8	28.52	ppm	13.5	JSTONE
56	11/19/2010 11:00	Soil	120	Final	1117	Dona	Front	IDX	40	6	< LOD	8.58	85.84	9.81	891.22	35.61	ppm	13.5	JSTONE
57	11/19/2010 11:03	Soil	120	Final	1117	Dona	Front	IDX	40	7	< LOD	13.85	57.13	12.41	440.04	38.2	ppm	13.5	JSTONE
58	11/19/2010 11:06	Soil	120	Final	1117	Dona	Front	IDX	40	8	< LOD	9.95	87.59	10.49	783.45	35.58	ppm	13.5	JSTONE
59	11/19/2010 11:08	Soil	120	Final	1117	Dona	Front	IDX	40	9	< LOD	8.49	44.97	7.71	370.54	23.68	ppm	13.5	JSTONE
60	11/19/2010 11:11	Soil	120	Final	1117	Dona	Front	IDX	40	10	< LOD	7.89	41.84	6.98	463.38	24.67	ppm	13.5	JSTONE
61	11/19/2010 11:14	Soil	120	Final	1117	Dona	Front	IDX	40	11	< LOD	9.21	91.6	11.09	1072.95	42.71	ppm	13.5	JSTONE
62	11/19/2010 11:17	Soil	120	Final	1117	Dona	Front	IDX	40	12	< LOD	8.55	105.86	10.75	1165.08	40.62	ppm	13.5	JSTONE
63	11/19/2010 11:19	Soil	120	Final	1117	Dona	Front	IDX	40	13	< LOD	8.56	136.54	13.7	1508.53	52.59	ppm	13.5	JSTONE
64	11/19/2010 11:22	Soil	120	Final	1117	Dona	Front	IDX	40	14	< LOD	8.16	109.72	10.51	1253.49	40.67	ppm	13.5	JSTONE
65	11/19/2010 11:25	Soil	120	Final	1117	Dona	Front	IDX	40	15	< LOD	8.2	112.56	11.02	1427.28	44.82	ppm	13.5	JSTONE
66	11/19/2010 11:28	Soil	120	Final	1117	Dona	Front	IDX	40	16	< LOD	11.26	87.91	11.36	783.46	38.33	ppm	13.5	JSTONE
67	11/19/2010 11:30	Soil	120	Final	1117	Dona	Front	IDX	40	17	< LOD	10.09	83.54	10.29	634.78	32.08	ppm	13.5	JSTONE
68	11/19/2010 11:33	Soil	120	Final	1117	Dona	Front	IDX	40	18	< LOD	8.33	117.46	10.74	1291.58	40.89	ppm	13.5	JSTONE
69	11/19/2010 11:36	Soil	120	Final	1117	Dona	Front	IDX	40	19	< LOD	10.77	131.74	13.32	1073.14	44.18	ppm	13.5	JSTONE
70	11/19/2010 11:39	Soil	120	Final	1117	Dona	Front	IDX	40	20	< LOD	8.52	146.77	12.26	1333.34	43.18	ppm	13.5	JSTONE
71	11/19/2010 11:58	Soil	120	Final	1117	Dona	Front	ECX	40	1	< LOD	8.27	108.27	9.8	862.69	31.71	ppm	5.6	JSTONE
72	11/19/2010 12:00	Soil	120	Final	1117	Dona	Front	ECX	40	2	< LOD	8.15	109.67	9.83	883.92	31.97	ppm	5.6	JSTONE
73	11/19/2010 12:02	Soil	120	Final	1117	Dona	Front	ECX	40	3	< LOD	8.22	110.09	9.9	868.7	31.92	ppm	5.6	JSTONE
74	11/19/2010 12:05	Soil	120	Final	1117	Dona	Front	ECX	40	4	< LOD	8.13	110.49	10.04	960.19	33.79	ppm	5.6	JSTONE
75	11/19/2010 12:07	Soil	120	Final	1117	Dona	Front	ECX	40	5	< LOD	8.41	110.43	9.97	901.57	32.71	ppm	5.6	JSTONE
46	11/19/2010 10:06	Soil	120	Final	1117	Dona	Back	IDX	40	1	< LOD	8.5	45.43	8.68	604.53	30.34	ppm	13.5	BSHIRLEY
47	11/19/2010 10:09	Soil	120	Final	1117	Dona	Back	IDX	40	2	< LOD	10.73	69.53	11.73	762.88	41.95	ppm	13.5	BSHIRLEY
48	11/19/2010 10:12	Soil	120	Final	1117	Dona	Back	IDX	40	3	< LOD	9.08	43.61	8.84	664.92	32.39	ppm	13.5	BSHIRLEY
49	11/19/2010 10:15	Soil	120	Final	1117	Dona	Back	IDX	40	4	< LOD	8.85	59.44	9.04	449.47	25.45	ppm	13.5	BSHIRLEY
50	11/19/2010 10:18	Soil	120	Final	1117	Dona	Back	IDX	40	5	< LOD	7.63	71.83	9.43	943.09	35.5	ppm	13.5	BSHIRLEY
51	11/19/2010 10:21	Soil	120	Final	1117	Dona	Back	IDX	40	6	< LOD	8.05	70.96	9.69	596.36	29.24	ppm	13.5	BSHIRLEY
52	11/19/2010 10:24	Soil	120	Final	1117	Dona	Back	IDX	40	7	< LOD	8.51	56.62	8.91	583.62	28.67	ppm	13.5	BSHIRLEY
53	11/19/2010 10:27	Soil	120	Final	1117	Dona	Back	IDX	40	8	< LOD	8.83	35.51	7.81	332.93	22.25	ppm	13.5	BSHIRLEY
54	11/19/2010 10:31	Soil	120	Final	1117	Dona	Back	IDX	40	9	< LOD	8.88	38.62	8.29	509.87	27.88	ppm	12	BSHIRLEY
55	11/19/2010 10:34	Soil	120	Final	1117	Dona	Back	IDX	40	10	< LOD	8.37	35.5	7.91	545.6	27.94	ppm	12	BSHIRLEY
56	11/19/2010 10:37	Soil	120	Final	1117	Dona	Back	IDX	40	11	< LOD	9.12	25.64	7.65	378.22	24.52	ppm	12	BSHIRLEY
57	11/19/2010 10:40	Soil	120	Final	1117	Dona	Back	IDX	40	12	< LOD	8.77	52.39	8.9	778.57	33.72	ppm	12	BSHIRLEY
58	11/19/2010 10:42	Soil	120	Final	1117	Dona	Back	IDX	40	13	< LOD	8.58	44.49	8.6	645.81	31.11	ppm	12	BSHIRLEY
59	11/19/2010 10:45	Soil	120	Final	1117	Dona	Back	IDX	40	14	< LOD	8.45	51.82	8.77	558.2	28.27	ppm	12	BSHIRLEY
60	11/19/2010 10:48	Soil	120	Final	1117	Dona	Back	IDX	40	15	< LOD	8.61	85.67	10.12	834.71	33.8	ppm	12	BSHIRLEY
61	11/19/2010 10:51	Soil	120	Final	1117	Dona	Back	IDX	40	16	< LOD	10.29	41.42	9.32	408.34	27.55	ppm	12	BSHIRLEY
62	11/19/2010 10:54	Soil	120	Final	1117	Dona	Back	IDX	40	17	< LOD	9.14	49.77	8.68	549.96	28.26	ppm	12	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
63	11/19/2010 10:57	Soil	120	Final	1117	Dona	Back	IDX	40	18	< LOD	8.87	61.95	9.14	631.97	29.89	ppm	12	BSHIRLEY
64	11/19/2010 11:00	Soil	120	Final	1117	Dona	Back	IDX	40	19	< LOD	9.37	40.2	8.61	458.12	27.11	ppm	12	BSHIRLEY
65	11/19/2010 11:02	Soil	120	Final	1117	Dona	Back	IDX	40	20	< LOD	8.77	31.58	7.96	532.53	28.63	ppm	12	BSHIRLEY
66	11/19/2010 11:09	Soil	120	Final	1117	Dona	Back	ECX	40	1	< LOD	8.42	43.74	8.1	517.44	26.57	ppm	4.2	BSHIRLEY
67	11/19/2010 11:12	Soil	120	Final	1117	Dona	Back	ECX	40	2	< LOD	8.5	48.75	8.33	467.45	25.34	ppm	4.2	BSHIRLEY
68	11/19/2010 11:14	Soil	120	Final	1117	Dona	Back	ECX	40	3	< LOD	8.62	50.75	8.55	508.79	26.66	ppm	4.2	BSHIRLEY
69	11/19/2010 11:17	Soil	120	Final	1117	Dona	Back	ECX	40	4	< LOD	8.58	59.46	8.82	479.9	25.56	ppm	4.2	BSHIRLEY
70	11/19/2010 11:19	Soil	120	Final	1117	Dona	Back	ECX	40	5	< LOD	8.68	55.24	8.59	467.59	25.08	ppm	4.2	BSHIRLEY
87	11/19/2010 14:00	Soil	120	Final	1030	Golla	Front	IDX	41	1	< LOD	7.63	88.83	9.26	656.06	28.45	ppm	6.5	JSTONE
88	11/19/2010 14:04	Soil	120	Final	1030	Golla	Front	IDX	41	2	< LOD	6.77	54.89	7.96	559.37	27.66	ppm	6.5	JSTONE
89	11/19/2010 14:07	Soil	120	Final	1030	Golla	Front	IDX	41	3	< LOD	7.88	89.45	10.58	1177.9	43.36	ppm	6.5	JSTONE
91	11/19/2010 14:13	Soil	120	Final	1030	Golla	Front	IDX	41	4	< LOD	9.18	70.3	8.92	361.84	22.82	ppm	6.5	JSTONE
92	11/19/2010 14:19	Soil	120	Final	1030	Golla	Front	IDX	41	5	< LOD	8.96	88.91	10.82	675.94	33.92	ppm	6.5	JSTONE
93	11/19/2010 14:22	Soil	120	Final	1030	Golla	Front	IDX	41	6	< LOD	5.98	102.27	9.18	849.72	30.24	ppm	6.5	JSTONE
94	11/19/2010 14:26	Soil	120	Final	1030	Golla	Front	IDX	41	7	< LOD	6.07	37.54	7.48	790.16	35.06	ppm	6.5	JSTONE
95	11/19/2010 14:36	Soil	120	Final	1030	Golla	Front	IDX	41	8	< LOD	5.36	29.67	5.72	624.26	26.09	ppm	6.5	JSTONE
96	11/19/2010 14:38	Soil	120	Final	1030	Golla	Front	IDX	41	9	< LOD	6.75	168.69	11.97	938.64	33.39	ppm	6.5	JSTONE
97	11/19/2010 14:43	Soil	120	Final	1030	Golla	Front	IDX	41	10	< LOD	6.35	83.33	9.36	792.15	32.53	ppm	6.5	JSTONE
98	11/19/2010 14:46	Soil	120	Final	1030	Golla	Front	IDX	41	11	< LOD	8.93	124.28	11.3	709.6	31.43	ppm	6.5	JSTONE
100	11/19/2010 14:50	Soil	120	Final	1030	Golla	Front	IDX	41	12	< LOD	9.69	116.53	11.33	698.11	32.31	ppm	6.5	JSTONE
101	11/19/2010 14:53	Soil	120	Final	1030	Golla	Front	IDX	41	13	< LOD	9.51	107.23	10.71	604.98	29.36	ppm	6.5	JSTONE
102	11/19/2010 14:56	Soil	120	Final	1030	Golla	Front	IDX	41	14	< LOD	15.19	130.02	21.87	837.43	65.79	ppm	6.5	JSTONE
103	11/19/2010 15:01	Soil	120	Final	1030	Golla	Front	IDX	41	15	< LOD	7	142.6	11.48	1096.81	37.11	ppm	6.5	JSTONE
104	11/19/2010 15:03	Soil	120	Final	1030	Golla	Front	IDX	41	16	< LOD	6.8	88.57	9.41	661.04	29.35	ppm	6.5	JSTONE
106	11/19/2010 15:06	Soil	120	Final	1030	Golla	Front	IDX	41	17	< LOD	11.32	165.64	14.89	395.74	27.96	ppm	6.5	JSTONE
108	11/19/2010 15:09	Soil	120	Final	1030	Golla	Front	IDX	41	18	< LOD	6.59	92.32	10.15	918.6	36.38	ppm	6.5	JSTONE
109	11/19/2010 15:12	Soil	120	Final	1030	Golla	Front	IDX	41	19	< LOD	7.9	122.08	11.42	946.15	36.73	ppm	6.5	JSTONE
111	11/19/2010 15:15	Soil	120	Final	1030	Golla	Front	IDX	41	20	< LOD	7.24	84.47	9.26	796.37	32.02	ppm	6.5	JSTONE
80	11/19/2010 13:38	Soil	120	Final	1030	Golla	Front	ECX	41	1	< LOD	8.02	146.49	10.97	623.69	26.66	ppm	3.5	JSTONE
81	11/19/2010 13:40	Soil	120	Final	1030	Golla	Front	ECX	41	2	< LOD	8.1	142.38	10.94	680.8	28.13	ppm	3.5	JSTONE
82	11/19/2010 13:42	Soil	120	Final	1030	Golla	Front	ECX	41	3	< LOD	8.48	128.73	10.65	609.88	27.09	ppm	3.5	JSTONE
83	11/19/2010 13:45	Soil	120	Final	1030	Golla	Front	ECX	41	4	< LOD	8.12	131.19	10.51	690.23	28.2	ppm	3.5	JSTONE
84	11/19/2010 13:47	Soil	120	Final	1030	Golla	Front	ECX	41	5	< LOD	8.21	137.46	10.8	673.13	27.94	ppm	3.5	JSTONE
76	11/19/2010 13:35	Soil	120	Final	1030	Golla	Back	ECX	41	1	< LOD	7.92	108.91	10.4	370.14	21.74	ppm	7.9	BSHIRLEY
77	11/19/2010 13:37	Soil	120	Final	1030	Golla	Back	ECX	41	2	< LOD	7.74	115.76	10.65	401.2	22.64	ppm	7.9	BSHIRLEY
78	11/19/2010 13:40	Soil	120	Final	1030	Golla	Back	ECX	41	3	< LOD	7.79	104.88	10.25	380.22	21.97	ppm	7.9	BSHIRLEY
79	11/19/2010 13:43	Soil	120	Final	1030	Golla	Back	ECX	41	4	< LOD	7.88	92.72	9.82	392.7	22.34	ppm	7.9	BSHIRLEY
80	11/19/2010 13:45	Soil	120	Final	1030	Golla	Back	ECX	41	5	< LOD	7.72	107.67	10.33	427.01	23.23	ppm	7.9	BSHIRLEY
117	11/19/2010 15:41	Soil	120	Final	1034	Golla	Front	IDX	42	1	< LOD	8.64	175.8	14.02	953.86	38.03	ppm	7.1	BSHIRLEY
118	11/19/2010 15:44	Soil	120	Final	1034	Golla	Front	IDX	42	2	< LOD	9.29	29.45	7.92	176.15	17.86	ppm	7.1	BSHIRLEY
119	11/19/2010 15:47	Soil	120	Final	1034	Golla	Front	IDX	42	3	< LOD	7	151.83	12.44	937.5	35.46	ppm	7.1	BSHIRLEY
120	11/19/2010 15:50	Soil	120	Final	1034	Golla	Front	IDX	42	4	< LOD	8.89	49.12	8.86	301.08	21.98	ppm	7.1	BSHIRLEY
121	11/19/2010 15:53	Soil	120	Final	1034	Golla	Front	IDX	42	5	< LOD	6.84	22.39	6.8	245.41	18.5	ppm	7.1	BSHIRLEY
122	11/19/2010 15:56	Soil	120	Final	1034	Golla	Front	IDX	42	6	< LOD	7.08	140.47	12.16	758.01	32.35	ppm	7.1	BSHIRLEY
123	11/19/2010 15:59	Soil	120	Final	1034	Golla	Front	IDX	42	7	< LOD	7.66	91.07	10.6	744.77	32.7	ppm	7.1	BSHIRLEY
124	11/19/2010 16:02	Soil	120	Final	1034	Golla	Front	IDX	42	8	< LOD	9.32	155.3	14.02	710.61	34.65	ppm	7.1	BSHIRLEY
126	11/19/2010 16:05	Soil	120	Final	1034	Golla	Front	IDX	42	9	< LOD	6.53	47.45	7.61	619.15	26.72	ppm	7.1	BSHIRLEY
127	11/19/2010 16:08	Soil	120	Final	1034	Golla	Front	IDX	42	10	< LOD	7.81	66.51	9.18	683.51	30.26	ppm	7.1	BSHIRLEY
128	11/19/2010 16:11	Soil	120	Final	1034	Golla	Front	IDX	42	11	< LOD	8.56	88.95	10.65	451.91	26.23	ppm	7.1	BSHIRLEY

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
129	11/19/2010 16:13	Soil	120	Final	1034	Golla	Front	IDX	42	12	< LOD	8.26	103.59	10.61	558.04	27.35	ppm	7.1	BSHIRLEY
130	11/19/2010 16:16	Soil	120	Final	1034	Golla	Front	IDX	42	13	< LOD	8.39	75.3	9.78	356.11	23.02	ppm	7.1	BSHIRLEY
131	11/19/2010 16:19	Soil	120	Final	1034	Golla	Front	IDX	42	14	< LOD	8.48	38.44	7.88	188.85	17.01	ppm	7.1	BSHIRLEY
132	11/19/2010 16:22	Soil	120	Final	1034	Golla	Front	IDX	42	15	< LOD	7.36	108.84	10.59	739.73	30.6	ppm	7.1	BSHIRLEY
133	11/19/2010 16:25	Soil	120	Final	1034	Golla	Front	IDX	42	16	< LOD	7.86	101.96	11.29	993.79	38.55	ppm	7.1	BSHIRLEY
136	11/19/2010 16:28	Soil	120	Final	1034	Golla	Front	IDX	42	17	< LOD	7.72	95.09	10.21	794.42	32.28	ppm	7.1	BSHIRLEY
137	11/19/2010 16:30	Soil	120	Final	1034	Golla	Front	IDX	42	18	< LOD	6.83	86.56	9.98	940.63	35.28	ppm	7.1	BSHIRLEY
138	11/19/2010 16:33	Soil	120	Final	1034	Golla	Front	IDX	42	19	< LOD	7.08	131.25	11.99	1141.34	39.73	ppm	7.1	BSHIRLEY
139	11/19/2010 16:36	Soil	120	Final	1034	Golla	Front	IDX	42	20	< LOD	7.93	115.22	11.12	733.72	31.45	ppm	7.1	BSHIRLEY
117	11/19/2010 15:45	Soil	120	Final	1034	Golla	Front	ECX	42	1	< LOD	8.42	100.24	9.35	367.97	20.77	ppm	5.2	JSTONE
118	11/19/2010 15:47	Soil	120	Final	1034	Golla	Front	ECX	42	2	< LOD	8.15	94.73	9.28	385.37	21.67	ppm	5.2	JSTONE
119	11/19/2010 15:49	Soil	120	Final	1034	Golla	Front	ECX	42	3	< LOD	8.05	90.26	8.91	398.74	21.54	ppm	5.2	JSTONE
120	11/19/2010 15:52	Soil	120	Final	1034	Golla	Front	ECX	42	4	< LOD	8.12	101.59	9.43	347.35	20.34	ppm	5.2	JSTONE
121	11/19/2010 15:54	Soil	120	Final	1034	Golla	Front	ECX	42	5	< LOD	7.94	99.08	9.34	354.59	20.62	ppm	5.2	JSTONE
85	11/19/2010 14:04	Soil	120	Final	1034	Golla	Back	IDX	42	1	< LOD	9.13	98.36	11.65	767.68	35.56	ppm	9.9	BSHIRLEY
86	11/19/2010 14:08	Soil	120	Final	1034	Golla	Back	IDX	42	2	< LOD	10.21	61.82	11.26	506.52	32.95	ppm	9.9	BSHIRLEY
87	11/19/2010 14:10	Soil	120	Final	1034	Golla	Back	IDX	42	3	< LOD	9.25	83.85	11.55	518.1	30.91	ppm	9.9	BSHIRLEY
88	11/19/2010 14:13	Soil	120	Final	1034	Golla	Back	IDX	42	4	< LOD	8.58	96.19	10.78	443.83	25.55	ppm	9.9	BSHIRLEY
90	11/19/2010 14:16	Soil	120	Final	1034	Golla	Back	IDX	42	5	< LOD	7.87	79.3	9.68	531.93	26.84	ppm	9.9	BSHIRLEY
91	11/19/2010 14:19	Soil	120	Final	1034	Golla	Back	IDX	42	6	< LOD	8.14	53.59	8.64	422.41	24.45	ppm	9.9	BSHIRLEY
92	11/19/2010 14:22	Soil	120	Final	1034	Golla	Back	IDX	42	7	< LOD	7.5	72.98	9.53	728.88	31.33	ppm	9.9	BSHIRLEY
94	11/19/2010 14:27	Soil	120	Final	1034	Golla	Back	IDX	42	8	< LOD	8.71	48.18	8.67	417.62	25.05	ppm	9.9	BSHIRLEY
97	11/19/2010 14:30	Soil	120	Final	1034	Golla	Back	IDX	42	9	< LOD	8.3	41.58	8.26	406.48	24.67	ppm	9.9	BSHIRLEY
98	11/19/2010 14:33	Soil	120	Final	1034	Golla	Back	IDX	42	10	< LOD	9.16	85.97	11.82	1145.1	45.64	ppm	9.9	BSHIRLEY
99	11/19/2010 14:36	Soil	120	Final	1034	Golla	Back	IDX	42	11	< LOD	7.57	78.02	10.46	702.53	33.09	ppm	9.9	BSHIRLEY
100	11/19/2010 14:38	Soil	120	Final	1034	Golla	Back	IDX	42	12	< LOD	7.53	49.52	8.5	484.92	26	ppm	9.9	BSHIRLEY
101	11/19/2010 14:41	Soil	120	Final	1034	Golla	Back	IDX	42	13	< LOD	9.19	42.71	8.93	649.66	32.2	ppm	9.9	BSHIRLEY
102	11/19/2010 14:44	Soil	120	Final	1034	Golla	Back	IDX	42	14	< LOD	8.17	48.28	8.67	434.44	25.48	ppm	9.9	BSHIRLEY
103	11/19/2010 14:47	Soil	120	Final	1034	Golla	Back	IDX	42	15	< LOD	8.36	74.74	10.06	487.34	27.29	ppm	9.9	BSHIRLEY
104	11/19/2010 14:50	Soil	120	Final	1034	Golla	Back	IDX	42	16	< LOD	8.05	134.35	12.04	742.5	32.15	ppm	9.9	BSHIRLEY
105	11/19/2010 14:53	Soil	120	Final	1034	Golla	Back	IDX	42	17	< LOD	6.51	58.05	8.14	458.66	23.19	ppm	9.9	BSHIRLEY
106	11/19/2010 14:55	Soil	120	Final	1034	Golla	Back	IDX	42	18	< LOD	7.34	68.64	9.17	550.42	27.12	ppm	9.9	BSHIRLEY
107	11/19/2010 14:58	Soil	120	Final	1034	Golla	Back	IDX	42	19	< LOD	6.58	44.29	7.4	400.12	21.47	ppm	9.9	BSHIRLEY
108	11/19/2010 15:01	Soil	120	Final	1034	Golla	Back	IDX	42	20	< LOD	7.82	80.55	10.72	936.25	38.53	ppm	9.9	BSHIRLEY
109	11/19/2010 15:09	Soil	120	Final	1034	Golla	Back	ECX	42	1	< LOD	8.16	65.77	8.94	384.09	22.6	ppm	6	BSHIRLEY
110	11/19/2010 15:12	Soil	120	Final	1034	Golla	Back	ECX	42	2	< LOD	8.14	59.76	8.7	370.91	22.32	ppm	6	BSHIRLEY
111	11/19/2010 15:15	Soil	120	Final	1034	Golla	Back	ECX	42	3	< LOD	8.16	67.95	9.11	390.01	22.9	ppm	6	BSHIRLEY
112	11/19/2010 15:17	Soil	120	Final	1034	Golla	Back	ECX	42	4	< LOD	8.19	65.65	8.89	383.91	22.63	ppm	6	BSHIRLEY
113	11/19/2010 15:20	Soil	120	Final	1034	Golla	Back	ECX	42	5	< LOD	8.14	67.37	9.14	375.05	22.72	ppm	6	BSHIRLEY
18	11/22/2010 8:02	Soil	120	Final	1113	Golla	Front	IDX	43	1	< LOD	10.74	66.61	10.07	299.98	24.27	ppm	8.1	JSTONE
19	11/22/2010 8:05	Soil	120	Final	1113	Golla	Front	IDX	43	2	< LOD	8.93	70.4	8.58	302.66	20.24	ppm	8.1	JSTONE
20	11/22/2010 8:08	Soil	120	Final	1113	Golla	Front	IDX	43	3	< LOD	9.26	50.08	8.05	232.47	19.22	ppm	8.1	JSTONE
21	11/22/2010 8:11	Soil	120	Final	1113	Golla	Front	IDX	43	4	< LOD	10.21	51.85	8.86	320.42	24.28	ppm	8.1	JSTONE
22	11/22/2010 8:14	Soil	120	Final	1113	Golla	Front	IDX	43	5	< LOD	9.21	74.1	8.87	571	27.79	ppm	8.1	JSTONE
24	11/22/2010 8:18	Soil	120	Final	1113	Golla	Front	IDX	43	6	< LOD	10.04	29.76	6.84	218.81	19.07	ppm	8.1	JSTONE
25	11/22/2010 8:21	Soil	120	Final	1113	Golla	Front	IDX	43	7	< LOD	10.37	53.39	8.54	232.68	19.9	ppm	8.1	JSTONE
26	11/22/2010 8:24	Soil	120	Final	1113	Golla	Front	IDX	43	8	< LOD	7.81	75.44	9.03	419.3	24.33	ppm	8.1	JSTONE
27	11/22/2010 8:27	Soil	120	Final	1113	Golla	Front	IDX	43	9	< LOD	8.31	81.46	9.53	727.42	32.03	ppm	8.1	JSTONE
28	11/22/2010 8:30	Soil	120	Final	1113	Golla	Front	IDX	43	10	< LOD	10.27	46.76	8.09	209.15	18.92	ppm	8.1	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
29	11/22/2010 8:33	Soil	120	Final	1113	Golla	Front	IDX	43	11	< LOD	8.7	49	7.95	498.55	27.18	ppm	8.1	JSTONE
31	11/22/2010 8:36	Soil	120	Final	1113	Golla	Front	IDX	43	12	< LOD	9.16	40.94	7.06	386.94	22.82	ppm	8.1	JSTONE
32	11/22/2010 8:39	Soil	120	Final	1113	Golla	Front	IDX	43	13	< LOD	9	62.56	8.24	391.4	23.04	ppm	8.1	JSTONE
33	11/22/2010 8:41	Soil	120	Final	1113	Golla	Front	IDX	43	14	< LOD	8.88	37.94	6.86	275.75	19.53	ppm	8.1	JSTONE
34	11/22/2010 8:44	Soil	120	Final	1113	Golla	Front	IDX	43	15	< LOD	8.53	51.52	7.69	466.81	25.18	ppm	8.1	JSTONE
36	11/22/2010 8:47	Soil	120	Final	1113	Golla	Front	IDX	43	16	< LOD	8.14	130.6	11.11	1059.78	36.6	ppm	8.1	JSTONE
38	11/22/2010 8:50	Soil	120	Final	1113	Golla	Front	IDX	43	17	< LOD	9.33	154.4	13.27	1024.29	40.08	ppm	8.1	JSTONE
40	11/22/2010 8:53	Soil	120	Final	1113	Golla	Front	IDX	43	18	< LOD	9.53	61.29	8.82	402.92	24.89	ppm	8.1	JSTONE
42	11/22/2010 8:56	Soil	86.87	Final	1113	Golla	Front	IDX	43	19	< LOD	12.88	112.16	10.41	818.62	32.48	ppm	8.1	JSTONE
44	11/22/2010 8:59	Soil	120	Final	1113	Golla	Front	IDX	43	20	< LOD	10.72	60.24	11.08	594.19	38.29	ppm	8.1	JSTONE
45	11/22/2010 9:07	Soil	120	Final	1113	Golla	Front	ECX	43	1	< LOD	8.43	82.61	8.76	486.17	24.09	ppm	3.7	JSTONE
46	11/22/2010 9:10	Soil	120	Final	1113	Golla	Front	ECX	43	2	< LOD	8.46	83.73	8.77	455.78	23.34	ppm	3.7	JSTONE
47	11/22/2010 9:13	Soil	120	Final	1113	Golla	Front	ECX	43	3	< LOD	8.45	91.76	9.17	468.52	23.8	ppm	3.7	JSTONE
48	11/22/2010 9:15	Soil	120	Final	1113	Golla	Front	ECX	43	4	< LOD	8.59	77.72	8.6	441.76	23.26	ppm	3.7	JSTONE
49	11/22/2010 9:17	Soil	120	Final	1113	Golla	Front	ECX	43	5	< LOD	8.36	90.54	9.08	487.15	24.18	ppm	3.7	JSTONE
23	11/22/2010 8:16	Soil	120	Final	1113	Golla	Back	IDX	43	1	< LOD	8.46	295.02	17.44	1823.18	51.81	ppm	12.3	BBRAND
28	11/22/2010 8:29	Soil	120	Final	1113	Golla	Back	IDX	43	2	< LOD	8.19	334.46	18.31	1445.81	45.91	ppm	12.3	BBRAND
29	11/22/2010 8:32	Soil	120	Final	1113	Golla	Back	IDX	43	3	< LOD	8.57	138.72	12.46	1020.9	38.38	ppm	12.3	BBRAND
30	11/22/2010 8:36	Soil	120	Final	1113	Golla	Back	IDX	43	4	14.98	6.69	49.96	8.91	243.38	19.91	ppm	12.3	BBRAND
31	11/22/2010 8:39	Soil	120	Final	1113	Golla	Back	IDX	43	5	22.3	7.26	73.51	10.86	2576.9	66.16	ppm	12.3	BBRAND
32	11/22/2010 8:42	Soil	120	Final	1113	Golla	Back	IDX	43	6	9.61	6.28	88.41	10.66	614.31	30.26	ppm	12.3	BBRAND
33	11/22/2010 8:46	Soil	120	Final	1113	Golla	Back	IDX	43	7	< LOD	8.58	120.04	11.49	848.97	34.21	ppm	12.3	BBRAND
34	11/22/2010 8:49	Soil	120	Final	1113	Golla	Back	IDX	43	8	15.12	6.92	106.23	12.35	763.52	36.84	ppm	12.3	BBRAND
35	11/22/2010 8:52	Soil	120	Final	1113	Golla	Back	IDX	43	9	12.93	6.47	81.45	10.73	652.28	32.32	ppm	12.3	BBRAND
37	11/22/2010 8:55	Soil	120	Final	1113	Golla	Back	IDX	43	10	10.2	6.33	47.03	8.7	403.03	24.7	ppm	12.3	BBRAND
38	11/22/2010 8:59	Soil	120	Final	1113	Golla	Back	IDX	43	11	< LOD	12.69	60.79	12.68	684.43	42.56	ppm	12.3	BBRAND
40	11/22/2010 9:02	Soil	120	Final	1113	Golla	Back	IDX	43	12	< LOD	8.85	107.66	11.32	1036.02	38.41	ppm	12.3	BBRAND
42	11/22/2010 9:05	Soil	120	Final	1113	Golla	Back	IDX	43	13	< LOD	9.49	213.68	16.25	1092.8	43.27	ppm	12.3	BBRAND
43	11/22/2010 9:08	Soil	120	Final	1113	Golla	Back	IDX	43	14	< LOD	9.17	98.3	11.37	609.55	31.19	ppm	12.3	BBRAND
46	11/22/2010 9:12	Soil	120	Final	1113	Golla	Back	IDX	43	15	10.05	6.24	96.5	10.91	749.89	33.15	ppm	12.3	BBRAND
47	11/22/2010 9:15	Soil	120	Final	1113	Golla	Back	IDX	43	16	12.04	6.84	97.78	11.85	547.09	30.8	ppm	12.3	BBRAND
51	11/22/2010 9:19	Soil	120	Final	1113	Golla	Back	IDX	43	17	12.12	6.5	114.6	12.34	693.38	33.85	ppm	12.3	BBRAND
52	11/22/2010 9:22	Soil	120	Final	1113	Golla	Back	IDX	43	18	14.45	7.36	58.98	10.38	572.62	32.44	ppm	12.3	BBRAND
56	11/22/2010 9:27	Soil	120	Final	1113	Golla	Back	IDX	43	19	< LOD	9.33	134.66	12.5	840.83	35.35	ppm	12.3	BBRAND
63	11/22/2010 9:31	Soil	120	Final	1113	Golla	Back	IDX	43	20	< LOD	9.27	86.14	10.62	742.86	33.65	ppm	12.3	BBRAND
67	11/22/2010 9:37	Soil	120	Final	1113	Golla	Back	ECX	43	1	< LOD	8.39	155.37	12.28	787.8	31.98	ppm	12.3	BBRAND
68	11/22/2010 9:40	Soil	120	Final	1113	Golla	Back	ECX	43	2	< LOD	8.4	158.64	12.52	797.65	32.43	ppm	12.3	BBRAND
69	11/22/2010 9:43	Soil	120	Final	1113	Golla	Back	ECX	43	3	< LOD	8.41	155.1	12.34	845.67	33.16	ppm	12.3	BBRAND
70	11/22/2010 9:46	Soil	120	Final	1113	Golla	Back	ECX	43	4	< LOD	8.45	152.38	12.23	791.06	32	ppm	12.3	BBRAND
71	11/22/2010 9:48	Soil	120	Final	1113	Golla	Back	ECX	43	5	< LOD	8.37	155.47	12.41	827.22	32.94	ppm	12.3	BBRAND
77	11/22/2010 10:09	Soil	120	Final	1106	Golla	Front	ECX	44	1	< LOD	8.59	36.11	7.98	223.27	18.73	ppm	7.3	BBRAND
78	11/22/2010 10:12	Soil	120	Final	1106	Golla	Front	ECX	44	2	< LOD	8.77	50.85	8.68	264.85	20.19	ppm	7.3	BBRAND
79	11/22/2010 10:15	Soil	120	Final	1106	Golla	Front	ECX	44	3	< LOD	8.37	37.06	7.97	215.09	18.42	ppm	7.3	BBRAND
80	11/22/2010 10:17	Soil	120	Final	1106	Golla	Front	ECX	44	4	< LOD	8.67	33.91	7.82	231.76	18.99	ppm	7.3	BBRAND
81	11/22/2010 10:20	Soil	120	Final	1106	Golla	Front	ECX	44	5	< LOD	8.56	38.73	8.08	257.18	19.89	ppm	7.3	BBRAND
58	11/22/2010 10:21	Soil	120	Final	1106	Golla	Back	IDX	44	1	< LOD	11.99	62.23	10.94	241.53	24.61	ppm	18	JSTONE
59	11/22/2010 10:24	Soil	120	Final	1106	Golla	Back	IDX	44	2	< LOD	8.92	99	10.19	269.58	19.96	ppm	18	JSTONE
64	11/22/2010 10:27	Soil	120	Final	1106	Golla	Back	IDX	44	3	< LOD	9.99	56.31	8.83	334.25	23.9	ppm	18	JSTONE
66	11/22/2010 10:30	Soil	120	Final	1106	Golla	Back	IDX	44	4	< LOD	7.81	63.86	8.36	383.95	22.84	ppm	18	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
67	11/22/2010 10:34	Soil	120	Final	1106	Golla	Back	IDX	44	5	< LOD	10.68	84.04	10.93	499.86	30.45	ppm	18	JSTONE
70	11/22/2010 10:36	Soil	120	Final	1106	Golla	Back	IDX	44	6	< LOD	8.11	90.12	9.51	622.24	28.49	ppm	18	JSTONE
71	11/22/2010 10:41	Soil	120	Final	1106	Golla	Back	IDX	44	7	< LOD	8.53	80.18	9.48	596.98	29.25	ppm	18	JSTONE
72	11/22/2010 10:43	Soil	120	Final	1106	Golla	Back	IDX	44	8	< LOD	8.38	92.32	9.43	642.2	28.44	ppm	18	JSTONE
73	11/22/2010 10:45	Soil	120	Final	1106	Golla	Back	IDX	44	9	< LOD	7.99	117.79	10.49	1126.96	37.36	ppm	18	JSTONE
74	11/22/2010 10:49	Soil	120	Final	1106	Golla	Back	IDX	44	10	< LOD	9.06	88.66	9.73	633.69	29.59	ppm	18	JSTONE
76	11/22/2010 10:51	Soil	120	Final	1106	Golla	Back	IDX	44	11	< LOD	9.31	75.39	9.72	461.85	27.18	ppm	18	JSTONE
77	11/22/2010 10:55	Soil	120	Final	1106	Golla	Back	IDX	44	12	< LOD	9.94	75.14	10.21	548.79	31.04	ppm	18	JSTONE
78	11/22/2010 10:58	Soil	120	Final	1106	Golla	Back	IDX	44	13	< LOD	9.34	69.39	9.15	581.51	29.46	ppm	18	JSTONE
79	11/22/2010 11:00	Soil	120	Final	1106	Golla	Back	IDX	44	14	< LOD	10.89	63.28	11.16	486.24	34.42	ppm	18	JSTONE
80	11/22/2010 11:03	Soil	120	Final	1106	Golla	Back	IDX	44	15	< LOD	9.46	79.42	9.62	379.9	24.09	ppm	18	JSTONE
82	11/22/2010 11:06	Soil	120	Final	1106	Golla	Back	IDX	44	16	< LOD	14.16	86.53	15.09	464.45	40.6	ppm	18	JSTONE
83	11/22/2010 11:08	Soil	120	Final	1106	Golla	Back	IDX	44	17	< LOD	11.45	248.35	19.74	693.5	40.23	ppm	18	JSTONE
84	11/22/2010 11:11	Soil	120	Final	1106	Golla	Back	IDX	44	18	13	7.34	239.34	19.21	1058.33	48.44	ppm	18	JSTONE
85	11/22/2010 11:14	Soil	120	Final	1106	Golla	Back	IDX	44	19	< LOD	9.14	197.96	14.36	989.57	38.03	ppm	18	JSTONE
86	11/22/2010 11:16	Soil	120	Final	1106	Golla	Back	IDX	44	20	< LOD	8.1	83.81	10.02	643.48	31.47	ppm	18	JSTONE
87	11/22/2010 11:33	Soil	120	Final	1106	Golla	Back	ECX	44	1	< LOD	8.03	113.87	10	596.55	26.57	ppm	11.3	JSTONE
88	11/22/2010 11:35	Soil	120	Final	1106	Golla	Back	ECX	44	2	< LOD	8.07	113.28	9.96	594.8	26.47	ppm	11.3	JSTONE
89	11/22/2010 11:38	Soil	120	Final	1106	Golla	Back	ECX	44	3	< LOD	8.2	107.52	9.76	533.85	25.18	ppm	11.3	JSTONE
90	11/22/2010 11:40	Soil	120	Final	1106	Golla	Back	ECX	44	4	< LOD	8.22	120.47	10.34	577.74	26.46	ppm	11.3	JSTONE
91	11/22/2010 11:42	Soil	120	Final	1106	Golla	Back	ECX	44	5	< LOD	8.17	114.52	10.26	602.2	27.23	ppm	11.3	JSTONE
85	11/22/2010 11:03	Soil	120	Final	1221	Golla	Front	ECX	45	1	< LOD	8.4	34.03	7.66	327.87	21.74	ppm	31.4	BBRAND
86	11/22/2010 11:06	Soil	120	Final	1221	Golla	Front	ECX	45	2	< LOD	8.58	29.64	7.58	375.79	23.48	ppm	31.4	BBRAND
87	11/22/2010 11:09	Soil	120	Final	1221	Golla	Front	ECX	45	3	< LOD	8.6	53.34	8.7	358.4	22.85	ppm	31.4	BBRAND
88	11/22/2010 11:11	Soil	120	Final	1221	Golla	Front	ECX	45	4	< LOD	8.39	30.22	7.57	357.42	22.65	ppm	31.4	BBRAND
89	11/22/2010 11:14	Soil	120	Final	1221	Golla	Front	ECX	45	5	< LOD	8.51	26.4	7.33	287.69	20.63	ppm	31.4	BBRAND
93	11/22/2010 11:56	Soil	120	Final	1213	Golla	Front	ECX	46	1	< LOD	8.38	16.42	6.74	207.89	17.98	ppm	8.9	BBRAND
94	11/22/2010 11:58	Soil	120	Final	1213	Golla	Front	ECX	46	2	< LOD	8.61	22.59	7.27	247.05	19.6	ppm	8.9	BBRAND
95	11/22/2010 12:01	Soil	120	Final	1213	Golla	Front	ECX	46	3	< LOD	8.34	24.93	7.18	239.26	19.05	ppm	8.9	BBRAND
96	11/22/2010 12:03	Soil	120	Final	1213	Golla	Front	ECX	46	4	< LOD	8.81	27.1	7.41	303.44	21.28	ppm	8.9	BBRAND
97	11/22/2010 12:07	Soil	120	Final	1213	Golla	Front	ECX	46	5	< LOD	8.63	14.3	6.67	170.32	16.75	ppm	8.9	BBRAND
97	11/22/2010 13:56	Soil	120	Final	1213	Golla	Back	ECX	46	1	18.32	6.05	208.33	13.35	2420.02	53.55	ppm	12.3	JSTONE
98	11/22/2010 13:59	Soil	120	Final	1213	Golla	Back	ECX	46	2	17.87	5.96	245.99	14.32	2400.35	53.12	ppm	12.3	JSTONE
99	11/22/2010 14:01	Soil	120	Final	1213	Golla	Back	ECX	46	3	20.74	6	232.93	14.01	2254.94	51.61	ppm	12.3	JSTONE
100	11/22/2010 14:04	Soil	120	Final	1213	Golla	Back	ECX	46	4	22.78	6.06	219.6	13.66	2308.71	52.3	ppm	12.3	JSTONE
101	11/22/2010 14:06	Soil	120	Final	1213	Golla	Back	ECX	46	5	16.81	5.94	246.41	14.32	2279.6	51.6	ppm	12.3	JSTONE
102	11/22/2010 14:33	Soil	120	Final	1222	Golla	Front	ECX	47	1	31.17	6.47	260.67	16.05	3191.83	66.33	ppm		BBRAND
103	11/22/2010 14:36	Soil	120	Final	1222	Golla	Front	ECX	47	2	30.58	6.38	292.6	16.68	3152.54	65.12	ppm		BBRAND
104	11/22/2010 14:39	Soil	120	Final	1222	Golla	Front	ECX	47	3	32.9	6.46	259.36	15.98	2982.29	64.09	ppm		BBRAND
105	11/22/2010 14:41	Soil	120	Final	1222	Golla	Front	ECX	47	4	33.54	6.47	268.88	16.28	3199.16	66.41	ppm		BBRAND
106	11/22/2010 14:43	Soil	120	Final	1222	Golla	Front	ECX	47	5	32.7	6.38	257.61	15.87	2985.31	63.83	ppm		BBRAND
106	11/22/2010 15:08	Soil	120	Final	1222	Golla	Back	ECX	47	1	19.88	6.2	284	15.73	2936.09	60.08	ppm	9.1	JSTONE
107	11/22/2010 15:11	Soil	120	Final	1222	Golla	Back	ECX	47	2	23.21	6.29	322.36	16.77	3146.41	62.46	ppm	9.1	JSTONE
108	11/22/2010 15:13	Soil	120	Final	1222	Golla	Back	ECX	47	3	20.67	6.19	321.97	16.7	2928.15	60.06	ppm	9.1	JSTONE
109	11/22/2010 15:16	Soil	120	Final	1222	Golla	Back	ECX	47	4	12.72	5.98	296.89	16.08	3131.11	62.06	ppm	9.1	JSTONE
110	11/22/2010 15:18	Soil	120	Final	1222	Golla	Back	ECX	47	5	< LOD	7.93	223.76	13.1	2458.27	51.4	ppm	9.1	JSTONE
117	11/22/2010 16:18	Soil	120	Final	1245	Golla	Front	ECX	48	1	< LOD	7.94	21.9	5.49	140.15	13.61	ppm	10.2	JSTONE
118	11/22/2010 16:21	Soil	120	Final	1245	Golla	Front	ECX	48	2	< LOD	7.93	20.14	5.37	145.94	13.9	ppm	10.2	JSTONE
119	11/22/2010 16:24	Soil	120	Final	1245	Golla	Front	ECX	48	3	< LOD	8.01	25.2	5.76	152.71	14.34	ppm	10.2	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
120	11/22/2010 16:26	Soil	120	Final	1245	Golla	Front	ECX	48	4	< LOD	8.07	24.53	5.59	144.25	13.8	ppm	10.2	JSTONE
121	11/22/2010 16:29	Soil	120	Final	1245	Golla	Front	ECX	48	5	< LOD	8.12	21	5.52	138.7	13.75	ppm	10.2	JSTONE
119	11/22/2010 16:43	Soil	120	Final	1245	Golla	Back	ECX	48	1	< LOD	8.25	20.56	6.91	253.39	19.59	ppm		BBRAND
120	11/22/2010 16:46	Soil	120	Final	1245	Golla	Back	ECX	48	2	< LOD	7.94	25.57	7.22	206.49	17.93	ppm		BBRAND
121	11/22/2010 16:48	Soil	120	Final	1245	Golla	Back	ECX	48	3	< LOD	8.14	30.98	7.54	289.22	20.53	ppm		BBRAND
122	11/22/2010 16:51	Soil	120	Final	1245	Golla	Back	ECX	48	4	< LOD	8.19	24.37	7.26	243.67	19.21	ppm		BBRAND
123	11/22/2010 16:53	Soil	120	Final	1245	Golla	Back	ECX	48	5	< LOD	8.43	23.33	7.09	248.95	19.2	ppm		BBRAND
149	11/23/2010 7:55	Soil	120	Final	1117	Manchester	Front	IDX	49	1	< LOD	8.38	144.11	12.35	1168.63	39.98	ppm	9.7	BBRAND
151	11/23/2010 7:59	Soil	120	Final	1117	Manchester	Front	IDX	49	2	14.65	7.13	45.15	9.38	570	31.47	ppm	9.7	BBRAND
153	11/23/2010 8:03	Soil	120	Final	1117	Manchester	Front	IDX	49	3	11.36	6.68	52.4	9.29	495.36	28.14	ppm	9.7	BBRAND
154	11/23/2010 8:06	Soil	120	Final	1117	Manchester	Front	IDX	49	4	< LOD	8.53	80.36	10.24	827.22	34.76	ppm	9.7	BBRAND
155	11/23/2010 8:10	Soil	120	Final	1117	Manchester	Front	IDX	49	5	12.25	7.1	65.72	10.58	485.64	29.92	ppm	9.7	BBRAND
156	11/23/2010 8:13	Soil	120	Final	1117	Manchester	Front	IDX	49	6	< LOD	9.23	59.96	9.91	494.57	28.79	ppm	9.7	BBRAND
158	11/23/2010 8:16	Soil	120	Final	1117	Manchester	Front	IDX	49	7	< LOD	9.22	120.07	11.84	979.2	37.78	ppm	9.7	BBRAND
160	11/23/2010 8:20	Soil	120	Final	1117	Manchester	Front	IDX	49	8	< LOD	8.33	151.81	12.71	1466.79	44.91	ppm	9.7	BBRAND
162	11/23/2010 8:27	Soil	120	Final	1117	Manchester	Front	IDX	49	9	< LOD	9.17	138.6	13.09	1371.72	46.42	ppm	9.7	BBRAND
164	11/23/2010 8:30	Soil	120	Final	1117	Manchester	Front	IDX	49	10	18.97	7.22	118.8	12.91	906.37	39.74	ppm	9.7	BBRAND
165	11/23/2010 8:33	Soil	120	Final	1117	Manchester	Front	IDX	49	11	< LOD	9.14	117.52	12.12	1436.2	46.85	ppm	9.7	BBRAND
166	11/23/2010 8:36	Soil	120	Final	1117	Manchester	Front	IDX	49	12	< LOD	8.32	140.18	12.9	1979.62	54.56	ppm	9.7	BBRAND
167	11/23/2010 8:39	Soil	120	Final	1117	Manchester	Front	IDX	49	13	< LOD	9.3	135.3	13.11	1438.31	47.95	ppm	9.7	BBRAND
168	11/23/2010 8:42	Soil	120	Final	1117	Manchester	Front	IDX	49	14	< LOD	9.89	63.11	10.38	658.29	34.04	ppm	9.7	BBRAND
170	11/23/2010 8:45	Soil	120	Final	1117	Manchester	Front	IDX	49	15	< LOD	8.3	55.09	8.99	513.97	27.4	ppm	9.7	BBRAND
171	11/23/2010 8:48	Soil	120	Final	1117	Manchester	Front	IDX	49	16	< LOD	11.34	24.5	8.6	432.85	29.36	ppm	9.7	BBRAND
172	11/23/2010 8:52	Soil	120	Final	1117	Manchester	Front	IDX	49	17	18.72	7.32	26.5	8.21	206.17	20.15	ppm	9.7	BBRAND
174	11/23/2010 8:55	Soil	120	Final	1117	Manchester	Front	IDX	49	18	< LOD	9.63	29.43	7.91	244.45	20.48	ppm	9.7	BBRAND
175	11/23/2010 8:59	Soil	120	Final	1117	Manchester	Front	IDX	49	19	16.35	7.24	56.67	10.17	343.28	25.52	ppm	9.7	BBRAND
177	11/23/2010 9:03	Soil	120	Final	1117	Manchester	Front	IDX	49	20	15.49	6.85	75.89	10.67	531.38	29.89	ppm	9.7	BBRAND
180	11/23/2010 9:14	Soil	120	Final	1117	Manchester	Front	ECX	49	1	11.18	6.11	110.35	11.07	889.5	34.81	ppm	5.5	BBRAND
181	11/23/2010 9:16	Soil	120	Final	1117	Manchester	Front	ECX	49	2	< LOD	9.04	123.2	11.65	963.63	36.34	ppm	5.5	BBRAND
182	11/23/2010 9:19	Soil	120	Final	1117	Manchester	Front	ECX	49	3	< LOD	8.73	113.6	11.17	833.5	33.7	ppm	5.5	BBRAND
183	11/23/2010 9:22	Soil	120	Final	1117	Manchester	Front	ECX	49	4	9.27	5.91	126.17	11.6	850.08	33.84	ppm	5.5	BBRAND
184	11/23/2010 9:24	Soil	120	Final	1117	Manchester	Front	ECX	49	5	< LOD	8.79	120.31	11.43	947.82	35.83	ppm	5.5	BBRAND
19	11/23/2010 8:05	Soil	120	Final	1117	Manchester	Back	IDX	49	1	< LOD	8.93	86.43	11.03	923.4	40.42	ppm	19.8	JSTONE
21	11/23/2010 8:08	Soil	120	Final	1117	Manchester	Back	IDX	49	2	< LOD	9.13	265.26	16.51	2215.74	56.73	ppm	19.8	JSTONE
23	11/23/2010 8:11	Soil	120	Final	1117	Manchester	Back	IDX	49	3	< LOD	9.48	170.6	13.06	1271.5	41.78	ppm	19.8	JSTONE
25	11/23/2010 8:14	Soil	120	Final	1117	Manchester	Back	IDX	49	4	< LOD	9.05	132.86	11.61	1221.38	40.85	ppm	19.8	JSTONE
27	11/23/2010 8:17	Soil	120	Final	1117	Manchester	Back	IDX	49	5	20.88	7.06	182.49	14.12	1199.21	42.62	ppm	19.8	JSTONE
29	11/23/2010 8:20	Soil	120	Final	1117	Manchester	Back	IDX	49	6	< LOD	15.09	137.03	19.72	910.54	59.54	ppm	19.8	JSTONE
30	11/23/2010 8:23	Soil	120	Final	1117	Manchester	Back	IDX	49	7	< LOD	8.54	71.12	8.47	577.74	27.08	ppm	19.8	JSTONE
33	11/23/2010 8:26	Soil	120	Final	1117	Manchester	Back	IDX	49	8	< LOD	8.74	72.62	9.48	646.04	31.66	ppm	19.8	JSTONE
39	11/23/2010 8:29	Soil	120	Final	1117	Manchester	Back	IDX	49	9	< LOD	7.61	109.67	9.8	1154.61	36.43	ppm	19.8	JSTONE
41	11/23/2010 8:32	Soil	120	Final	1117	Manchester	Back	IDX	49	10	< LOD	8.92	59.04	8.06	476.68	25.09	ppm	19.8	JSTONE
43	11/23/2010 8:34	Soil	120	Final	1117	Manchester	Back	IDX	49	11	18.36	7.14	210.73	15.6	1021.18	40.87	ppm	19.8	JSTONE
44	11/23/2010 8:37	Soil	120	Final	1117	Manchester	Back	IDX	49	12	13.12	6.24	393.22	18.85	3223.78	64.78	ppm	19.8	JSTONE
45	11/23/2010 8:40	Soil	120	Final	1117	Manchester	Back	IDX	49	13	< LOD	8.85	211.47	14.95	2023.69	54.64	ppm	19.8	JSTONE
46	11/23/2010 8:42	Soil	120	Final	1117	Manchester	Back	IDX	49	14	< LOD	6.93	65.44	8.11	811.66	31.47	ppm	19.8	JSTONE
47	11/23/2010 8:45	Soil	120	Final	1117	Manchester	Back	IDX	49	15	< LOD	7.9	232.24	14.81	2368.14	55.72	ppm	19.8	JSTONE
48	11/23/2010 8:48	Soil	120	Final	1117	Manchester	Back	IDX	49	16	< LOD	8.85	87.83	9.43	755.49	31.27	ppm	19.8	JSTONE
49	11/23/2010 8:50	Soil	120	Final	1117	Manchester	Back	IDX	49	17	< LOD	8.19	288.55	15.63	2419.39	53.91	ppm	19.8	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
51	11/23/2010 8:53	Soil	120	Final	1117	Manchester	Back	IDX	49	18	< LOD	9.59	103.44	11.13	872.56	37.05	ppm	19.8	JSTONE
52	11/23/2010 8:56	Soil	120	Final	1117	Manchester	Back	IDX	49	19	< LOD	8.68	122.34	10.74	1115.97	37.46	ppm	19.8	JSTONE
54	11/23/2010 8:59	Soil	120	Final	1117	Manchester	Back	IDX	49	20	< LOD	7.39	164.63	11.76	1668.78	43.76	ppm	19.8	JSTONE
55	11/23/2010 9:11	Soil	120	Final	1117	Manchester	Back	ECX	49	1	< LOD	8.16	218.83	13.4	1726.2	44.55	ppm	7.3	JSTONE
56	11/23/2010 9:14	Soil	120	Final	1117	Manchester	Back	ECX	49	2	< LOD	8.42	176.23	12.26	1550.44	42.6	ppm	7.3	JSTONE
57	11/23/2010 9:16	Soil	120	Final	1117	Manchester	Back	ECX	49	3	< LOD	8.64	208.11	13.33	1595.47	43.62	ppm	7.3	JSTONE
58	11/23/2010 9:19	Soil	120	Final	1117	Manchester	Back	ECX	49	3	< LOD	8.69	198.84	13.14	1544.76	43.16	ppm	7.3	JSTONE
59	11/23/2010 9:21	Soil	120	Final	1117	Manchester	Back	ECX	49	5	< LOD	8.19	199.06	13	1609.06	43.63	ppm	7.3	JSTONE
65	11/23/2010 11:11	Soil	120	Final	1042	Dona	Front	ECX	50	1	< LOD	8.14	66.9	7.93	565.88	25.64	ppm	5.3	JSTONE
66	11/23/2010 11:14	Soil	120	Final	1042	Dona	Front	ECX	50	2	< LOD	8.2	57.25	7.54	552	25.61	ppm	5.3	JSTONE
67	11/23/2010 11:17	Soil	120	Final	1042	Dona	Front	ECX	50	3	< LOD	8.05	59.43	7.61	559.75	25.54	ppm	5.3	JSTONE
68	11/23/2010 11:19	Soil	120	Final	1042	Dona	Front	ECX	50	4	< LOD	8.21	54.12	7.38	577.08	26.05	ppm	5.3	JSTONE
69	11/23/2010 11:22	Soil	120	Final	1042	Dona	Front	ECX	50	5	< LOD	8.13	57.46	7.61	601.11	26.72	ppm	5.3	JSTONE
76	11/23/2010 13:57	Soil	120	Final	1042	Dona	Back	ECX	50	1	< LOD	7.93	92.61	8.95	821.45	30.26	ppm	6.4	JSTONE
77	11/23/2010 13:59	Soil	120	Final	1042	Dona	Back	ECX	50	2	< LOD	7.78	100.73	9.3	839.43	30.63	ppm	6.4	JSTONE
78	11/23/2010 14:02	Soil	120	Final	1042	Dona	Back	ECX	50	3	< LOD	7.76	77.68	8.45	823.93	30.78	ppm	6.4	JSTONE
79	11/23/2010 14:04	Soil	120	Final	1042	Dona	Back	ECX	50	4	< LOD	7.63	95.29	9.08	844.56	30.75	ppm	6.4	JSTONE
80	11/23/2010 14:07	Soil	120	Final	1042	Dona	Back	ECX	50	5	< LOD	7.72	91.12	8.97	813.52	30.38	ppm	6.4	JSTONE
197	11/23/2010 11:46	Soil	120	Final	1029	Dona	Front	ECX	51	1	< LOD	8.84	47.54	8.71	316.43	22.22	ppm	6.2	BBRAND
198	11/23/2010 11:49	Soil	120	Final	1029	Dona	Front	ECX	51	2	< LOD	8.72	35.37	7.92	284.85	20.77	ppm	6.2	BBRAND
199	11/23/2010 11:51	Soil	120	Final	1029	Dona	Front	ECX	51	3	< LOD	8.69	41.23	8.33	297.69	21.37	ppm	6.2	BBRAND
200	11/23/2010 11:54	Soil	120	Final	1029	Dona	Front	ECX	51	4	< LOD	8.9	34.23	7.99	283.33	21.12	ppm	6.2	BBRAND
201	11/23/2010 11:56	Soil	120	Final	1029	Dona	Front	ECX	51	5	< LOD	8.77	32.01	7.78	290.48	21.09	ppm	6.2	BBRAND
210	11/23/2010 14:38	Soil	120	Final	1029	Dona	Back	ECX	51	1	< LOD	8.72	68.35	9.43	655.01	30.18	ppm	5.4	BBRAND
211	11/23/2010 14:41	Soil	120	Final	1029	Dona	Back	ECX	51	2	< LOD	8.65	74.87	9.61	668.38	30.27	ppm	5.4	BBRAND
212	11/23/2010 14:43	Soil	120	Final	1029	Dona	Back	ECX	51	3	< LOD	8.46	90.32	10.19	644.62	29.62	ppm	5.4	BBRAND
213	11/23/2010 14:46	Soil	120	Final	1029	Dona	Back	ECX	51	4	< LOD	8.67	77.47	9.78	666.1	30.31	ppm	5.4	BBRAND
214	11/23/2010 14:48	Soil	120	Final	1029	Dona	Back	ECX	51	5	< LOD	8.4	69.05	9.4	632.66	29.52	ppm	5.4	BBRAND
19	12/7/2010 8:38	Soil	120	Final	1105	Vernon	Front	IDX	52	1	< LOD	18.75	57.93	20.75	258.12	54.31	ppm	15.8	JSTONE
20	12/7/2010 8:41	Soil	120	Final	1105	Vernon	Front	IDX	52	2	< LOD	10.93	102.51	14.23	660.56	41.61	ppm	15.8	JSTONE
21	12/7/2010 8:45	Soil	120	Final	1105	Vernon	Front	IDX	52	3	< LOD	9.21	394.45	21.37	1868.45	55.93	ppm	15.8	JSTONE
22	12/7/2010 8:48	Soil	120	Final	1105	Vernon	Front	IDX	52	4	< LOD	7.92	64.56	9.36	539.64	30.1	ppm	15.8	JSTONE
24	12/7/2010 8:51	Soil	120	Final	1105	Vernon	Front	IDX	52	5	< LOD	7.77	85.18	9.65	591.5	28.89	ppm	15.8	JSTONE
26	12/7/2010 8:54	Soil	120	Final	1105	Vernon	Front	IDX	52	6	< LOD	15.04	150.36	26.06	805.82	72.04	ppm	15.8	JSTONE
28	12/7/2010 8:57	Soil	120	Final	1105	Vernon	Front	IDX	52	7	< LOD	10.1	50.09	13.03	332	37.91	ppm	15.8	JSTONE
29	12/7/2010 9:00	Soil	120	Final	1105	Vernon	Front	IDX	52	8	< LOD	9.3	78.49	10.75	825.97	39.08	ppm	15.8	JSTONE
30	12/7/2010 9:03	Soil	120	Final	1105	Vernon	Front	IDX	52	9	< LOD	7.06	119.68	11.17	974.04	36.87	ppm	15.8	JSTONE
32	12/7/2010 9:05	Soil	120	Final	1105	Vernon	Front	IDX	52	10	< LOD	9.26	341.81	23.39	1630.47	61.67	ppm	15.8	JSTONE
33	12/7/2010 9:08	Soil	120	Final	1105	Vernon	Front	IDX	52	11	< LOD	6.38	286.08	15.6	1405.47	41.46	ppm	15.8	JSTONE
34	12/7/2010 9:13	Soil	120	Final	1105	Vernon	Front	IDX	52	12	< LOD	9.87	204.36	20.42	1152.88	57.38	ppm	15.8	JSTONE
35	12/7/2010 9:17	Soil	120	Final	1105	Vernon	Front	IDX	52	13	< LOD	8.55	235.06	15.81	1651.41	49.75	ppm	15.8	JSTONE
36	12/7/2010 9:19	Soil	120	Final	1105	Vernon	Front	IDX	52	14	< LOD	8.51	481.44	23.59	2323.07	62.6	ppm	15.8	JSTONE
37	12/7/2010 9:22	Soil	120	Final	1105	Vernon	Front	IDX	52	15	< LOD	7.2	397.89	18.7	1907.74	49.29	ppm	15.8	JSTONE
40	12/7/2010 9:26	Soil	120	Final	1105	Vernon	Front	IDX	52	16	< LOD	11.64	316.99	24.08	2129.98	74.76	ppm	15.8	JSTONE
41	12/7/2010 9:29	Soil	120	Final	1105	Vernon	Front	IDX	52	17	< LOD	6.82	35.97	7.93	914.55	40.81	ppm	15.8	JSTONE
43	12/7/2010 9:32	Soil	120	Final	1105	Vernon	Front	IDX	52	18	< LOD	7.12	134.05	11.8	1186.45	40.52	ppm	15.8	JSTONE
45	12/7/2010 9:35	Soil	120	Final	1105	Vernon	Front	IDX	52	19	< LOD	6.76	170.55	12.91	1001.19	36.88	ppm	15.8	JSTONE
46	12/7/2010 9:37	Soil	120	Final	1105	Vernon	Front	IDX	52	20	< LOD	8.86	147.69	13.92	1037.02	43.21	ppm	15.8	JSTONE
47	12/7/2010 9:46	Soil	120	Final	1105	Vernon	Front	ECX	52	1	< LOD	8.41	292.05	15.81	1450.85	42.15	ppm	4.8	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
48	12/7/2010 9:48	Soil	120	Final	1105	Vernon	Front	ECX	52	2	< LOD	8.28	328.86	16.61	1484.64	42.35	ppm	4.8	JSTONE
49	12/7/2010 9:51	Soil	120	Final	1105	Vernon	Front	ECX	52	3	< LOD	8.34	295.85	15.84	1527.25	43.06	ppm	4.8	JSTONE
50	12/7/2010 9:55	Soil	120	Final	1105	Vernon	Front	ECX	52	4	< LOD	8.18	293.56	15.77	1461.26	42.05	ppm	4.8	JSTONE
51	12/7/2010 9:58	Soil	120	Final	1105	Vernon	Front	ECX	52	5	< LOD	8.23	305.58	16.04	1517.48	42.72	ppm	4.8	JSTONE
18	12/7/2010 8:44	Soil	120	Final	1105	Vernon	Back	IDX	52	1	< LOD	8.88	66.97	9.69	680.98	31.74	ppm	7.4	BSHIRLEY
19	12/7/2010 8:47	Soil	120	Final	1105	Vernon	Back	IDX	52	2	< LOD	8.13	63.88	9.58	1037.03	38.79	ppm	7.4	BSHIRLEY
20	12/7/2010 8:54	Soil	120	Final	1105	Vernon	Back	IDX	52	3	< LOD	10.72	90.11	13.11	761.44	41.1	ppm	7.4	BSHIRLEY
21	12/7/2010 8:57	Soil	120	Final	1105	Vernon	Back	IDX	52	4	< LOD	5.99	112.8	10.53	820.64	31.73	ppm	7.4	BSHIRLEY
22	12/7/2010 9:00	Soil	120	Final	1105	Vernon	Back	IDX	52	5	< LOD	6.75	150.16	11.61	805.01	30.88	ppm	7.4	BSHIRLEY
24	12/7/2010 9:04	Soil	120	Final	1105	Vernon	Back	IDX	52	6	< LOD	6.38	73.48	8.74	579.9	25.87	ppm	7.4	BSHIRLEY
25	12/7/2010 9:07	Soil	120	Final	1105	Vernon	Back	IDX	52	7	< LOD	6.7	241.92	15.33	1234.5	41.24	ppm	7.4	BSHIRLEY
26	12/7/2010 9:10	Soil	120	Final	1105	Vernon	Back	IDX	52	8	< LOD	6.98	298.8	16.35	1507.47	43.97	ppm	7.4	BSHIRLEY
27	12/7/2010 9:13	Soil	120	Final	1105	Vernon	Back	IDX	52	9	< LOD	7.18	286.13	16.05	1534.02	44.42	ppm	7.4	BSHIRLEY
28	12/7/2010 9:16	Soil	120	Final	1105	Vernon	Back	IDX	52	10	< LOD	8.24	57.57	8.95	556.05	28.08	ppm	7.4	BSHIRLEY
29	12/7/2010 9:19	Soil	120	Final	1105	Vernon	Back	IDX	52	11	< LOD	8.23	57.67	9.18	711.13	32.15	ppm	7.4	BSHIRLEY
30	12/7/2010 9:23	Soil	120	Final	1105	Vernon	Back	IDX	52	12	< LOD	6.97	189.39	13.61	1370.58	42.44	ppm	7.4	BSHIRLEY
31	12/7/2010 9:26	Soil	120	Final	1105	Vernon	Back	IDX	52	13	< LOD	8.44	13.79	6.84	299.62	22.16	ppm	7.4	BSHIRLEY
32	12/7/2010 9:29	Soil	120	Final	1105	Vernon	Back	IDX	52	14	< LOD	7.93	122.27	11.77	722.32	32.17	ppm	7.4	BSHIRLEY
33	12/7/2010 9:32	Soil	120	Final	1105	Vernon	Back	IDX	52	15	< LOD	7.38	158.17	13	937.82	36.64	ppm	7.4	BSHIRLEY
34	12/7/2010 9:36	Soil	120	Final	1105	Vernon	Back	IDX	52	16	< LOD	8.64	< LOD	8.76	78.3	12.19	ppm	7.4	BSHIRLEY
35	12/7/2010 9:39	Soil	120	Final	1105	Vernon	Back	IDX	52	17	12.04	7.15	128.92	13.74	691.6	35.97	ppm	7.4	BSHIRLEY
36	12/7/2010 9:42	Soil	120	Final	1105	Vernon	Back	IDX	52	18	< LOD	9.2	107.93	11.56	601.26	30.35	ppm	7.4	BSHIRLEY
37	12/7/2010 9:45	Soil	120	Final	1105	Vernon	Back	IDX	52	19	< LOD	8.27	171.63	15.68	1049.12	44.75	ppm	7.4	BSHIRLEY
38	12/7/2010 9:49	Soil	120	Final	1105	Vernon	Back	IDX	52	20	< LOD	13	395.57	28.32	1584.29	68.98	ppm	7.4	BSHIRLEY
43	12/7/2010 9:57	Soil	120	Final	1105	Vernon	Back	ECX	52	1	< LOD	8.44	150.03	12.36	826.14	33.24	ppm	2.7	BSHIRLEY
44	12/7/2010 9:59	Soil	120	Final	1105	Vernon	Back	ECX	52	2	< LOD	8.41	163.88	12.58	863.25	33.36	ppm	2.7	BSHIRLEY
45	12/7/2010 10:02	Soil	120	Final	1105	Vernon	Back	ECX	52	3	< LOD	8.33	174.84	13.05	879.29	34.12	ppm	2.7	BSHIRLEY
46	12/7/2010 10:06	Soil	120	Final	1105	Vernon	Back	ECX	52	4	< LOD	8.52	179.93	13.28	825.85	33.15	ppm	2.7	BSHIRLEY
47	12/7/2010 10:08	Soil	120	Final	1105	Vernon	Back	ECX	52	5	< LOD	8.56	201.83	13.89	890.33	34.37	ppm	2.7	BSHIRLEY
70	12/7/2010 13:22	Soil	120	Final	1138	Manchester	Front	IDX	53	1	< LOD	10.79	53.46	9.38	442.29	29.48	ppm	5.6	JSTONE
71	12/7/2010 13:25	Soil	120	Final	1138	Manchester	Front	IDX	53	2	43.83	12.68	501.87	38.26	6222.2	161.94	ppm	5.6	JSTONE
72	12/7/2010 13:28	Soil	120	Final	1138	Manchester	Front	IDX	53	3	< LOD	9.33	54.94	8.71	567.39	30.34	ppm	5.6	JSTONE
73	12/7/2010 13:31	Soil	120	Final	1138	Manchester	Front	IDX	53	4	< LOD	11.96	39.12	8.69	412.32	29.15	ppm	5.6	JSTONE
74	12/7/2010 13:36	Soil	120	Final	1138	Manchester	Front	IDX	53	5	< LOD	14.88	36.96	11.07	459.81	40.82	ppm	5.6	JSTONE
75	12/7/2010 13:40	Soil	120	Final	1138	Manchester	Front	IDX	53	6	< LOD	8.68	38.96	7.58	380.72	24.86	ppm	5.6	JSTONE
76	12/7/2010 13:43	Soil	120	Final	1138	Manchester	Front	IDX	53	7	15.11	6.66	294.3	17.34	2704.81	62.65	ppm	5.6	JSTONE
77	12/7/2010 13:45	Soil	120	Final	1138	Manchester	Front	IDX	53	8	< LOD	12.34	107.85	14.11	1361.75	56.96	ppm	5.6	JSTONE
78	12/7/2010 13:48	Soil	120	Final	1138	Manchester	Front	IDX	53	9	< LOD	11.06	96.47	12.36	1018.82	45.56	ppm	5.6	JSTONE
80	12/7/2010 13:52	Soil	120	Final	1138	Manchester	Front	IDX	53	10	< LOD	11.07	75.67	10.63	550.87	32.19	ppm	5.6	JSTONE
81	12/7/2010 13:55	Soil	120	Final	1138	Manchester	Front	IDX	53	11	< LOD	11.75	36.94	9.33	365.3	30.9	ppm	5.6	JSTONE
82	12/7/2010 13:58	Soil	120	Final	1138	Manchester	Front	IDX	53	12	< LOD	9.29	132.77	11.81	1309.81	42.96	ppm	5.6	JSTONE
83	12/7/2010 14:02	Soil	120	Final	1138	Manchester	Front	IDX	53	13	< LOD	10.75	111.65	15.27	1354.83	60.96	ppm	5.6	JSTONE
84	12/7/2010 14:05	Soil	120	Final	1138	Manchester	Front	IDX	53	14	< LOD	9.12	102.77	11.98	1879.97	57.89	ppm	5.6	JSTONE
85	12/7/2010 14:07	Soil	120	Final	1138	Manchester	Front	IDX	53	15	< LOD	10.13	145.1	15.78	2017.49	68.47	ppm	5.6	JSTONE
86	12/7/2010 14:10	Soil	120	Final	1138	Manchester	Front	IDX	53	16	< LOD	7.01	116.47	11.73	2274.44	58.92	ppm	5.6	JSTONE
88	12/7/2010 14:13	Soil	120	Final	1138	Manchester	Front	IDX	53	17	< LOD	6.48	133.15	11.39	1952.08	50.36	ppm	5.6	JSTONE
89	12/7/2010 14:15	Soil	120	Final	1138	Manchester	Front	IDX	53	18	< LOD	7.38	128.8	11.19	1864.72	49.07	ppm	5.6	JSTONE
90	12/7/2010 14:18	Soil	120	Final	1138	Manchester	Front	IDX	53	19	< LOD	8.26	92.48	10.01	1161.3	39.98	ppm	5.6	JSTONE
91	12/7/2010 14:21	Soil	120	Final	1138	Manchester	Front	IDX	53	20	< LOD	8.3	100.61	10.08	1198.88	39.83	ppm	5.6	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
60	12/7/2010 11:21	Soil	120	Final	1138	Manchester	Front	ECX	53	1	< LOD	8.88	165.87	12.12	1443.17	41.83	ppm	3.3	JSTONE
61	12/7/2010 11:27	Soil	120	Final	1138	Manchester	Front	ECX	53	2	< LOD	8.9	173.98	12.44	1546.35	43.53	ppm	3.3	JSTONE
62	12/7/2010 11:31	Soil	120	Final	1138	Manchester	Front	ECX	53	3	< LOD	8.71	176.54	12.42	1568.82	43.32	ppm	3.3	JSTONE
63	12/7/2010 11:34	Soil	120	Final	1138	Manchester	Front	ECX	53	4	< LOD	8.81	188.72	12.88	1692.87	45.36	ppm	3.3	JSTONE
64	12/7/2010 11:38	Soil	120	Final	1138	Manchester	Front	ECX	53	5	< LOD	8.73	200.88	13.27	1774.51	46.48	ppm	3.3	JSTONE
59	12/7/2010 13:29	Soil	120	Final	1138	Manchester	Back	IDX	53	1	< LOD	9.04	170.13	14.12	2195.18	58.07	ppm	6.8	BSHIRLEY
60	12/7/2010 13:32	Soil	120	Final	1138	Manchester	Back	IDX	53	2	11.78	6.16	63.4	9.33	733.07	32.22	ppm	6.8	BSHIRLEY
61	12/7/2010 13:35	Soil	120	Final	1138	Manchester	Back	IDX	53	3	< LOD	9.75	57.59	9.79	493.57	28.74	ppm	6.8	BSHIRLEY
62	12/7/2010 13:38	Soil	120	Final	1138	Manchester	Back	IDX	53	4	< LOD	9.2	75.27	10.13	855.83	35.68	ppm	6.8	BSHIRLEY
63	12/7/2010 13:41	Soil	120	Final	1138	Manchester	Back	IDX	53	5	< LOD	8.46	154.74	13	1832.64	51.01	ppm	6.8	BSHIRLEY
64	12/7/2010 13:44	Soil	120	Final	1138	Manchester	Back	IDX	53	6	< LOD	10.07	97.81	11.81	814.62	37.23	ppm	6.8	BSHIRLEY
65	12/7/2010 13:46	Soil	120	Final	1138	Manchester	Back	IDX	53	7	< LOD	8.97	146.71	13.41	1922.81	54.75	ppm	6.8	BSHIRLEY
66	12/7/2010 13:49	Soil	120	Final	1138	Manchester	Back	IDX	53	8	16.72	6.87	169.65	14.56	1178.12	44.27	ppm	6.8	BSHIRLEY
67	12/7/2010 13:52	Soil	120	Final	1138	Manchester	Back	IDX	53	9	24.24	7	241.13	16.74	1256.03	45.25	ppm	6.8	BSHIRLEY
68	12/7/2010 13:54	Soil	120	Final	1138	Manchester	Back	IDX	53	10	< LOD	10.03	60.64	9.97	673.86	33.52	ppm	6.8	BSHIRLEY
69	12/7/2010 13:57	Soil	120	Final	1138	Manchester	Back	IDX	53	11	10.52	6.76	42.55	8.94	439.37	27.16	ppm	6.8	BSHIRLEY
70	12/7/2010 14:00	Soil	120	Final	1138	Manchester	Back	IDX	53	12	13.54	6.45	82.58	10.44	839.36	35.51	ppm	6.8	BSHIRLEY
71	12/7/2010 14:02	Soil	120	Final	1138	Manchester	Back	IDX	53	13	17.7	6.95	96.49	11.94	852.12	38.65	ppm	6.8	BSHIRLEY
72	12/7/2010 14:05	Soil	120	Final	1138	Manchester	Back	IDX	53	14	16.42	5.97	311.99	17.78	2947.91	65.39	ppm	6.8	BSHIRLEY
73	12/7/2010 14:08	Soil	120	Final	1138	Manchester	Back	IDX	53	15	9.63	6.37	118.85	12.09	996.3	38.98	ppm	6.8	BSHIRLEY
74	12/7/2010 14:11	Soil	120	Final	1138	Manchester	Back	IDX	53	16	13.54	6.83	122.39	13.05	1541.52	51.34	ppm	6.8	BSHIRLEY
75	12/7/2010 14:14	Soil	120	Final	1138	Manchester	Back	IDX	53	17	18.11	6.3	168.17	13.37	1607.69	47.41	ppm	6.8	BSHIRLEY
76	12/7/2010 14:17	Soil	120	Final	1138	Manchester	Back	IDX	53	18	13.43	6.12	221.04	15.27	3206.49	67.99	ppm	6.8	BSHIRLEY
77	12/7/2010 14:20	Soil	120	Final	1138	Manchester	Back	IDX	53	19	17.51	6.55	145.96	13.05	607.17	30.7	ppm	6.8	BSHIRLEY
78	12/7/2010 14:22	Soil	120	Final	1138	Manchester	Back	IDX	53	20	16.07	6.93	84.79	11.07	684.21	33.61	ppm	6.8	BSHIRLEY
52	12/7/2010 11:27	Soil	120	Final	1138	Manchester	Back	ECX	53	1	12.38	6.04	204.32	14.18	1280.34	41.65	ppm	4.4	BSHIRLEY
53	12/7/2010 11:30	Soil	120	Final	1138	Manchester	Back	ECX	53	2	14.23	6.12	161.62	12.83	1115.04	38.72	ppm	4.4	BSHIRLEY
54	12/7/2010 11:32	Soil	120	Final	1138	Manchester	Back	ECX	53	3	11.75	6.07	211.95	14.52	1339.97	42.69	ppm	4.4	BSHIRLEY
55	12/7/2010 11:35	Soil	120	Final	1138	Manchester	Back	ECX	53	4	14.69	6.09	188.62	13.8	1293.47	41.94	ppm	4.4	BSHIRLEY
56	12/7/2010 11:38	Soil	120	Final	1138	Manchester	Back	ECX	53	5	10.91	5.88	190.64	13.72	1647.21	46.77	ppm	4.4	BSHIRLEY
110	12/7/2010 16:23	Soil	120	Final	1142	Golla	Front	IDX	54	1	< LOD	10.03	112.26	12.02	1036.72	41.95	ppm	9.6	JSTONE
111	12/7/2010 16:26	Soil	120	Final	1142	Golla	Front	IDX	54	2	< LOD	11.43	72.29	10.36	432.84	28.71	ppm	9.6	JSTONE
113	12/7/2010 16:29	Soil	120	Final	1142	Golla	Front	IDX	54	3	< LOD	9.84	80.67	11.14	550.39	32.98	ppm	9.6	JSTONE
114	12/7/2010 16:32	Soil	120	Final	1142	Golla	Front	IDX	54	4	< LOD	10.02	79.71	11.39	809.33	40.7	ppm	9.6	JSTONE
115	12/7/2010 16:44	Soil	120	Final	1142	Golla	Front	IDX	54	5	< LOD	10.14	120.61	12.68	893	39.95	ppm	9.6	JSTONE
116	12/7/2010 16:46	Soil	120	Final	1142	Golla	Front	IDX	54	6	< LOD	9.59	130.38	13.24	1290.95	48.1	ppm	9.6	JSTONE
117	12/7/2010 16:49	Soil	120	Final	1142	Golla	Front	IDX	54	7	< LOD	8.4	120.06	11.26	1511.51	45.71	ppm	9.6	JSTONE
118	12/7/2010 16:52	Soil	120	Final	1142	Golla	Front	IDX	54	8	< LOD	13.64	94.44	14.06	659.7	42.73	ppm	9.6	JSTONE
119	12/7/2010 16:55	Soil	120	Final	1142	Golla	Front	IDX	54	9	< LOD	8.33	58.86	8.28	696.22	30.92	ppm	9.6	JSTONE
120	12/7/2010 16:58	Soil	120	Final	1142	Golla	Front	IDX	54	10	< LOD	13.06	125.96	15.67	1183.05	55.59	ppm	9.6	JSTONE
121	12/7/2010 17:01	Soil	120	Final	1142	Golla	Front	IDX	54	11	< LOD	10.12	83.26	10.41	899.53	38.26	ppm	9.6	JSTONE
122	12/7/2010 17:03	Soil	120	Final	1142	Golla	Front	IDX	54	12	12.01	7.07	79.86	10.08	661.74	32.91	ppm	9.6	JSTONE
123	12/7/2010 17:06	Soil	120	Final	1142	Golla	Front	IDX	54	13	< LOD	9.02	116.72	10.56	1046.96	36.43	ppm	9.6	JSTONE
124	12/7/2010 17:09	Soil	120	Final	1142	Golla	Front	IDX	54	14	22.12	6.79	183.88	13.5	1755.87	49.19	ppm	9.6	JSTONE
125	12/7/2010 17:11	Soil	120	Final	1142	Golla	Front	IDX	54	15	< LOD	10.31	200.86	15.53	2271.32	61.45	ppm	9.6	JSTONE
126	12/7/2010 17:14	Soil	120	Final	1142	Golla	Front	IDX	54	16	< LOD	9.02	103.57	11.22	1138.38	42.37	ppm	9.6	JSTONE
127	12/7/2010 17:17	Soil	120	Final	1142	Golla	Front	IDX	54	17	< LOD	14.01	75.21	14.09	581.86	44.56	ppm	9.6	JSTONE
128	12/7/2010 17:19	Soil	120	Final	1142	Golla	Front	IDX	54	18	37.54	8.18	280.02	19.3	2541.81	69.19	ppm	9.6	JSTONE
129	12/7/2010 17:22	Soil	120	Final	1142	Golla	Front	IDX	54	19	< LOD	8.99	205.49	15.61	2890.6	68.67	ppm	9.6	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
130	12/7/2010 17:29	Soil	120	Final	1142	Golla	Front	IDX	54	20	19.69	8.22	242.39	19.34	2206.85	69.27	ppm	9.6	JSTONE
104	12/7/2010 15:43	Soil	120	Final	1142	Golla	Front	ECX	54	1	< LOD	8.77	171.18	12.23	1458.71	41.88	ppm	4.6	JSTONE
105	12/7/2010 15:46	Soil	120	Final	1142	Golla	Front	ECX	54	2	< LOD	8.84	153.56	11.7	1407.19	41.28	ppm	4.6	JSTONE
106	12/7/2010 15:48	Soil	120	Final	1142	Golla	Front	ECX	54	3	< LOD	8.8	175.43	12.4	1564.68	43.52	ppm	4.6	JSTONE
107	12/7/2010 15:51	Soil	120	Final	1142	Golla	Front	ECX	54	4	< LOD	8.7	160.51	11.86	1524.03	42.76	ppm	4.6	JSTONE
108	12/7/2010 15:53	Soil	120	Final	1142	Golla	Front	ECX	54	5	< LOD	8.79	167.36	12.17	1460.25	42.09	ppm	4.6	JSTONE
88	12/7/2010 16:20	Soil	120	Final	1142	Golla	Back	IDX	54	1	< LOD	9.14	66.9	11.01	1957.35	60.3	ppm	8.6	BSHIRLEY
89	12/7/2010 16:23	Soil	120	Final	1142	Golla	Back	IDX	54	2	< LOD	8.85	105.82	11.97	1796.88	53.59	ppm	8.6	BSHIRLEY
90	12/7/2010 16:25	Soil	120	Final	1142	Golla	Back	IDX	54	3	< LOD	9.99	107.81	13.1	1229.59	48.4	ppm	8.6	BSHIRLEY
91	12/7/2010 16:28	Soil	120	Final	1142	Golla	Back	IDX	54	4	< LOD	9.73	150.29	13.79	1061.55	41.93	ppm	8.6	BSHIRLEY
92	12/7/2010 16:31	Soil	120	Final	1142	Golla	Back	IDX	54	5	13.62	6.69	92.74	11.33	830.58	36.75	ppm	8.6	BSHIRLEY
93	12/7/2010 16:34	Soil	120	Final	1142	Golla	Back	IDX	54	6	< LOD	9.78	48.23	9.2	641.14	32.42	ppm	8.6	BSHIRLEY
94	12/7/2010 16:37	Soil	120	Final	1142	Golla	Back	IDX	54	7	9.93	6.4	77.02	10.51	905.35	37.66	ppm	8.6	BSHIRLEY
95	12/7/2010 16:40	Soil	120	Final	1142	Golla	Back	IDX	54	8	13.36	6.96	72.21	10.89	1011.85	42.17	ppm	8.6	BSHIRLEY
96	12/7/2010 16:43	Soil	120	Final	1142	Golla	Back	IDX	54	9	13.29	7.2	75.78	11.2	771.51	37.39	ppm	8.6	BSHIRLEY
97	12/7/2010 16:46	Soil	120	Final	1142	Golla	Back	IDX	54	10	11.22	7.01	101.77	12.52	819.96	38.98	ppm	8.6	BSHIRLEY
98	12/7/2010 16:49	Soil	120	Final	1142	Golla	Back	IDX	54	11	< LOD	8.99	223.4	16	2486.76	62.34	ppm	8.6	BSHIRLEY
99	12/7/2010 16:52	Soil	120	Final	1142	Golla	Back	IDX	54	12	< LOD	9.41	118.76	12.61	1912.2	55.58	ppm	8.6	BSHIRLEY
100	12/7/2010 16:55	Soil	120	Final	1142	Golla	Back	IDX	54	13	< LOD	9.49	58.5	9.4	724.33	33.12	ppm	8.6	BSHIRLEY
101	12/7/2010 16:58	Soil	120	Final	1142	Golla	Back	IDX	54	14	18.76	6.5	82.52	10.47	1056.97	39.66	ppm	8.6	BSHIRLEY
102	12/7/2010 17:01	Soil	120	Final	1142	Golla	Back	IDX	54	15	< LOD	8.88	106.21	11.46	1293.36	43.7	ppm	8.6	BSHIRLEY
103	12/7/2010 17:03	Soil	120	Final	1142	Golla	Back	IDX	54	16	11.82	7.08	49.74	9.69	470.02	29.4	ppm	8.6	BSHIRLEY
104	12/7/2010 17:06	Soil	120	Final	1142	Golla	Back	IDX	54	17	17.57	6.79	65.25	10.27	1170.94	43.53	ppm	8.6	BSHIRLEY
105	12/7/2010 17:09	Soil	120	Final	1142	Golla	Back	IDX	54	18	< LOD	8.28	102.55	11.33	1303.34	43.95	ppm	8.6	BSHIRLEY
106	12/7/2010 17:12	Soil	120	Final	1142	Golla	Back	IDX	54	19	17.97	6.65	133.75	12.92	1547.93	49.25	ppm	8.6	BSHIRLEY
107	12/7/2010 17:14	Soil	120	Final	1142	Golla	Back	IDX	54	20	10.18	6.14	149.07	13.27	1914.19	53.75	ppm	8.6	BSHIRLEY
82	12/7/2010 15:56	Soil	120	Final	1142	Golla	Back	ECX	54	1	17.12	6.04	164.14	12.87	1451.72	43.87	ppm	5.8	BSHIRLEY
83	12/7/2010 15:59	Soil	120	Final	1142	Golla	Back	ECX	54	2	9.7	5.71	165.12	12.89	1617.45	46.27	ppm	5.8	BSHIRLEY
84	12/7/2010 16:02	Soil	120	Final	1142	Golla	Back	ECX	54	3	< LOD	8.75	176.08	13.31	1558.23	45.7	ppm	5.8	BSHIRLEY
85	12/7/2010 16:04	Soil	120	Final	1142	Golla	Back	ECX	54	4	17.05	6.01	170.57	13.01	1573.3	45.49	ppm	5.8	BSHIRLEY
86	12/7/2010 16:07	Soil	120	Final	1142	Golla	Back	ECX	54	5	15.9	6.02	181.19	13.45	1608.23	46.15	ppm	5.8	BSHIRLEY
18	12/8/2010 9:27	Soil	120	Final	1249	Vernon	Front	IDX	55	1	< LOD	9.78	124.77	13.96	1358.51	53.34	ppm	6.7	JSTONE
19	12/8/2010 9:31	Soil	120	Final	1249	Vernon	Front	IDX	55	2	< LOD	6.78	107.45	10.41	2274.65	54.58	ppm	6.7	JSTONE
20	12/8/2010 9:34	Soil	120	Final	1249	Vernon	Front	IDX	55	3	< LOD	9.49	147.12	15.54	2437.42	73.09	ppm	6.7	JSTONE
21	12/8/2010 9:37	Soil	120	Final	1249	Vernon	Front	IDX	55	4	< LOD	12.96	116.17	12.48	1074.38	43.59	ppm	6.7	JSTONE
22	12/8/2010 9:40	Soil	120	Final	1249	Vernon	Front	IDX	55	5	< LOD	8.73	111.61	11.01	1214.65	41.65	ppm	6.7	JSTONE
23	12/8/2010 9:43	Soil	120	Final	1249	Vernon	Front	IDX	55	6	< LOD	8.24	150.41	12.26	1523.74	45.41	ppm	6.7	JSTONE
24	12/8/2010 9:48	Soil	120	Final	1249	Vernon	Front	IDX	55	7	< LOD	9.42	224.75	16.27	2861.64	68.6	ppm	6.7	JSTONE
25	12/8/2010 9:52	Soil	120	Final	1249	Vernon	Front	IDX	55	8	< LOD	6.98	254.86	15.93	4307.89	77.85	ppm	6.7	JSTONE
26	12/8/2010 9:54	Soil	120	Final	1249	Vernon	Front	IDX	55	9	< LOD	8.88	323.89	20.26	4792.71	92.88	ppm	6.7	JSTONE
27	12/8/2010 9:57	Soil	120	Final	1249	Vernon	Front	IDX	55	10	< LOD	8.26	160.94	13.44	1950.21	54.81	ppm	6.7	JSTONE
28	12/8/2010 10:00	Soil	120	Final	1249	Vernon	Front	IDX	55	11	< LOD	8.49	188.39	13.74	1972.67	52.35	ppm	6.7	JSTONE
29	12/8/2010 10:03	Soil	120	Final	1249	Vernon	Front	IDX	55	12	< LOD	8.49	171.62	13.45	2048.74	54.56	ppm	6.7	JSTONE
30	12/8/2010 10:05	Soil	120	Final	1249	Vernon	Front	IDX	55	13	< LOD	9.11	485.76	21.98	5371.15	88	ppm	6.7	JSTONE
31	12/8/2010 10:09	Soil	120	Final	1249	Vernon	Front	IDX	55	14	< LOD	9.04	176.08	15.27	2649.79	69.33	ppm	6.7	JSTONE
33	12/8/2010 10:14	Soil	120	Final	1249	Vernon	Front	IDX	55	15	< LOD	8.18	71.6	10.39	1375.09	50.15	ppm	6.7	JSTONE
34	12/8/2010 10:17	Soil	120	Final	1249	Vernon	Front	IDX	55	16	< LOD	6.71	219.9	13.86	2338.11	53.5	ppm	6.7	JSTONE
36	12/8/2010 10:20	Soil	120	Final	1249	Vernon	Front	IDX	55	17	< LOD	7.29	176.2	12.3	2333.57	52.57	ppm	6.7	JSTONE
37	12/8/2010 10:23	Soil	120	Final	1249	Vernon	Front	IDX	55	18	< LOD	7.59	99.64	12.23	1166.8	47.45	ppm	6.7	JSTONE

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
38	12/8/2010 10:26	Soil	120	Final	1249	Vernon	Front	IDX	55	19	< LOD	9.58	168.48	15.17	3099.36	76.02	ppm	6.7	JSTONE
39	12/8/2010 10:29	Soil	120	Final	1249	Vernon	Front	IDX	55	20	< LOD	7.98	112.55	12.81	2387.13	67.27	ppm	6.7	JSTONE
41	12/8/2010 11:32	Soil	120	Final	1249	Vernon	Front	ECX	55	1	< LOD	8.84	347.89	17.17	4688.99	75.43	ppm	2.7	BBRAND
42	12/8/2010 11:35	Soil	120	Final	1249	Vernon	Front	ECX	55	2	< LOD	8.92	366.15	17.74	5417.26	81.58	ppm	2.7	BBRAND
43	12/8/2010 11:37	Soil	120	Final	1249	Vernon	Front	ECX	55	3	< LOD	8.62	342.25	17.17	4848.36	77.11	ppm	2.7	BBRAND
44	12/8/2010 11:40	Soil	120	Final	1249	Vernon	Front	ECX	55	4	9.82	5.93	364.11	17.67	5035.93	78.66	ppm	2.7	BBRAND
45	12/8/2010 11:42	Soil	120	Final	1249	Vernon	Front	ECX	55	5	< LOD	8.59	374.03	18.03	5794.86	84.91	ppm	2.7	BBRAND
19	12/8/2010 9:20	Soil	120	Final	1249	Vernon	Back	IDX	55	1	< LOD	9.33	22.1	7.91	588	32.12	ppm	12.7	BSHIRLEY
20	12/8/2010 9:23	Soil	120	Final	1249	Vernon	Back	IDX	55	2	< LOD	7.93	134.1	11.99	2015.99	52.05	ppm	12.7	BSHIRLEY
21	12/8/2010 9:26	Soil	120	Final	1249	Vernon	Back	IDX	55	3	< LOD	8.3	111.84	11.44	1824.69	50.71	ppm	12.7	BSHIRLEY
22	12/8/2010 9:32	Soil	120	Final	1249	Vernon	Back	IDX	55	4	11.81	7.06	57.99	10.22	469.79	29.39	ppm	12.7	BSHIRLEY
23	12/8/2010 9:35	Soil	120	Final	1249	Vernon	Back	IDX	55	5	< LOD	9.12	41.31	8.43	816.68	34.87	ppm	12.7	BSHIRLEY
24	12/8/2010 9:38	Soil	120	Final	1249	Vernon	Back	IDX	55	6	< LOD	9.8	109.4	12.85	1220.1	47.31	ppm	12.7	BSHIRLEY
25	12/8/2010 9:41	Soil	120	Final	1249	Vernon	Back	IDX	55	7	< LOD	8.03	53.78	9.21	1275.3	43.71	ppm	12.7	BSHIRLEY
26	12/8/2010 9:44	Soil	120	Final	1249	Vernon	Back	IDX	55	8	< LOD	8.77	21.86	7.62	882.36	37.28	ppm	12.7	BSHIRLEY
27	12/8/2010 9:46	Soil	120	Final	1249	Vernon	Back	IDX	55	9	15.74	8.8	122.42	16.52	1506.68	64.3	ppm	12.7	BSHIRLEY
28	12/8/2010 9:49	Soil	120	Final	1249	Vernon	Back	IDX	55	10	< LOD	9.16	93.62	11.61	1237.48	45.38	ppm	12.7	BSHIRLEY
29	12/8/2010 9:52	Soil	120	Final	1249	Vernon	Back	IDX	55	11	17.74	7.56	21	8.3	202.84	20.98	ppm	12.7	BSHIRLEY
30	12/8/2010 9:55	Soil	120	Final	1249	Vernon	Back	IDX	55	12	< LOD	7.33	160.49	12.76	1466.66	44.28	ppm	12.7	BSHIRLEY
31	12/8/2010 9:58	Soil	120	Final	1249	Vernon	Back	IDX	55	13	< LOD	7.08	62.84	8.96	1402.34	42.55	ppm	12.7	BSHIRLEY
33	12/8/2010 10:02	Soil	120	Final	1249	Vernon	Back	IDX	55	14	< LOD	6.47	22.86	6.61	1058.87	35.97	ppm	12.7	BSHIRLEY
34	12/8/2010 10:05	Soil	120	Final	1249	Vernon	Back	IDX	55	15	< LOD	9.53	115.89	13.24	1623.14	54.66	ppm	12.7	BSHIRLEY
35	12/8/2010 10:08	Soil	120	Final	1249	Vernon	Back	IDX	55	16	10.07	6.67	131.56	13.23	1205.46	44.91	ppm	12.7	BSHIRLEY
36	12/8/2010 10:11	Soil	120	Final	1249	Vernon	Back	IDX	55	17	< LOD	8.63	132.19	12.56	1436.04	46.49	ppm	12.7	BSHIRLEY
37	12/8/2010 10:14	Soil	120	Final	1249	Vernon	Back	IDX	55	18	< LOD	7.9	111.73	12.13	1811.79	53.7	ppm	12.7	BSHIRLEY
38	12/8/2010 10:17	Soil	120	Final	1249	Vernon	Back	IDX	55	19	< LOD	7.26	93.56	10.75	1776	50.31	ppm	12.7	BSHIRLEY
39	12/8/2010 10:20	Soil	120	Final	1249	Vernon	Back	IDX	55	20	< LOD	9.3	139.67	13.42	2075.88	58.07	ppm	12.7	BSHIRLEY
40	12/8/2010 11:02	Soil	120	Final	1249	Vernon	Back	ECX	55	1	< LOD	8.67	130.95	11.74	1586.59	45.66	ppm	4.4	BSHIRLEY
41	12/8/2010 11:05	Soil	120	Final	1249	Vernon	Back	ECX	55	2	< LOD	8.6	157.77	12.54	1509.5	44.47	ppm	4.4	BSHIRLEY
42	12/8/2010 11:08	Soil	120	Final	1249	Vernon	Back	ECX	55	3	< LOD	8.67	144.58	12.2	1541.3	45.22	ppm	4.4	BSHIRLEY
43	12/8/2010 11:11	Soil	120	Final	1249	Vernon	Back	ECX	55	4	< LOD	8.76	146.9	12.31	1529.82	45.02	ppm	4.4	BSHIRLEY
44	12/8/2010 11:13	Soil	120	Final	1249	Vernon	Back	ECX	55	5	< LOD	8.61	142.24	12.23	1595.78	46.27	ppm	4.4	BSHIRLEY
58	12/8/2010 13:33	Soil	120	Final	1602	Dona	Front	IDX	56	1	< LOD	11.62	22.43	9.11	165.78	24.58	ppm		BBRAND
60	12/8/2010 13:37	Soil	120	Final	1602	Dona	Front	IDX	56	2	< LOD	13.57	91.93	15.16	908.58	54.25	ppm		BBRAND
61	12/8/2010 13:40	Soil	120	Final	1602	Dona	Front	IDX	56	3	< LOD	12.25	103.04	15.52	970.53	54.89	ppm		BBRAND
62	12/8/2010 13:43	Soil	120	Final	1602	Dona	Front	IDX	56	4	< LOD	20.71	120.49	21.7	909.94	69.3	ppm		BBRAND
63	12/8/2010 13:46	Soil	120	Final	1602	Dona	Front	IDX	56	5	< LOD	13.17	48.91	11.54	582	43.05	ppm		BBRAND
64	12/8/2010 13:49	Soil	120	Final	1602	Dona	Front	IDX	56	6	< LOD	11.16	74.31	11.46	655.68	38.06	ppm		BBRAND
65	12/8/2010 13:53	Soil	120	Final	1602	Dona	Front	IDX	56	7	< LOD	15.69	77.15	16.31	558.86	50.42	ppm		BBRAND
66	12/8/2010 13:55	Soil	120	Final	1602	Dona	Front	IDX	56	8	< LOD	11.99	74.81	13.87	763.89	50.12	ppm		BBRAND
67	12/8/2010 13:59	Soil	120	Final	1602	Dona	Front	IDX	56	9	< LOD	13.81	136.94	17.97	1171.05	61.06	ppm		BBRAND
68	12/8/2010 14:02	Soil	120	Final	1602	Dona	Front	IDX	56	10	< LOD	9.7	66.72	10.93	777.59	41.21	ppm		BBRAND
69	12/8/2010 14:06	Soil	120	Final	1602	Dona	Front	IDX	56	11	< LOD	9.86	131.21	13.47	1253.38	48.23	ppm		BBRAND
70	12/8/2010 14:09	Soil	120	Final	1602	Dona	Front	IDX	56	12	< LOD	14.29	113.5	16.67	960.87	56.24	ppm		BBRAND
71	12/8/2010 14:12	Soil	120	Final	1602	Dona	Front	IDX	56	13	< LOD	14.13	150.75	19.48	1181.69	64.06	ppm		BBRAND
72	12/8/2010 14:15	Soil	120	Final	1602	Dona	Front	IDX	56	14	< LOD	12.49	150.88	17.41	1504.56	64.1	ppm		BBRAND
73	12/8/2010 14:18	Soil	120	Final	1602	Dona	Front	IDX	56	15	< LOD	14.02	87.73	14.46	750.59	48.02	ppm		BBRAND
74	12/8/2010 14:21	Soil	120	Final	1602	Dona	Front	IDX	56	16	< LOD	12.48	122.89	15.08	1244.09	55.34	ppm		BBRAND
75	12/8/2010 14:25	Soil	120	Final	1602	Dona	Front	IDX	56	17	< LOD	8.45	44.76	9.97	911.8	47.81	ppm		BBRAND

Attachment 2- Cumulative Field XRF Readings

Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
76	12/8/2010 14:28	Soil	120	Final	1602	Dona	Front	IDX	56	18	< LOD	8.82	110.81	13.69	838.82	43.77	ppm		BBRAND
79	12/8/2010 14:31	Soil	120	Final	1602	Dona	Front	IDX	56	19	< LOD	9.11	198.44	16.61	2560.3	70.01	ppm		BBRAND
80	12/8/2010 14:34	Soil	120	Final	1602	Dona	Front	IDX	56	20	< LOD	10.42	221.62	17.78	2135.62	65.35	ppm		BBRAND
51	12/8/2010 13:09	Soil	120	Final	1602	Dona	Front	ECX	56	1	< LOD	7.9	149.38	11.2	1313.84	38.77	ppm	6.6	BBRAND
52	12/8/2010 13:14	Soil	120	Final	1602	Dona	Front	ECX	56	2	< LOD	7.83	138.96	10.82	1322.27	38.79	ppm	6.6	BBRAND
53	12/8/2010 13:16	Soil	120	Final	1602	Dona	Front	ECX	56	3	< LOD	7.97	157.08	11.47	1353.64	39.39	ppm	6.6	BBRAND
54	12/8/2010 13:19	Soil	120	Final	1602	Dona	Front	ECX	56	4	< LOD	8.05	160.41	11.58	1375.43	39.69	ppm	6.6	BBRAND
55	12/8/2010 13:22	Soil	120	Final	1602	Dona	Front	ECX	56	5	< LOD	7.96	203.73	12.94	1434.96	40.47	ppm	6.6	BBRAND
58	12/8/2010 13:38	Soil	120	Final	1206	Dona	Back	IDX	56	1	< LOD	9.14	125.51	13.13	1777.79	54.88	ppm	12.9	BSHIRLEY
59	12/8/2010 13:41	Soil	120	Final	1206	Dona	Back	IDX	56	2	20.4	7.87	99.01	13.19	649.29	36.91	ppm	12.9	BSHIRLEY
60	12/8/2010 13:44	Soil	120	Final	1206	Dona	Back	IDX	56	3	< LOD	7.05	80.16	9.13	751.44	29.56	ppm	12.9	BSHIRLEY
61	12/8/2010 13:47	Soil	120	Final	1206	Dona	Back	IDX	56	4	< LOD	9.97	40.69	8.89	447.68	27.57	ppm	12.9	BSHIRLEY
62	12/8/2010 13:50	Soil	120	Final	1206	Dona	Back	IDX	56	5	15.62	7.21	46.11	9.44	376.34	26.46	ppm	12.9	BSHIRLEY
63	12/8/2010 13:53	Soil	120	Final	1206	Dona	Back	IDX	56	6	< LOD	9.49	19.61	7.29	211.2	19.08	ppm	12.9	BSHIRLEY
64	12/8/2010 13:56	Soil	120	Final	1206	Dona	Back	IDX	56	7	16.86	6.85	165.47	14.27	907.37	38.61	ppm	12.9	BSHIRLEY
66	12/8/2010 13:59	Soil	120	Final	1206	Dona	Back	IDX	56	8	20.46	6.72	105.89	11.55	881.53	36.88	ppm	12.9	BSHIRLEY
67	12/8/2010 14:01	Soil	120	Final	1206	Dona	Back	IDX	56	9	< LOD	8.94	81.22	10.95	1030.51	40.99	ppm	12.9	BSHIRLEY
68	12/8/2010 14:04	Soil	120	Final	1206	Dona	Back	IDX	56	10	< LOD	9.35	75.76	10.32	784.33	34.79	ppm	12.9	BSHIRLEY
69	12/8/2010 14:07	Soil	120	Final	1206	Dona	Back	IDX	56	11	< LOD	7.54	130.97	11.51	1732.59	46.73	ppm	12.9	BSHIRLEY
70	12/8/2010 14:10	Soil	120	Final	1206	Dona	Back	IDX	56	12	< LOD	9.11	94.75	10.75	869.49	35.33	ppm	12.9	BSHIRLEY
71	12/8/2010 14:12	Soil	120	Final	1206	Dona	Back	IDX	56	13	< LOD	9.46	327.14	19.23	1482.02	49.29	ppm	12.9	BSHIRLEY
72	12/8/2010 14:15	Soil	120	Final	1206	Dona	Back	IDX	56	14	< LOD	10.15	128.5	13.58	1426.09	50.48	ppm	12.9	BSHIRLEY
73	12/8/2010 14:18	Soil	120	Final	1206	Dona	Back	IDX	56	15	14.29	6.55	44.49	8.71	419.64	25.43	ppm	12.9	BSHIRLEY
74	12/8/2010 14:20	Soil	120	Final	1206	Dona	Back	IDX	56	16	< LOD	9.77	75.35	10.89	612.54	32.83	ppm	12.9	BSHIRLEY
75	12/8/2010 14:23	Soil	120	Final	1206	Dona	Back	IDX	56	17	< LOD	8.93	68.23	9.42	608.52	29.3	ppm	12.9	BSHIRLEY
76	12/8/2010 14:26	Soil	120	Final	1206	Dona	Back	IDX	56	18	< LOD	12.54	154.95	20.03	2195.2	88.63	ppm	12.9	BSHIRLEY
77	12/8/2010 14:29	Soil	120	Final	1206	Dona	Back	IDX	56	19	15.3	7.54	215.48	17.92	1586.55	56.85	ppm	12.9	BSHIRLEY
78	12/8/2010 14:32	Soil	120	Final	1206	Dona	Back	IDX	56	20	< LOD	8.63	48.81	8.98	495.33	28.15	ppm	12.9	BSHIRLEY
52	12/8/2010 13:20	Soil	120	Final	1206	Dona	Back	ECX	56	1	< LOD	8.83	175.95	13.18	1231.22	40.46	ppm	3.9	BSHIRLEY
53	12/8/2010 13:23	Soil	120	Final	1206	Dona	Back	ECX	56	2	< LOD	8.72	154.87	12.51	1027.54	36.91	ppm	3.9	BSHIRLEY
54	12/8/2010 13:25	Soil	120	Final	1206	Dona	Back	ECX	56	3	< LOD	8.71	150.76	12.46	1124.88	38.83	ppm	3.9	BSHIRLEY
55	12/8/2010 13:28	Soil	120	Final	1206	Dona	Back	ECX	56	4	< LOD	8.59	157.76	12.66	1029.23	37.03	ppm	3.9	BSHIRLEY
56	12/8/2010 13:31	Soil	120	Final	1206	Dona	Back	ECX	56	5	< LOD	8.48	155.59	12.5	1225.37	40.24	ppm	3.9	BSHIRLEY
92	12/8/2010 15:26	Soil	120	Final	1006	Vernon	Front	IDX	57	1	< LOD	14.41	72.78	12.86	301.97	30.64	ppm	13.4	BBRAND
93	12/8/2010 15:29	Soil	120	Final	1006	Vernon	Front	IDX	57	2	< LOD	13.08	86.54	13.43	464.55	35.8	ppm	13.4	BBRAND
94	12/8/2010 15:32	Soil	120	Final	1006	Vernon	Front	IDX	57	3	< LOD	12.9	88.13	14.04	447.58	36.96	ppm	13.4	BBRAND
95	12/8/2010 15:35	Soil	120	Final	1006	Vernon	Front	IDX	57	4	< LOD	11.96	79.77	13.13	475.34	36.57	ppm	13.4	BBRAND
96	12/8/2010 15:37	Soil	120	Final	1006	Vernon	Front	IDX	57	5	< LOD	16.13	66.88	14.82	384.27	41.07	ppm	13.4	BBRAND
97	12/8/2010 15:40	Soil	120	Final	1006	Vernon	Front	IDX	57	6	< LOD	11.04	99.93	13.11	504.42	34.2	ppm	13.4	BBRAND
98	12/8/2010 15:43	Soil	120	Final	1006	Vernon	Front	IDX	57	7	< LOD	12.48	113.84	16.19	667.63	45.57	ppm	13.4	BBRAND
99	12/8/2010 15:46	Soil	120	Final	1006	Vernon	Front	IDX	57	8	< LOD	11.02	116.29	13.58	571.81	35.02	ppm	13.4	BBRAND
100	12/8/2010 15:49	Soil	120	Final	1006	Vernon	Front	IDX	57	9	< LOD	12.63	74.77	12.01	400.56	31.79	ppm	13.4	BBRAND
101	12/8/2010 15:52	Soil	120	Final	1006	Vernon	Front	IDX	57	10	< LOD	17.69	76.25	17.33	360.71	44.53	ppm	13.4	BBRAND
102	12/8/2010 15:55	Soil	120	Final	1006	Vernon	Front	IDX	57	11	< LOD	11.86	87.25	12.97	686.94	41.74	ppm	13.4	BBRAND
103	12/8/2010 15:58	Soil	120	Final	1006	Vernon	Front	IDX	57	12	< LOD	11.71	130.65	14.67	907.17	45.24	ppm	13.4	BBRAND
104	12/8/2010 16:01	Soil	120	Final	1006	Vernon	Front	IDX	57	13	< LOD	10.92	126.89	14.16	925.89	44.43	ppm	13.4	BBRAND
105	12/8/2010 16:04	Soil	120	Final	1006	Vernon	Front	IDX	57	14	< LOD	12.75	73.76	15.21	453.15	43.15	ppm	13.4	BBRAND
106	12/8/2010 16:06	Soil	120	Final	1006	Vernon	Front	IDX	57	15	< LOD	12.04	100.93	14.68	605.22	41.5	ppm	13.4	BBRAND
107	12/8/2010 16:10	Soil	120	Final	1006	Vernon	Front	IDX	57	16	< LOD	11.86	47.35	11.21	275.79	29.38	ppm	13.4	BBRAND

Attachment 2- Cumulative Field XRF Readings

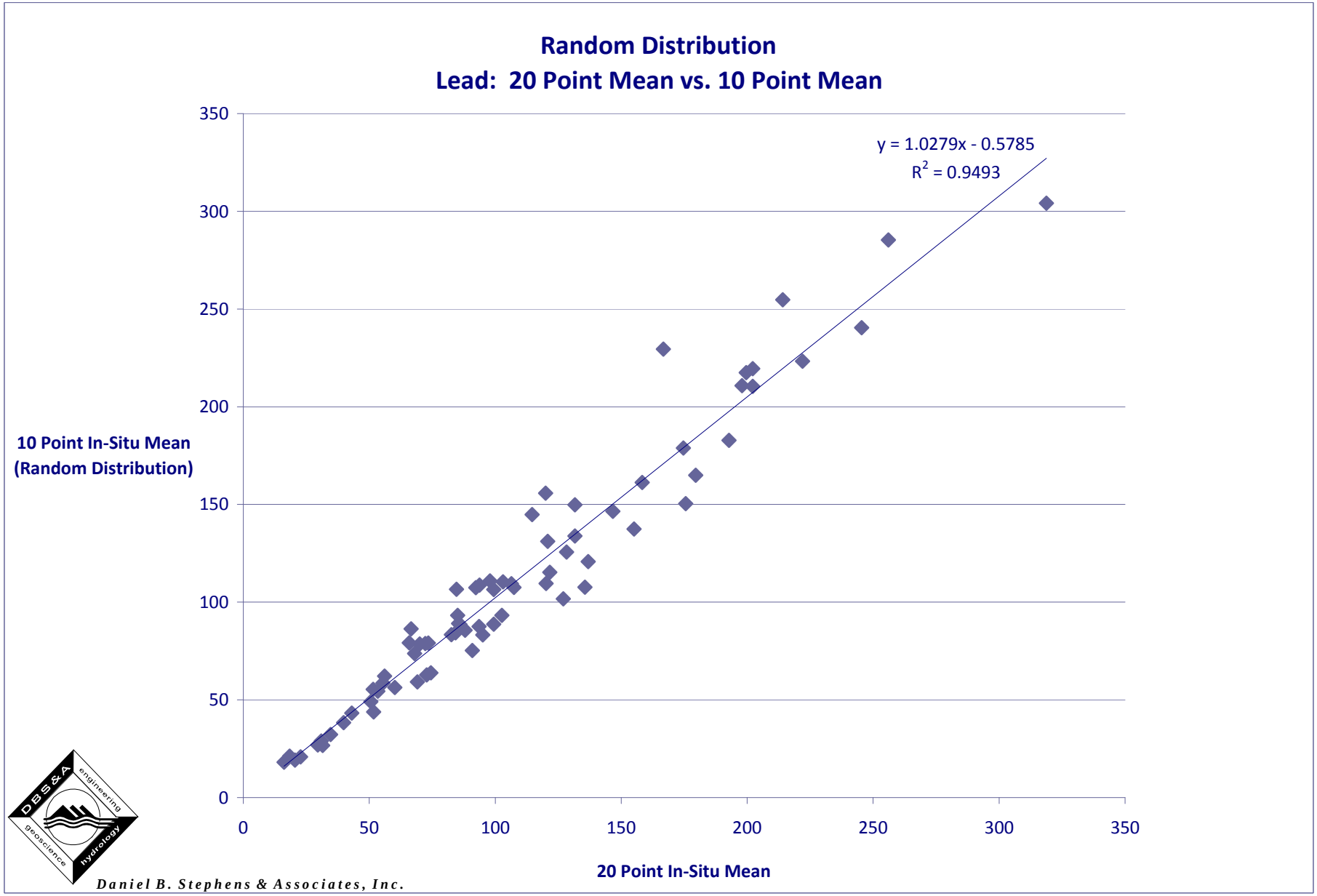
Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
108	12/8/2010 16:12	Soil	120	Final	1006	Vernon	Front	IDX	57	17	< LOD	12.33	77.75	14.33	455.75	39.83	ppm	13.4	BBRAND
109	12/8/2010 16:15	Soil	120	Final	1006	Vernon	Front	IDX	57	18	16	9.27	73.65	12.51	284.94	28.64	ppm	13.4	BBRAND
110	12/8/2010 16:18	Soil	120	Final	1006	Vernon	Front	IDX	57	19	< LOD	11.37	50.07	10.2	298.57	27.73	ppm	13.4	BBRAND
111	12/8/2010 16:21	Soil	120	Final	1006	Vernon	Front	IDX	57	20	< LOD	12.49	77.16	11.77	271.27	25.8	ppm	13.4	BBRAND
86	12/8/2010 15:05	Soil	120	Final	1006	Vernon	Front	ECX	57	1	< LOD	8.13	124.39	10.46	643.4	27.91	ppm	3.3	BBRAND
87	12/8/2010 15:08	Soil	120	Final	1006	Vernon	Front	ECX	57	2	< LOD	8.25	122.78	10.53	677.32	28.86	ppm	3.3	BBRAND
88	12/8/2010 15:11	Soil	120	Final	1006	Vernon	Front	ECX	57	3	< LOD	8.08	133.4	10.81	663.59	28.21	ppm	3.3	BBRAND
89	12/8/2010 15:13	Soil	120	Final	1006	Vernon	Front	ECX	57	4	< LOD	8.43	124.11	10.53	649.39	28.11	ppm	3.3	BBRAND
90	12/8/2010 15:15	Soil	120	Final	1006	Vernon	Front	ECX	57	5	< LOD	8.33	121.35	10.55	727.32	29.91	ppm	3.3	BBRAND
90	12/8/2010 15:32	Soil	120	Final	1006	Vernon	Back	IDX	57	1	< LOD	8.21	50.31	8.64	578.58	28.73	ppm	12.9	BSHIRLEY
91	12/8/2010 15:35	Soil	120	Final	1006	Vernon	Back	IDX	57	2	< LOD	8.2	114.45	11.63	1141.39	40.65	ppm	12.9	BSHIRLEY
92	12/8/2010 15:38	Soil	120	Final	1006	Vernon	Back	IDX	57	3	< LOD	8.07	51.11	9.05	489.72	27.5	ppm	12.9	BSHIRLEY
93	12/8/2010 15:41	Soil	120	Final	1006	Vernon	Back	IDX	57	4	< LOD	10.58	49.15	10.08	283.02	24.12	ppm	12.9	BSHIRLEY
94	12/8/2010 15:43	Soil	120	Final	1006	Vernon	Back	IDX	57	5	< LOD	7.57	22.47	7.61	201.69	19.11	ppm	12.9	BSHIRLEY
95	12/8/2010 15:46	Soil	120	Final	1006	Vernon	Back	IDX	57	6	< LOD	9.41	54.3	9.47	441.79	27.15	ppm	12.9	BSHIRLEY
96	12/8/2010 15:49	Soil	120	Final	1006	Vernon	Back	IDX	57	7	14.32	7.18	51.4	9.99	359.77	26.2	ppm	12.9	BSHIRLEY
97	12/8/2010 15:51	Soil	120	Final	1006	Vernon	Back	IDX	57	8	< LOD	9.49	42.99	8.94	478.16	28.28	ppm	12.9	BSHIRLEY
99	12/8/2010 15:55	Soil	120	Final	1006	Vernon	Back	IDX	57	9	< LOD	10.22	33.25	8.72	276.59	23.09	ppm	12.9	BSHIRLEY
100	12/8/2010 15:58	Soil	120	Final	1006	Vernon	Back	IDX	57	10	< LOD	11.12	65.72	11.3	401.08	29.14	ppm	12.9	BSHIRLEY
101	12/8/2010 16:01	Soil	120	Final	1006	Vernon	Back	IDX	57	11	< LOD	8.84	57.91	9.32	488.38	27.38	ppm	12.9	BSHIRLEY
102	12/8/2010 16:04	Soil	120	Final	1006	Vernon	Back	IDX	57	12	< LOD	8.16	80.95	9.83	483.73	25.87	ppm	12.9	BSHIRLEY
103	12/8/2010 16:06	Soil	120	Final	1006	Vernon	Back	IDX	57	13	< LOD	8.61	74.5	10.48	602.81	31.41	ppm	12.9	BSHIRLEY
104	12/8/2010 16:09	Soil	120	Final	1006	Vernon	Back	IDX	57	14	19.45	7.07	41.41	9.18	367.67	25.91	ppm	12.9	BSHIRLEY
105	12/8/2010 16:12	Soil	120	Final	1006	Vernon	Back	IDX	57	15	19.55	7.54	69.76	11.06	436.1	29.09	ppm	12.9	BSHIRLEY
106	12/8/2010 16:15	Soil	120	Final	1006	Vernon	Back	IDX	57	16	12.78	7.66	29.67	9.26	265.74	24.46	ppm	12.9	BSHIRLEY
107	12/8/2010 16:17	Soil	120	Final	1006	Vernon	Back	IDX	57	17	< LOD	10.49	28.01	8.56	266.26	22.97	ppm	12.9	BSHIRLEY
108	12/8/2010 16:20	Soil	120	Final	1006	Vernon	Back	IDX	57	18	< LOD	10.19	38.03	8.95	303.94	23.51	ppm	12.9	BSHIRLEY
109	12/8/2010 16:23	Soil	120	Final	1006	Vernon	Back	IDX	57	19	< LOD	10.38	35.36	8.81	319.14	24.05	ppm	12.9	BSHIRLEY
110	12/8/2010 16:25	Soil	120	Final	1006	Vernon	Back	IDX	57	20	< LOD	9.49	44.5	8.9	402.57	25.87	ppm	12.9	BSHIRLEY
84	12/8/2010 15:13	Soil	120	Final	1006	Vernon	Back	ECX	57	1	< LOD	8.43	61.89	8.97	400.14	23.66	ppm	12.9	BSHIRLEY
85	12/8/2010 15:15	Soil	120	Final	1006	Vernon	Back	ECX	57	2	< LOD	8.42	77.36	9.77	401.18	23.93	ppm	12.9	BSHIRLEY
86	12/8/2010 15:18	Soil	120	Final	1006	Vernon	Back	ECX	57	3	< LOD	8.42	67.17	9.27	399.35	23.8	ppm	12.9	BSHIRLEY
87	12/8/2010 15:20	Soil	120	Final	1006	Vernon	Back	ECX	57	4	< LOD	8.56	53.36	8.68	378.35	23.17	ppm	12.9	BSHIRLEY
88	12/8/2010 15:23	Soil	120	Final	1006	Vernon	Back	ECX	57	5	< LOD	8.53	68.31	9.29	408.03	24.04	ppm	12.9	BSHIRLEY
134	12/9/2010 8:56	Soil	120	Final	1218	Vernon	Front	IDX	58	1	< LOD	10.52	245.17	19.75	1882.55	65.11	ppm	13.3	BBRAND
135	12/9/2010 9:01	Soil	120	Final	1218	Vernon	Front	IDX	58	2	< LOD	12.44	137.52	18.35	1567.63	72.17	ppm	13.3	BBRAND
137	12/9/2010 9:04	Soil	120	Final	1218	Vernon	Front	IDX	58	3	< LOD	10.42	92.54	13.63	1337.94	58.6	ppm	13.3	BBRAND
138	12/9/2010 9:07	Soil	120	Final	1218	Vernon	Front	IDX	58	4	< LOD	10.57	52.95	11.88	1374.18	64.66	ppm	13.3	BBRAND
140	12/9/2010 9:10	Soil	120	Final	1218	Vernon	Front	IDX	58	5	< LOD	11.77	70.9	13.45	1260.68	62.03	ppm	13.3	BBRAND
141	12/9/2010 9:14	Soil	120	Final	1218	Vernon	Front	IDX	58	6	< LOD	12.58	118.75	15.03	1297.9	56.91	ppm	13.3	BBRAND
142	12/9/2010 9:18	Soil	120	Final	1218	Vernon	Front	IDX	58	7	< LOD	11.32	80.38	13.98	789.73	48.79	ppm	13.3	BBRAND
143	12/9/2010 9:21	Soil	120	Final	1218	Vernon	Front	IDX	58	8	< LOD	9.32	104.76	13.46	1095.66	49.7	ppm	13.3	BBRAND
145	12/9/2010 9:24	Soil	120	Final	1218	Vernon	Front	IDX	58	9	< LOD	9.76	114.63	13.94	613.03	37.53	ppm	13.3	BBRAND
147	12/9/2010 9:27	Soil	120	Final	1218	Vernon	Front	IDX	58	10	< LOD	12.58	69.69	13.71	1324.08	65.33	ppm	13.3	BBRAND
148	12/9/2010 9:31	Soil	120	Final	1218	Vernon	Front	IDX	58	11	< LOD	9.48	28.82	10.4	1252.91	66.32	ppm	13.3	BBRAND
149	12/9/2010 9:34	Soil	120	Final	1218	Vernon	Front	IDX	58	12	< LOD	9.8	91.94	12.13	844.56	41.91	ppm	13.3	BBRAND
150	12/9/2010 9:37	Soil	120	Final	1218	Vernon	Front	IDX	58	13	< LOD	18.54	103.4	22	515.2	58.79	ppm	13.3	BBRAND
152	12/9/2010 9:40	Soil	120	Final	1218	Vernon	Front	IDX	58	14	< LOD	13.43	108.55	14.89	602.53	41.03	ppm	13.3	BBRAND
154	12/9/2010 9:43	Soil	120	Final	1218	Vernon	Front	IDX	58	15	< LOD	13.43	80.74	16.47	651.82	53.33	ppm	13.3	BBRAND

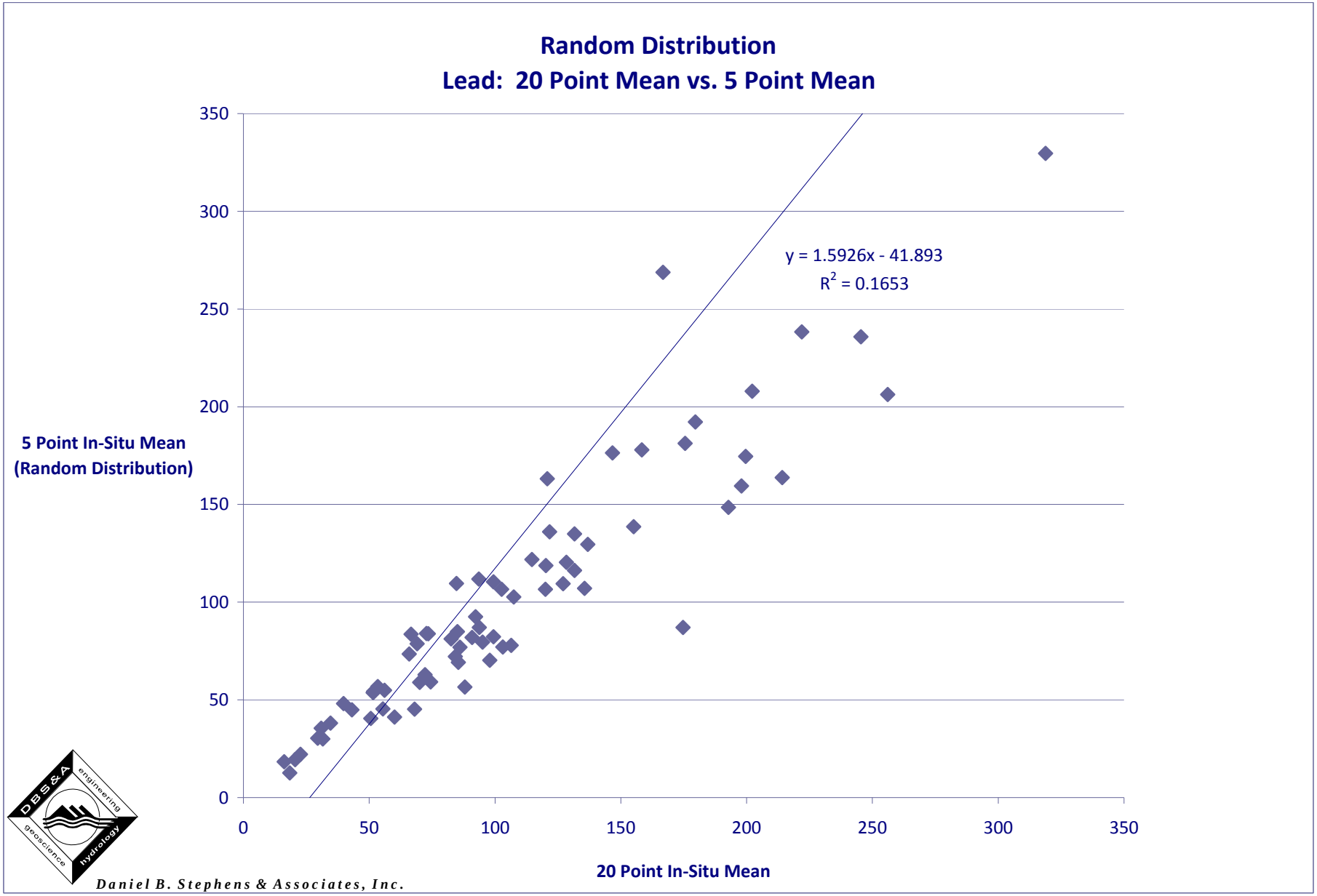
Attachment 2- Cumulative Field XRF Readings

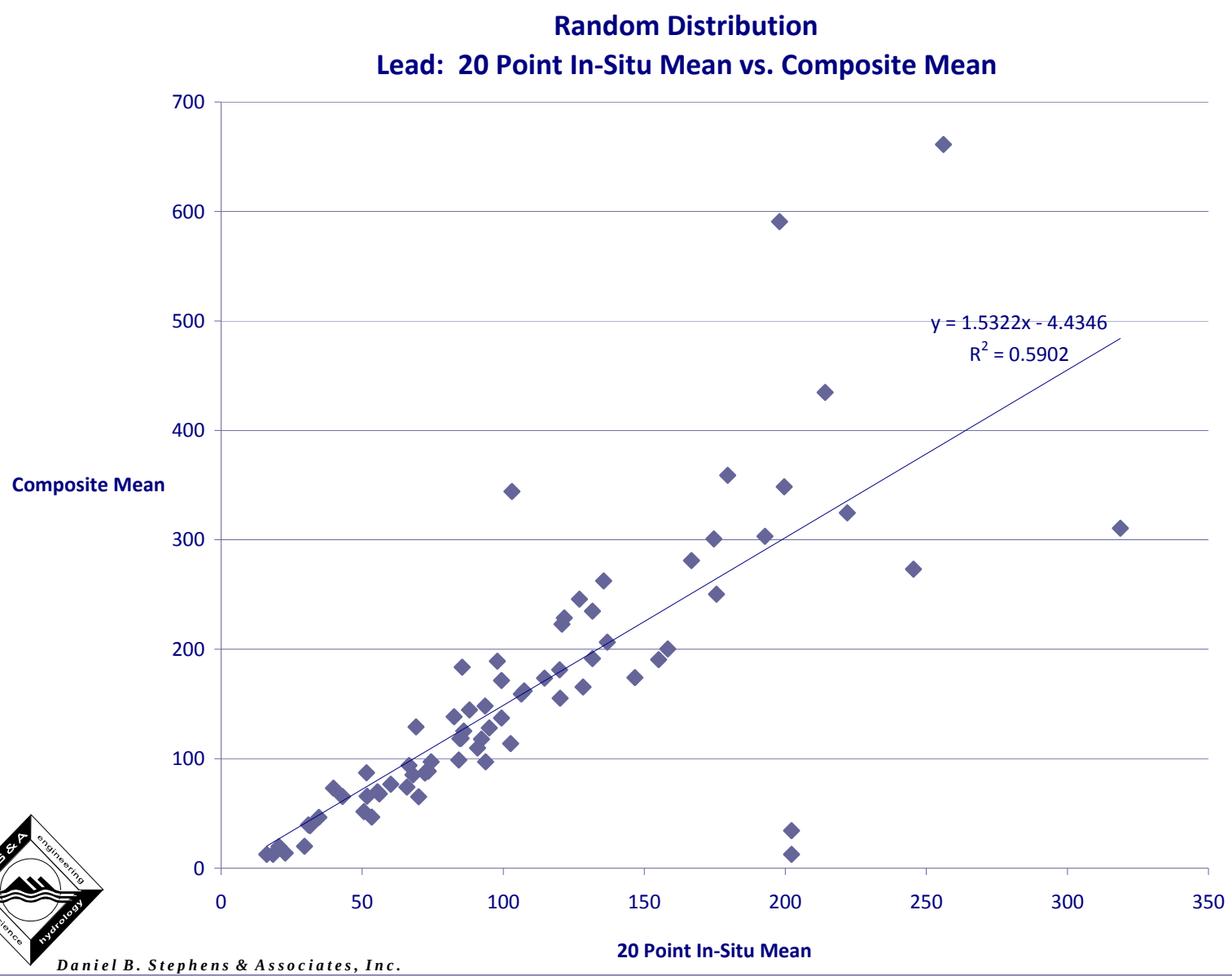
Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
155	12/9/2010 9:46	Soil	120	Final	1218	Vernon	Front	IDX	58	16	< LOD	14.1	62.32	14.27	393.61	40.4	ppm	13.3	BBRAND
158	12/9/2010 9:49	Soil	120	Final	1218	Vernon	Front	IDX	58	17	< LOD	16.4	109.69	19.19	519.33	49.46	ppm	13.3	BBRAND
159	12/9/2010 9:52	Soil	120	Final	1218	Vernon	Front	IDX	58	18	< LOD	12.38	94.27	14.99	783.06	49.3	ppm	13.3	BBRAND
160	12/9/2010 9:55	Soil	120	Final	1218	Vernon	Front	IDX	58	19	< LOD	9.84	112.99	13.63	1218.75	50.92	ppm	13.3	BBRAND
161	12/9/2010 9:58	Soil	120	Final	1218	Vernon	Front	IDX	58	20	< LOD	12.57	78.47	12.05	914.41	45.78	ppm	13.3	BBRAND
162	12/9/2010 10:03	Soil	120	Final	1218	Vernon	Front	ECX	58	1	< LOD	8.39	185.95	12.62	1168.93	37.38	ppm	4.8	BBRAND
163	12/9/2010 10:06	Soil	120	Final	1218	Vernon	Front	ECX	58	2	< LOD	8.65	193.85	13.04	1270.2	39.42	ppm	4.8	BBRAND
164	12/9/2010 10:09	Soil	65.92	Final	1218	Vernon	Front	ECX	58	3	< LOD	51.57	197.7	13.09	1251.67	39.06	ppm	4.8	BBRAND
165	12/9/2010 10:12	Soil	120	Final	1218	Vernon	Front	ECX	58	4	< LOD	8.56	172.72	12.34	1215.02	38.47	ppm	4.8	BBRAND
166	12/9/2010 10:14	Soil	120	Final	1218	Vernon	Front	ECX	58	5	< LOD	8.34	195.27	13	1192.54	37.98	ppm	4.8	BBRAND
17	12/9/2010 8:58	Soil	120	Final	1218	Vernon	Back	IDX	58	1	12.68	6.83	113.03	12.42	1137.58	43.48	ppm	5.5	BSHIRLEY
18	12/9/2010 9:01	Soil	120	Final	1218	Vernon	Back	IDX	58	2	18.06	6.81	74.78	10.37	956.68	38.72	ppm	5.5	BSHIRLEY
19	12/9/2010 9:04	Soil	120	Final	1218	Vernon	Back	IDX	58	3	< LOD	9.15	86.54	10.77	1141.16	41.56	ppm	5.5	BSHIRLEY
20	12/9/2010 9:07	Soil	120	Final	1218	Vernon	Back	IDX	58	4	< LOD	10.77	43.72	10.57	1508.08	57.77	ppm	5.5	BSHIRLEY
22	12/9/2010 9:10	Soil	120	Final	1218	Vernon	Back	IDX	58	5	< LOD	9.3	83.7	11.16	692.2	34.44	ppm	5.5	BSHIRLEY
23	12/9/2010 9:12	Soil	120	Final	1218	Vernon	Back	IDX	58	6	< LOD	8.28	61.35	9.34	1199.78	41.41	ppm	5.5	BSHIRLEY
24	12/9/2010 9:16	Soil	120	Final	1218	Vernon	Back	IDX	58	7	< LOD	8.19	50.17	9.69	1283.29	47.13	ppm	5.5	BSHIRLEY
25	12/9/2010 9:19	Soil	120	Final	1218	Vernon	Back	IDX	58	8	< LOD	8.87	56.15	9.97	957.63	40.58	ppm	5.5	BSHIRLEY
26	12/9/2010 9:22	Soil	120	Final	1218	Vernon	Back	IDX	58	9	16.47	7.12	49.87	9.56	373.28	25.8	ppm	5.5	BSHIRLEY
27	12/9/2010 9:25	Soil	120	Final	1218	Vernon	Back	IDX	58	10	< LOD	10.23	58.97	10.5	474.69	30.23	ppm	5.5	BSHIRLEY
28	12/9/2010 9:28	Soil	120	Final	1218	Vernon	Back	IDX	58	11	20.66	7.29	62.74	10.44	408.91	27.71	ppm	5.5	BSHIRLEY
29	12/9/2010 9:31	Soil	120	Final	1218	Vernon	Back	IDX	58	12	< LOD	9.23	34.55	8.1	545.66	28.99	ppm	5.5	BSHIRLEY
30	12/9/2010 9:40	Soil	120	Final	1218	Vernon	Back	IDX	58	13	< LOD	9.55	51.23	9.82	647.79	34.16	ppm	5.5	BSHIRLEY
31	12/9/2010 9:42	Soil	120	Final	1218	Vernon	Back	IDX	58	14	< LOD	10.63	45.03	10.97	1349.33	56	ppm	5.5	BSHIRLEY
32	12/9/2010 9:46	Soil	120	Final	1218	Vernon	Back	IDX	58	15	< LOD	9.82	29.15	7.94	436.6	26.57	ppm	5.5	BSHIRLEY
33	12/9/2010 9:49	Soil	120	Final	1218	Vernon	Back	IDX	58	16	< LOD	10.78	32.18	9.26	604.75	35.2	ppm	5.5	BSHIRLEY
34	12/9/2010 9:51	Soil	120	Final	1218	Vernon	Back	IDX	58	17	< LOD	9.58	45.07	8.68	543.69	28.84	ppm	5.5	BSHIRLEY
35	12/9/2010 9:54	Soil	120	Final	1218	Vernon	Back	IDX	58	18	< LOD	9.98	42.61	8.97	280.77	22.5	ppm	5.5	BSHIRLEY
36	12/9/2010 9:57	Soil	120	Final	1218	Vernon	Back	IDX	58	19	< LOD	9.24	32.47	8.15	518.92	28.76	ppm	5.5	BSHIRLEY
37	12/9/2010 10:00	Soil	120	Final	1218	Vernon	Back	IDX	58	20	< LOD	9.69	55.19	9.7	559.23	30.69	ppm	5.5	BSHIRLEY
38	12/9/2010 10:12	Soil	120	Final	1218	Vernon	Back	ECX	58	1	< LOD	8.55	65.16	9.14	474.92	25.73	ppm	3.5	BSHIRLEY
39	12/9/2010 10:15	Soil	120	Final	1218	Vernon	Back	ECX	58	2	< LOD	8.75	76.39	9.65	497.54	26.38	ppm	3.5	BSHIRLEY
40	12/9/2010 10:18	Soil	120	Final	1218	Vernon	Back	ECX	58	3	< LOD	8.38	70.75	9.42	506.03	26.47	ppm	3.5	BSHIRLEY
41	12/9/2010 10:21	Soil	120	Final	1218	Vernon	Back	ECX	58	4	< LOD	8.57	73.01	9.47	481.66	25.9	ppm	3.5	BSHIRLEY
42	12/9/2010 10:23	Soil	120	Final	1218	Vernon	Back	ECX	58	5	< LOD	8.61	63.91	9.18	494.18	26.33	ppm	3.5	BSHIRLEY
171	12/9/2010 11:00	Soil	120	Final	1209	Dona	Front	IDX	59	1	< LOD	14.32	279.98	25.2	1635.49	73.33	ppm	6.4	BBRAND
172	12/9/2010 11:03	Soil	120	Final	1209	Dona	Front	IDX	59	2	< LOD	11.26	206.35	16.7	913.22	41.89	ppm	6.4	BBRAND
173	12/9/2010 11:06	Soil	120	Final	1209	Dona	Front	IDX	59	3	< LOD	9.97	52.01	9.87	384.03	29.14	ppm	6.4	BBRAND
174	12/9/2010 11:09	Soil	120	Final	1209	Dona	Front	IDX	59	4	< LOD	11.57	65.22	12.49	684.83	44.92	ppm	6.4	BBRAND
175	12/9/2010 11:12	Soil	120	Final	1209	Dona	Front	IDX	59	5	< LOD	9.85	140.65	13.93	951.27	42.26	ppm	6.4	BBRAND
178	12/9/2010 11:16	Soil	120	Final	1209	Dona	Front	IDX	59	6	< LOD	12.36	141.53	15.09	530.88	34.71	ppm	6.4	BBRAND
181	12/9/2010 11:20	Soil	120	Final	1209	Dona	Front	IDX	59	7	< LOD	12.44	101.78	13.48	506.49	34.97	ppm	6.4	BBRAND
182	12/9/2010 11:23	Soil	120	Final	1209	Dona	Front	IDX	59	8	< LOD	10.81	233.33	18.56	1445.07	54.8	ppm	6.4	BBRAND
183	12/9/2010 11:26	Soil	120	Final	1209	Dona	Front	IDX	59	9	< LOD	10.83	188.5	17.15	1163.8	50.46	ppm	6.4	BBRAND
184	12/9/2010 11:29	Soil	120	Final	1209	Dona	Front	IDX	59	10	< LOD	12.84	142.07	16.02	649.45	40.54	ppm	6.4	BBRAND
185	12/9/2010 11:32	Soil	120	Final	1209	Dona	Front	IDX	59	11	< LOD	12.65	106.93	14.01	688.12	40.91	ppm	6.4	BBRAND
186	12/9/2010 11:35	Soil	120	Final	1209	Dona	Front	IDX	59	12	< LOD	11.26	91.78	12.53	346.2	28.45	ppm	6.4	BBRAND
187	12/9/2010 11:38	Soil	120	Final	1209	Dona	Front	IDX	59	13	< LOD	11.51	80.29	11.85	421.61	30.95	ppm	6.4	BBRAND
188	12/9/2010 11:41	Soil	120	Final	1209	Dona	Front	IDX	59	14	< LOD	15.65	71.04	14.39	365.03	38.15	ppm	6.4	BBRAND

Attachment 2- Cumulative Field XRF Readings

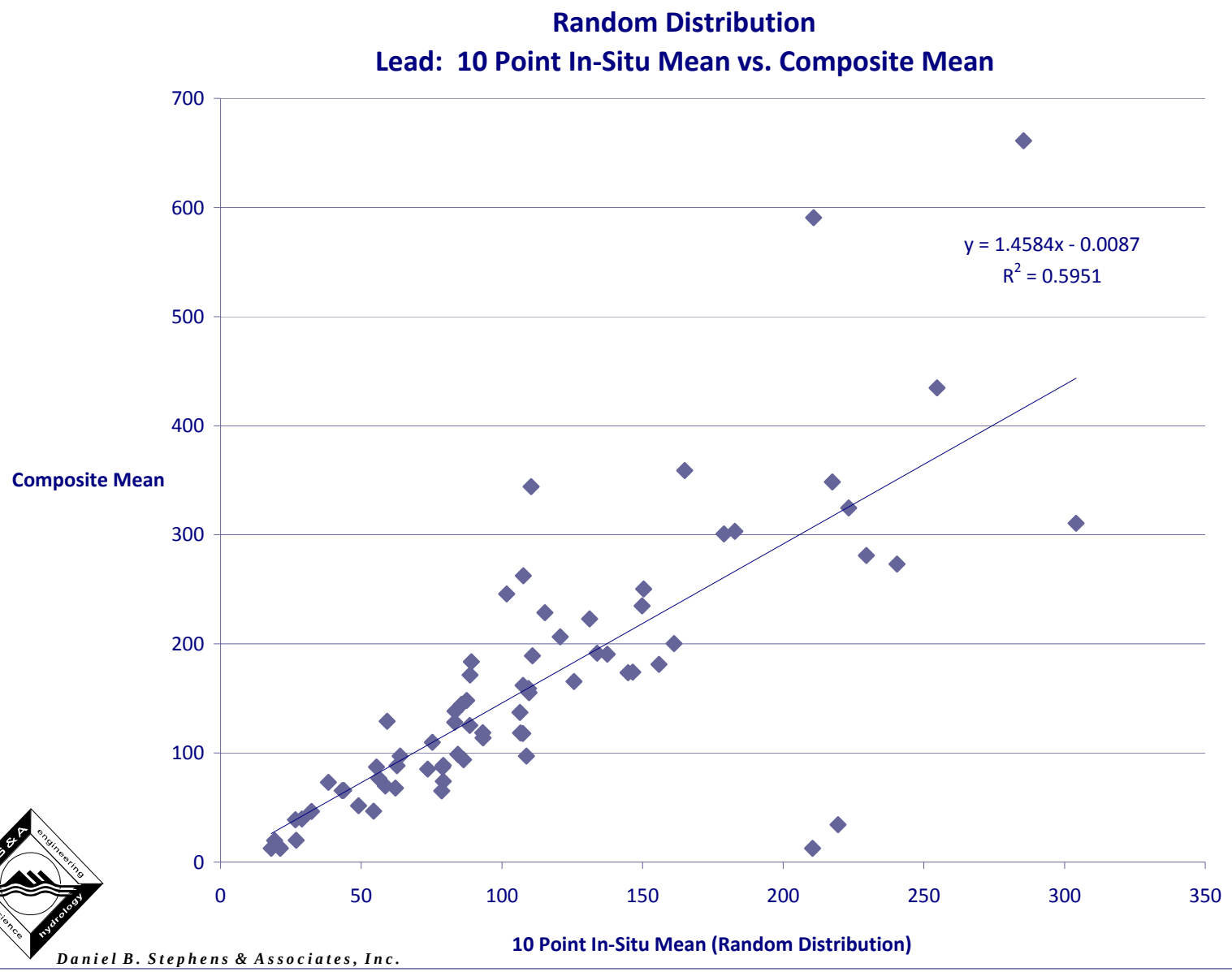
Reading No	Time	Type	Duration	Sequence	House #	Street	Yard	Sample Type	Sample #	Aliquot #	Cd	Cd Error	Pb	Pb Error	Zn	Zn Error	Units	Soil Moisture	User Login
189	12/9/2010 11:44	Soil	120	Final	1209	Dona	Front	IDX	59	15	< LOD	12.23	103.49	13.12	426.48	31.31	ppm	6.4	BBRAND
190	12/9/2010 11:46	Soil	120	Final	1209	Dona	Front	IDX	59	16	< LOD	14.91	147.07	20.44	620.91	50.37	ppm	6.4	BBRAND
191	12/9/2010 11:50	Soil	120	Final	1209	Dona	Front	IDX	59	17	< LOD	10.41	87.34	11.65	680.54	36.85	ppm	6.4	BBRAND
192	12/9/2010 11:52	Soil	120	Final	1209	Dona	Front	IDX	59	18	< LOD	11.15	89.18	12.66	701.03	40.44	ppm	6.4	BBRAND
194	12/9/2010 11:55	Soil	120	Final	1209	Dona	Front	IDX	59	19	< LOD	9.74	58.81	9.8	363.06	26.86	ppm	6.4	BBRAND
195	12/9/2010 11:58	Soil	120	Final	1209	Dona	Front	IDX	59	20	< LOD	9.23	28.44	7.45	351.24	25.78	ppm	6.4	BBRAND
196	12/9/2010 12:06	Soil	120	Final	1209	Dona	Front	ECX	59	1	< LOD	8.49	218.17	13.72	1304.98	39.86	ppm	3.3	BBRAND
197	12/9/2010 12:09	Soil	120	Final	1209	Dona	Front	ECX	59	2	< LOD	8.9	199.11	13.35	1103.29	37.2	ppm	3.3	BBRAND
198	12/9/2010 12:11	Soil	120	Final	1209	Dona	Front	ECX	59	3	< LOD	8.75	246.03	14.49	1116.24	36.91	ppm	3.3	BBRAND
199	12/9/2010 12:14	Soil	120	Final	1209	Dona	Front	ECX	59	4	< LOD	8.58	242.46	14.47	1309.42	40.07	ppm	3.3	BBRAND
200	12/9/2010 12:17	Soil	120	Final	1209	Dona	Front	ECX	59	5	< LOD	8.63	208.65	13.6	1077.73	36.67	ppm	3.3	BBRAND
47	12/9/2010 11:00	Soil	120	Final	1209	Dona	Back	IDX	59	1	< LOD	9.87	119.92	12.84	862.22	38.42	ppm	7.3	BSHIRLEY
48	12/9/2010 11:03	Soil	120	Final	1209	Dona	Back	IDX	59	2	< LOD	9.89	80.01	10.98	828.21	37.54	ppm	7.3	BSHIRLEY
49	12/9/2010 11:06	Soil	120	Final	1209	Dona	Back	IDX	59	3	< LOD	11.3	120.85	16.09	1079.55	53.25	ppm	7.3	BSHIRLEY
50	12/9/2010 11:10	Soil	120	Final	1209	Dona	Back	IDX	59	4	< LOD	8.07	70.08	9.59	542.62	27.93	ppm	7.3	BSHIRLEY
51	12/9/2010 11:13	Soil	120	Final	1209	Dona	Back	IDX	59	5	< LOD	9.33	122.71	13.44	1527.81	52.58	ppm	7.3	BSHIRLEY
52	12/9/2010 11:16	Soil	120	Final	1209	Dona	Back	IDX	59	6	< LOD	8.67	45.48	9.8	1230.49	47.86	ppm	7.3	BSHIRLEY
53	12/9/2010 11:18	Soil	120	Final	1209	Dona	Back	IDX	59	7	< LOD	9.3	53.4	9.81	856.35	38.38	ppm	7.3	BSHIRLEY
54	12/9/2010 11:21	Soil	120	Final	1209	Dona	Back	IDX	59	8	< LOD	9.16	43.6	8.8	575.12	30.47	ppm	7.3	BSHIRLEY
56	12/9/2010 11:24	Soil	120	Final	1209	Dona	Back	IDX	59	9	< LOD	8.4	108.38	11.25	824.29	34.37	ppm	7.3	BSHIRLEY
57	12/9/2010 11:27	Soil	120	Final	1209	Dona	Back	IDX	59	10	< LOD	9.44	43.67	10.19	1172.81	49.36	ppm	7.3	BSHIRLEY
58	12/9/2010 11:30	Soil	120	Final	1209	Dona	Back	IDX	59	11	< LOD	11.55	70.65	12.99	1184.92	54.6	ppm	7.3	BSHIRLEY
59	12/9/2010 11:32	Soil	120	Final	1209	Dona	Back	IDX	59	12	< LOD	8.4	70.16	11.38	2218.58	65.32	ppm	7.3	BSHIRLEY
60	12/9/2010 11:35	Soil	120	Final	1209	Dona	Back	IDX	59	13	< LOD	10.83	92.01	13.44	1454.45	56.62	ppm	7.3	BSHIRLEY
61	12/9/2010 11:38	Soil	120	Final	1209	Dona	Back	IDX	59	14	< LOD	8.81	39.39	9.13	1035.59	42.77	ppm	7.3	BSHIRLEY
62	12/9/2010 11:41	Soil	120	Final	1209	Dona	Back	IDX	59	15	< LOD	7.41	172.23	13.82	4509.65	80.75	ppm	7.3	BSHIRLEY
64	12/9/2010 11:44	Soil	120	Final	1209	Dona	Back	IDX	59	16	< LOD	8.8	116.39	13.49	1574.25	54.43	ppm	7.3	BSHIRLEY
65	12/9/2010 11:48	Soil	120	Final	1209	Dona	Back	IDX	59	17	< LOD	9.76	51.35	10.32	949.37	43.01	ppm	7.3	BSHIRLEY
66	12/9/2010 11:50	Soil	120	Final	1209	Dona	Back	IDX	59	18	< LOD	8.42	79.4	10.38	1342.48	44.53	ppm	7.3	BSHIRLEY
67	12/9/2010 11:53	Soil	120	Final	1209	Dona	Back	IDX	59	19	< LOD	7.52	113.53	11.74	2053.37	54.54	ppm	7.3	BSHIRLEY
68	12/9/2010 11:56	Soil	120	Final	1209	Dona	Back	IDX	59	20	13.98	7.31	95.41	12.7	1689.95	57.08	ppm	7.3	BSHIRLEY
69	12/9/2010 12:14	Soil	120	Final	1209	Dona	Back	ECX	59	1	< LOD	8.15	174.13	13.14	1110.79	38.48	ppm	4.8	BSHIRLEY
70	12/9/2010 12:17	Soil	120	Final	1209	Dona	Back	ECX	59	2	< LOD	8.23	177.65	13.14	1169.51	38.98	ppm	4.8	BSHIRLEY
71	12/9/2010 12:19	Soil	120	Final	1209	Dona	Back	ECX	59	3	< LOD	8.44	205.2	13.93	955.36	35.33	ppm	4.8	BSHIRLEY
72	12/9/2010 12:22	Soil	120	Final	1209	Dona	Back	ECX	59	4	< LOD	8.14	190.49	13.67	1082.65	38.05	ppm	4.8	BSHIRLEY
73	12/9/2010 12:25	Soil	120	Final	1209	Dona	Back	ECX	59	5	< LOD	8.61	170.78	13.11	1073.7	38.04	ppm	4.8	BSHIRLEY


Random Distribution
Lead: 20 Point Mean vs. 10 Point Mean
y = 1.0279x - 0.5785
R2 = 0.9493
10 Point In-Situ Mean
(Random Distribution)
20 Point In-Situ Mean
0
50
100
150
200
250
300
350
DBS&A
engineering
geoscience
hydrology
Daniel B. Stephens & Associates, Inc.

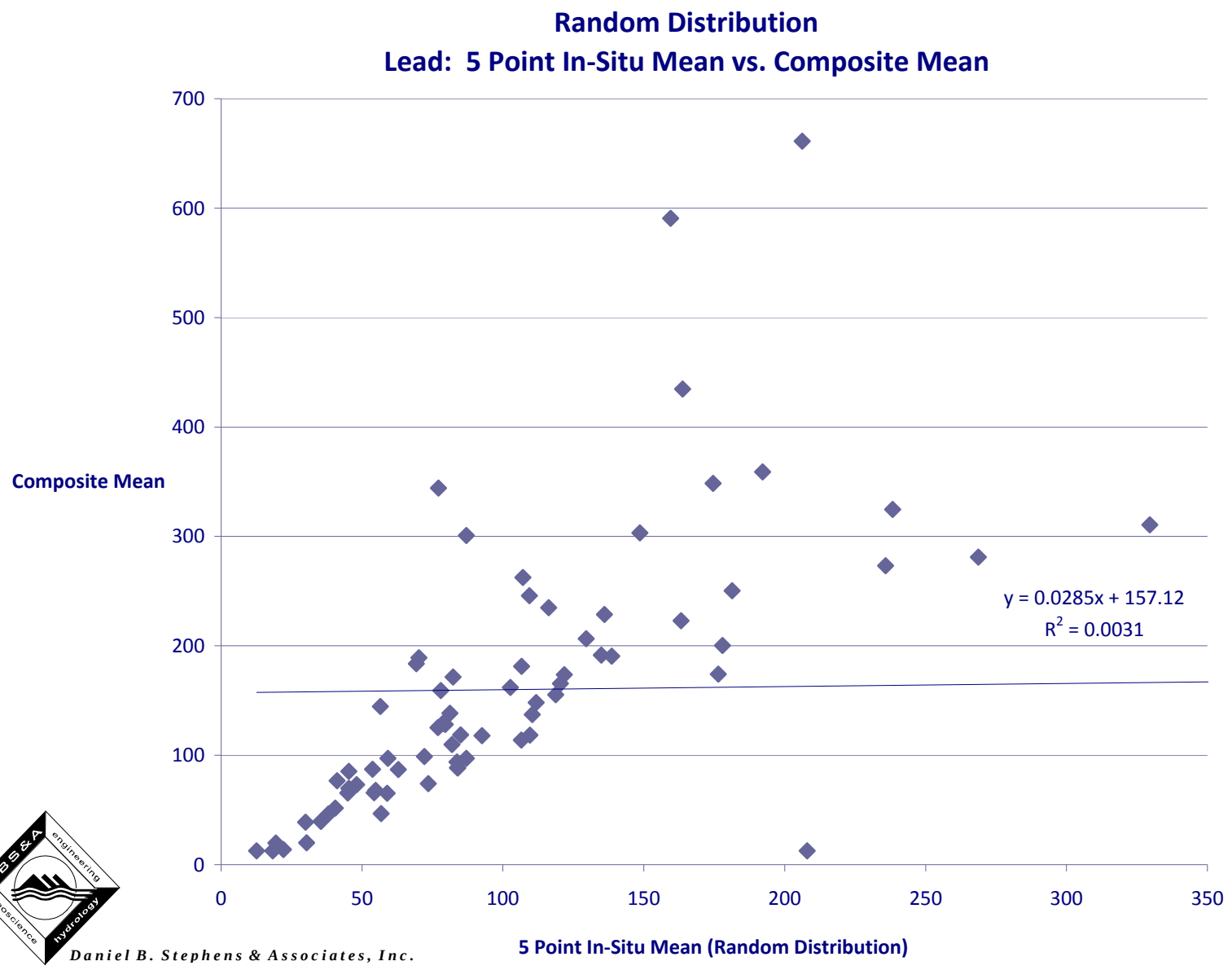

Random Distribution
Lead: 20 Point Mean vs. 5 Point Mean
y = 1.5926x - 41.893
R2 = 0.1653
5 Point In-Situ Mean
(Random Distribution)
20 Point In-Situ Mean
0
50
100
150
200
250
300
350
DBS&A
engineering
geoscience
hydrology
Daniel B. Stephens & Associates, Inc.



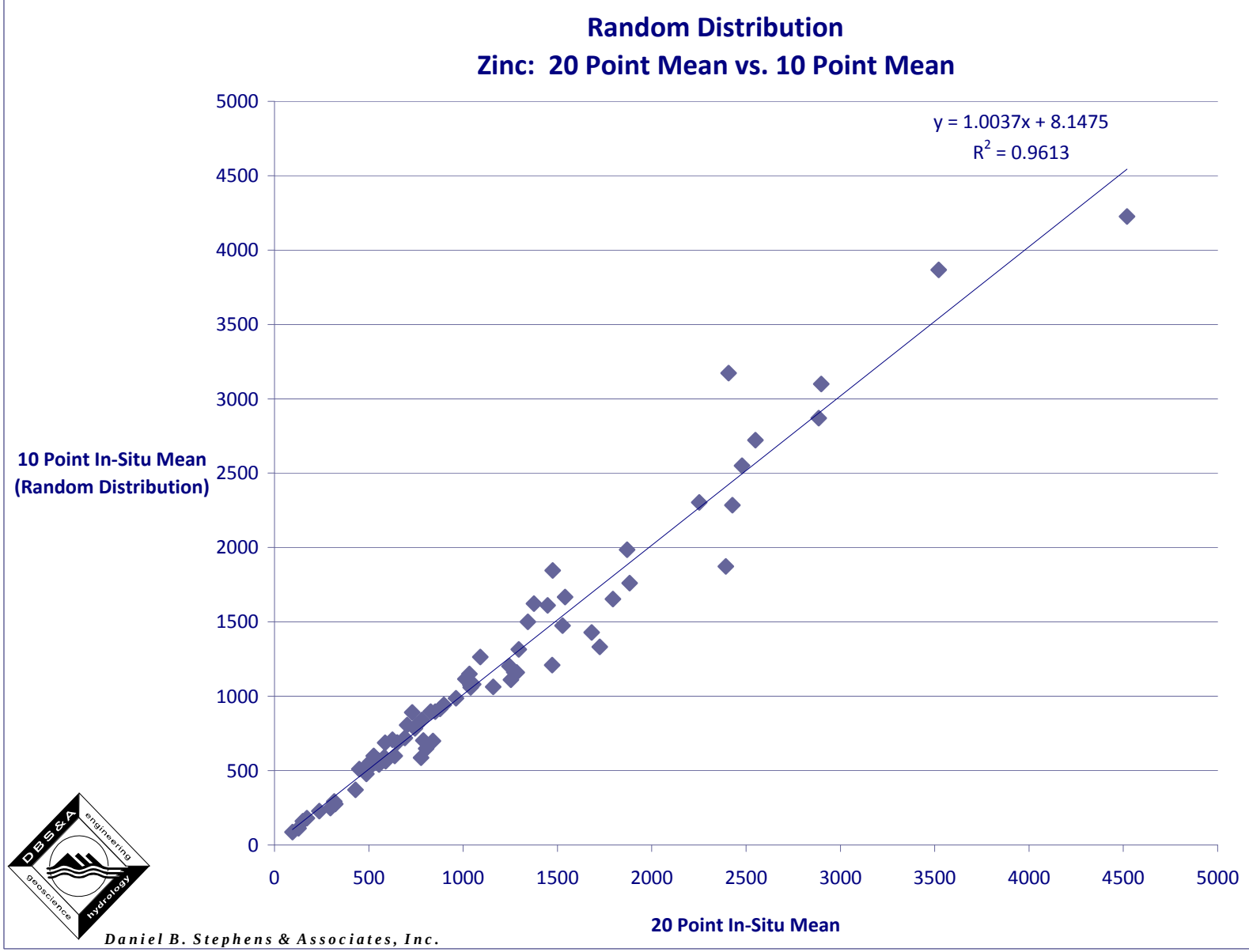
Daniel B. Stephens & Associates, Inc.



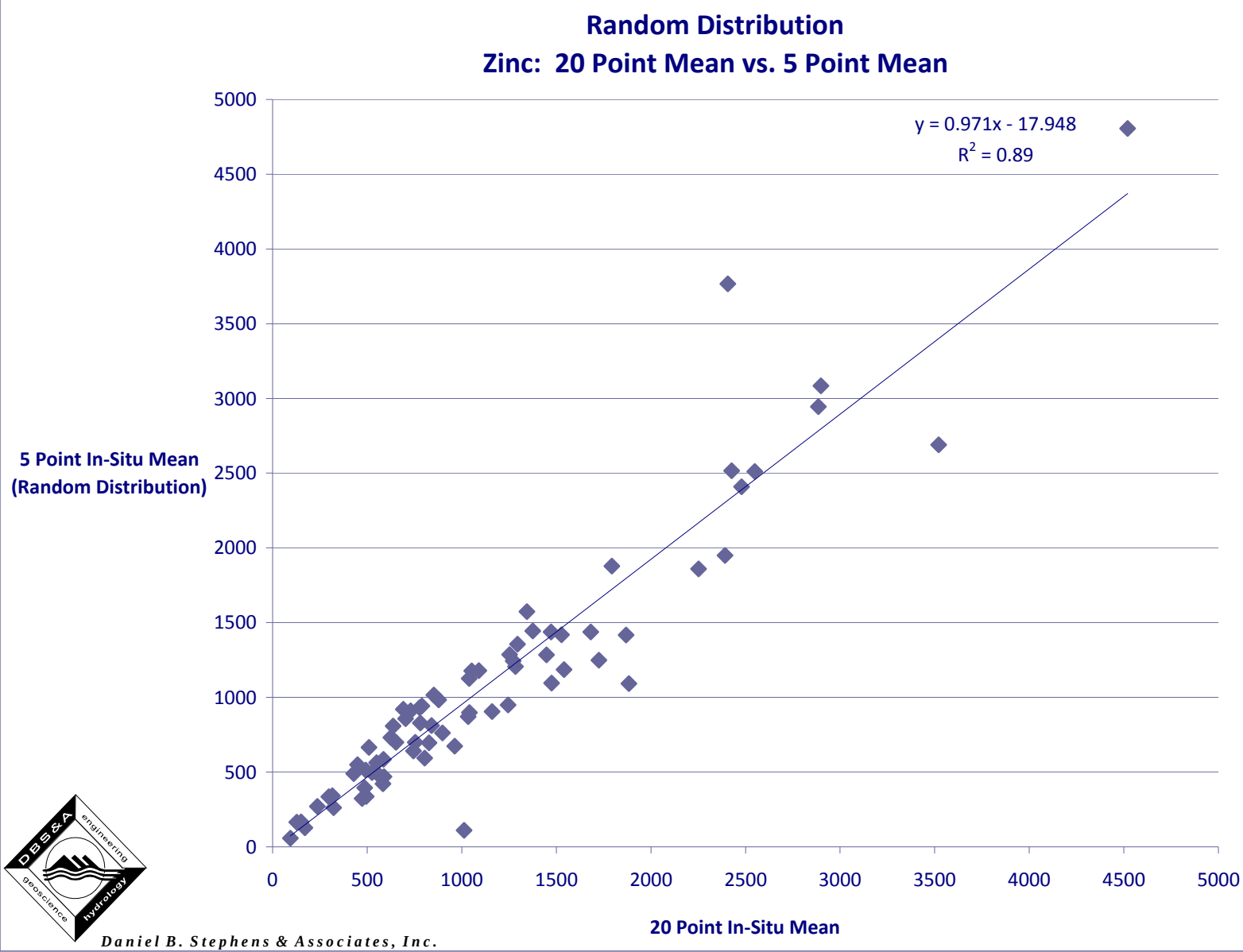
Daniel B. Stephens & Associates, Inc.



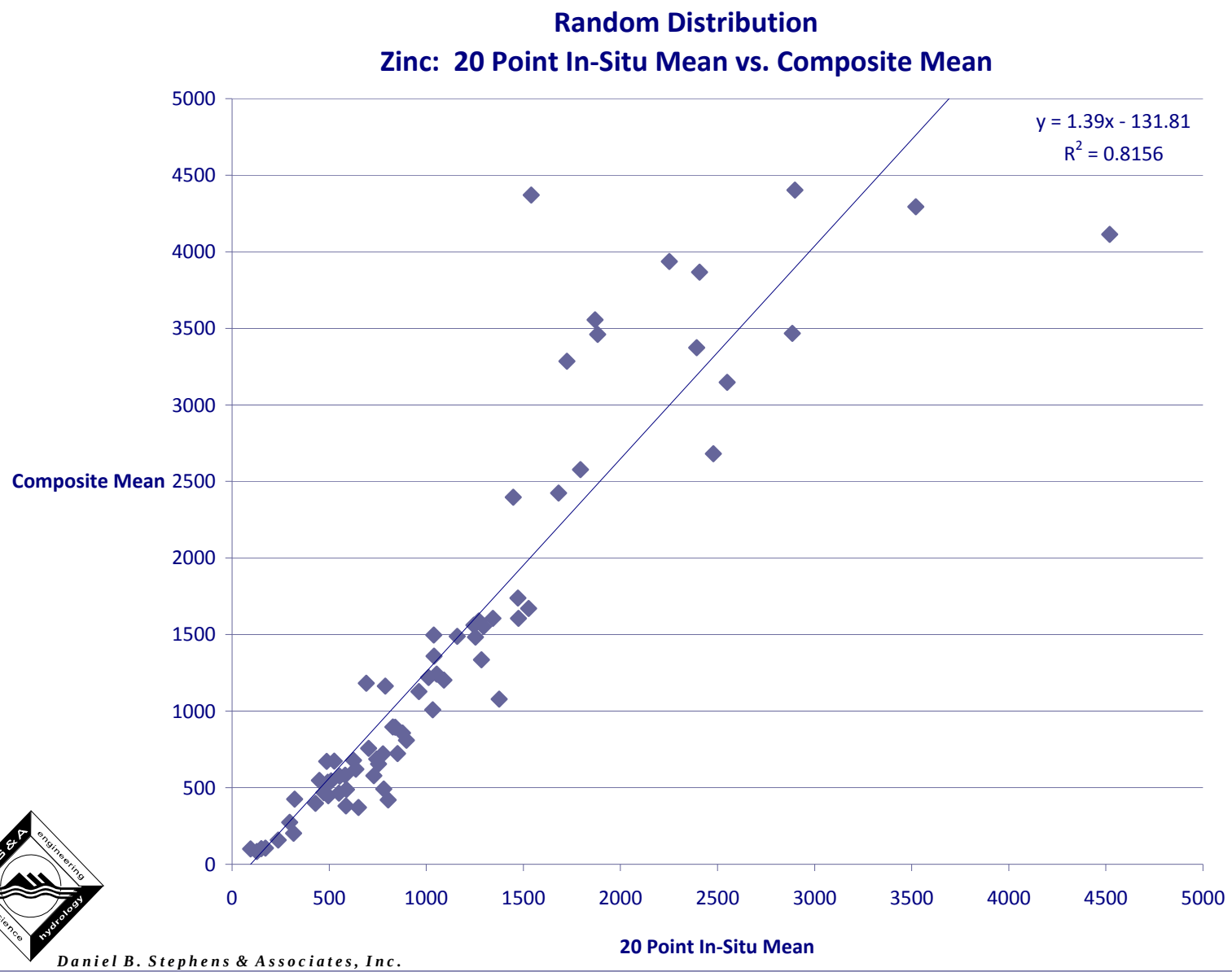
Daniel B. Stephens & Associates, Inc.



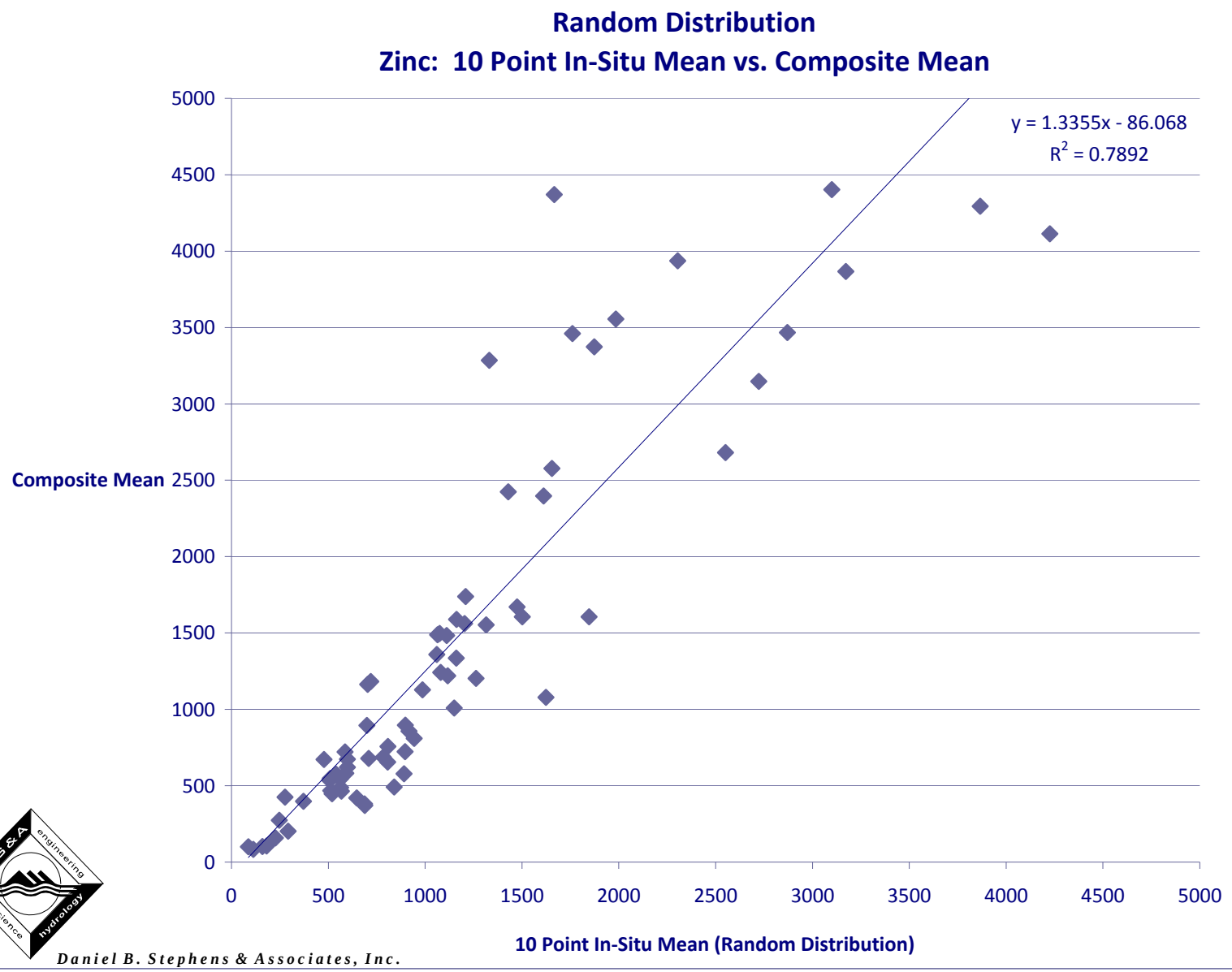
Daniel B. Stephens & Associates, Inc.



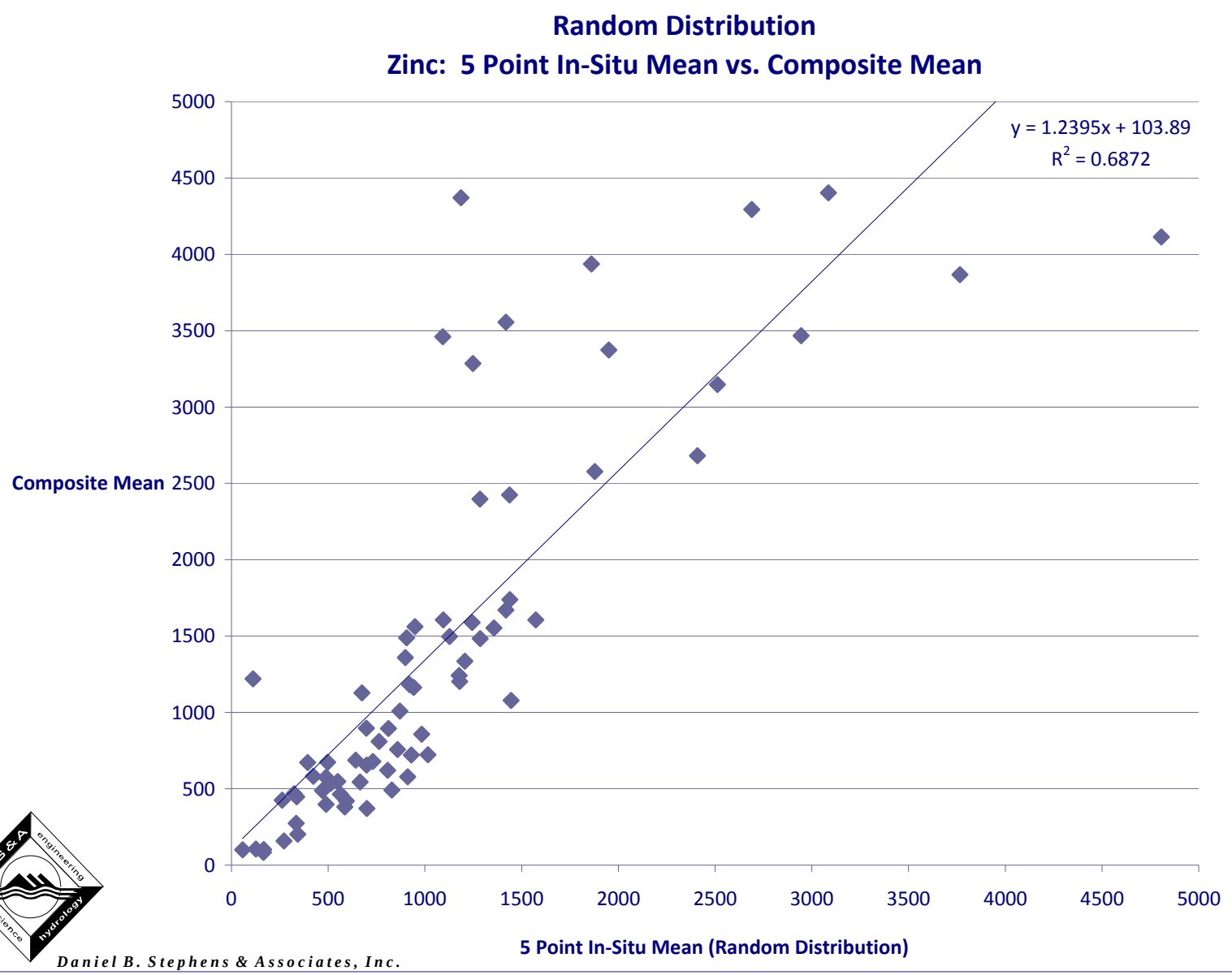
Daniel B. Stephens & Associates, Inc.



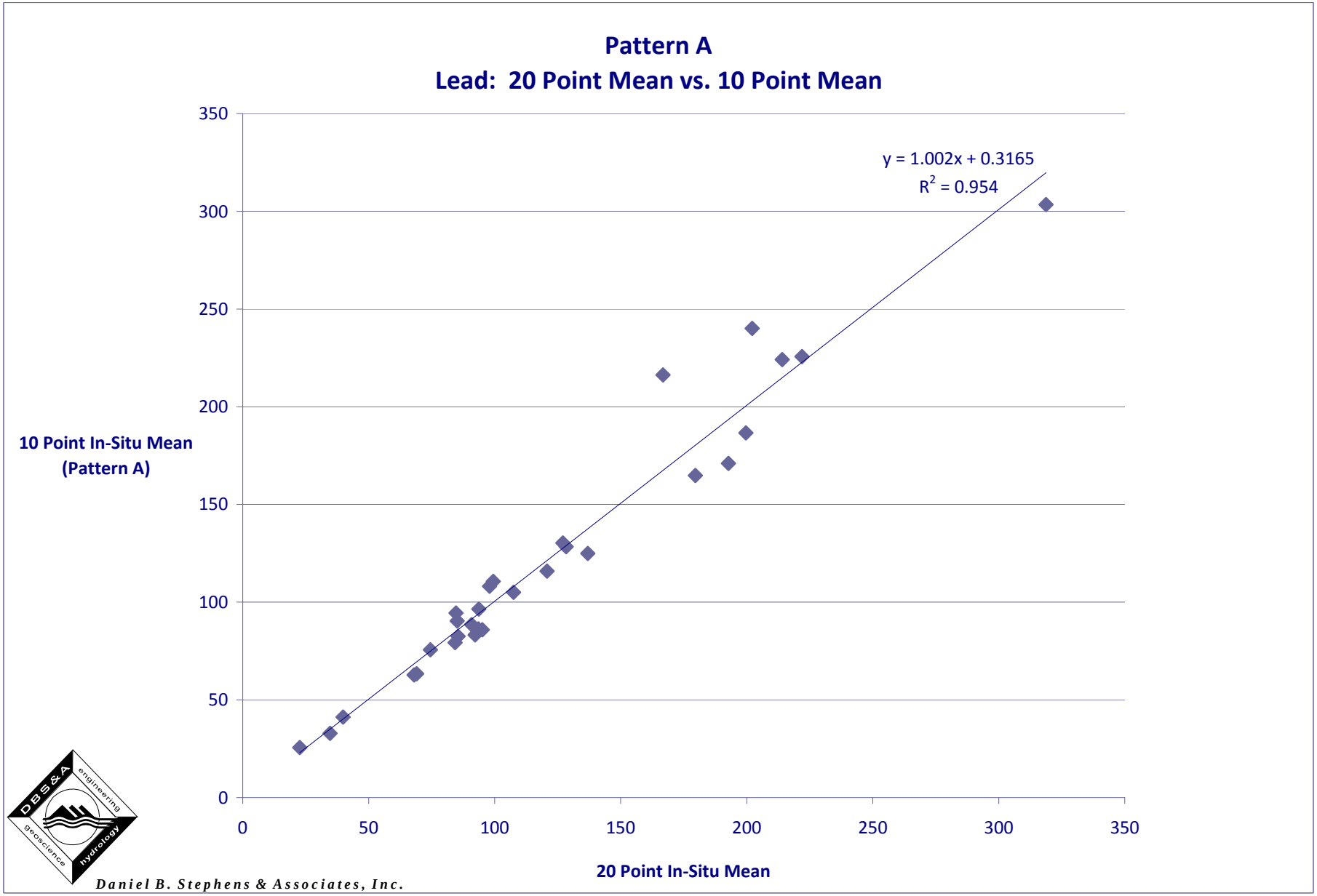
Daniel B. Stephens & Associates, Inc.

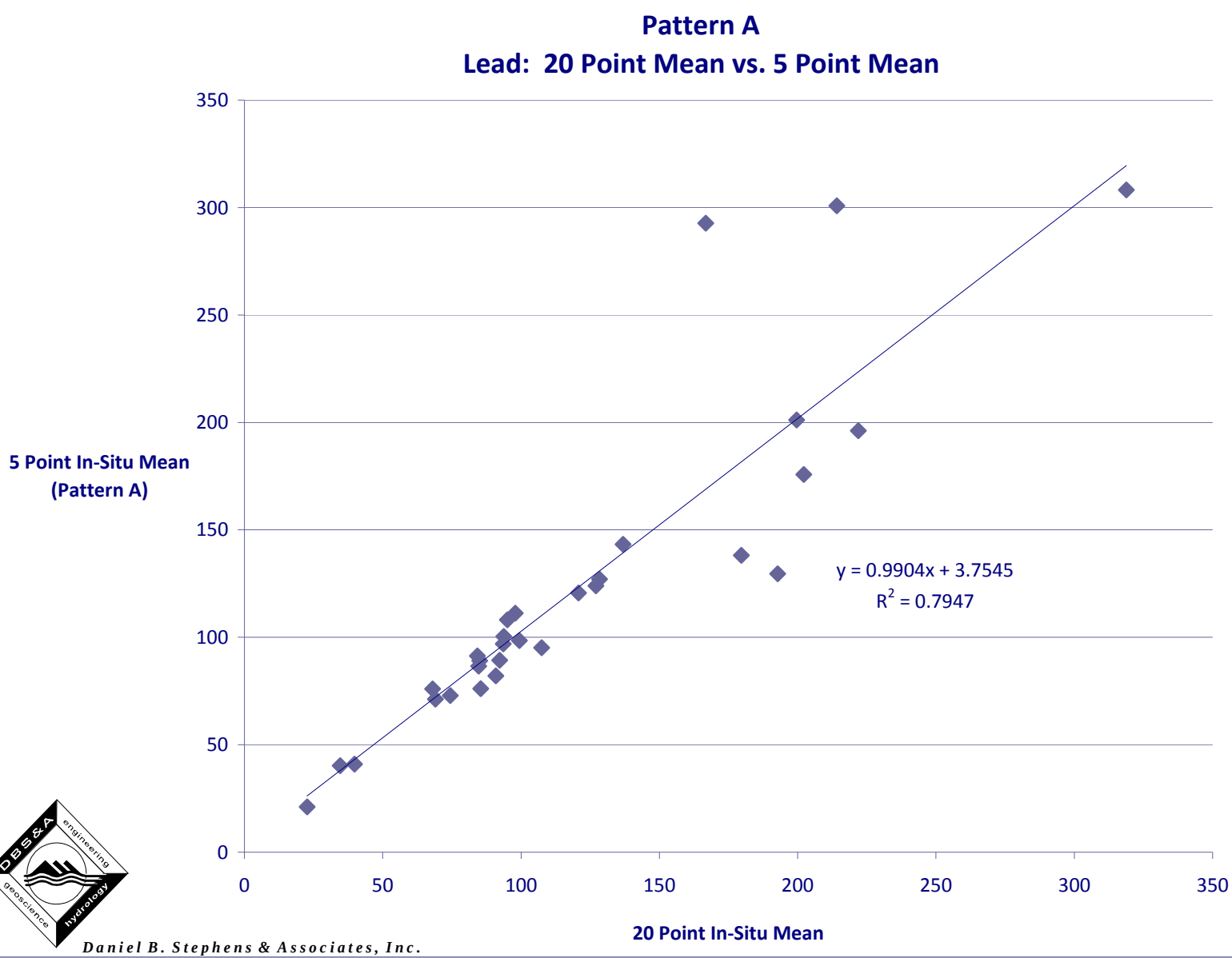


Daniel B. Stephens & Associates, Inc.

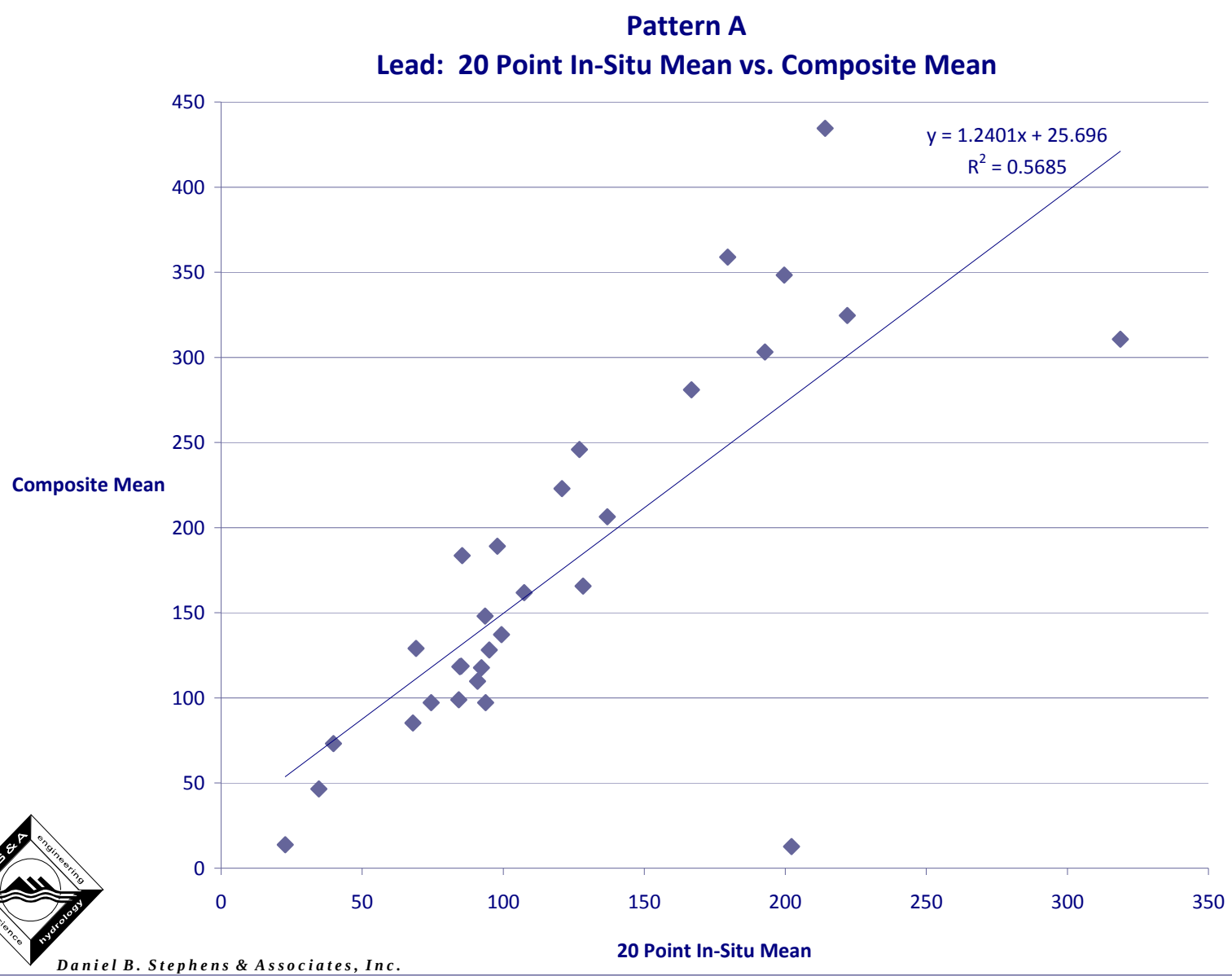


Daniel B. Stephens & Associates, Inc.

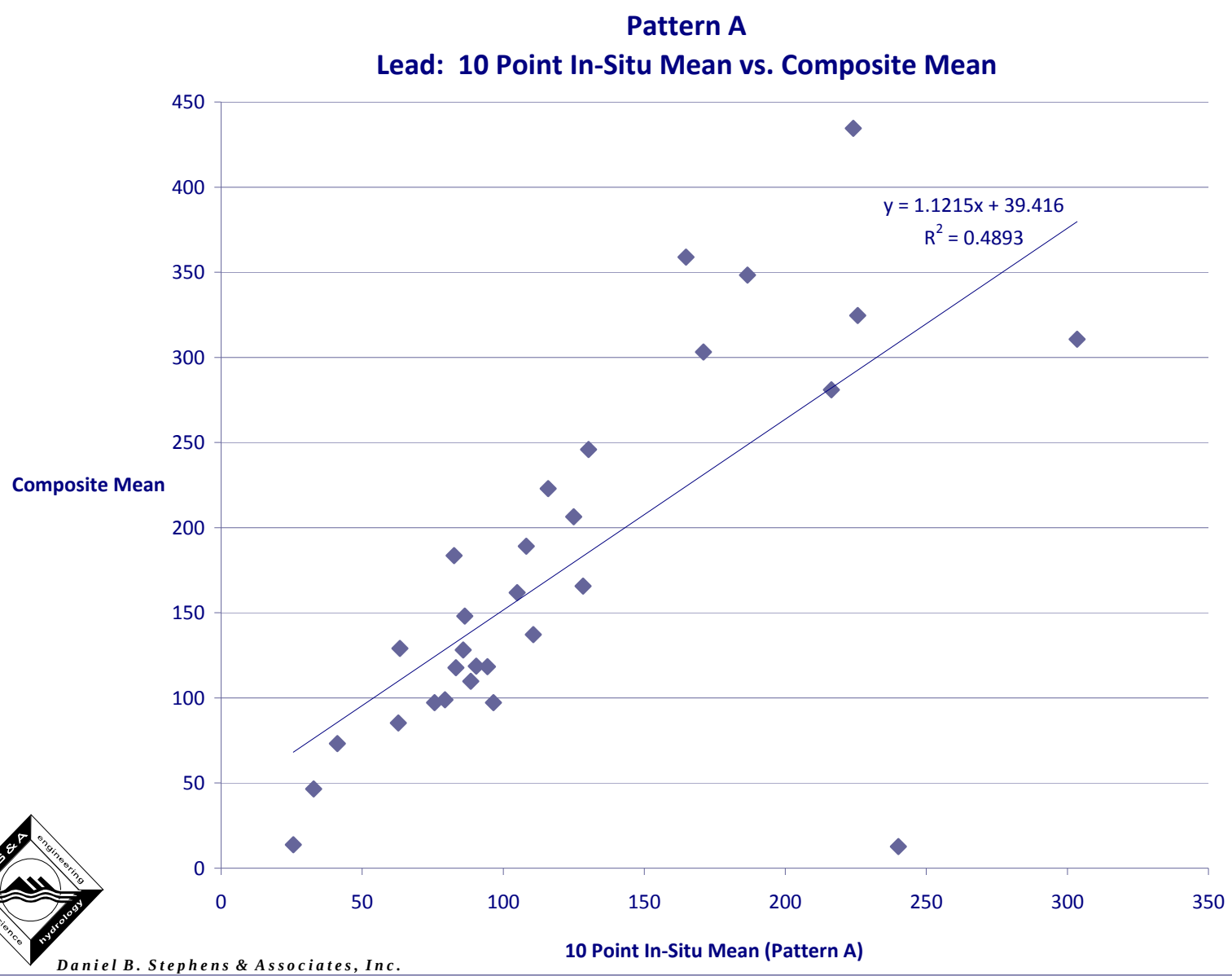

Pattern A
Lead: 20 Point Mean vs. 10 Point Mean
y = 1.002x + 0.3165
R2 = 0.954
10 Point In-Situ Mean (Pattern A)
20 Point In-Situ Mean
0
50
100
150
200
250
300
350
DBS&A
engineering
geoscience
hydrology
Daniel B. Stephens & Associates, Inc.



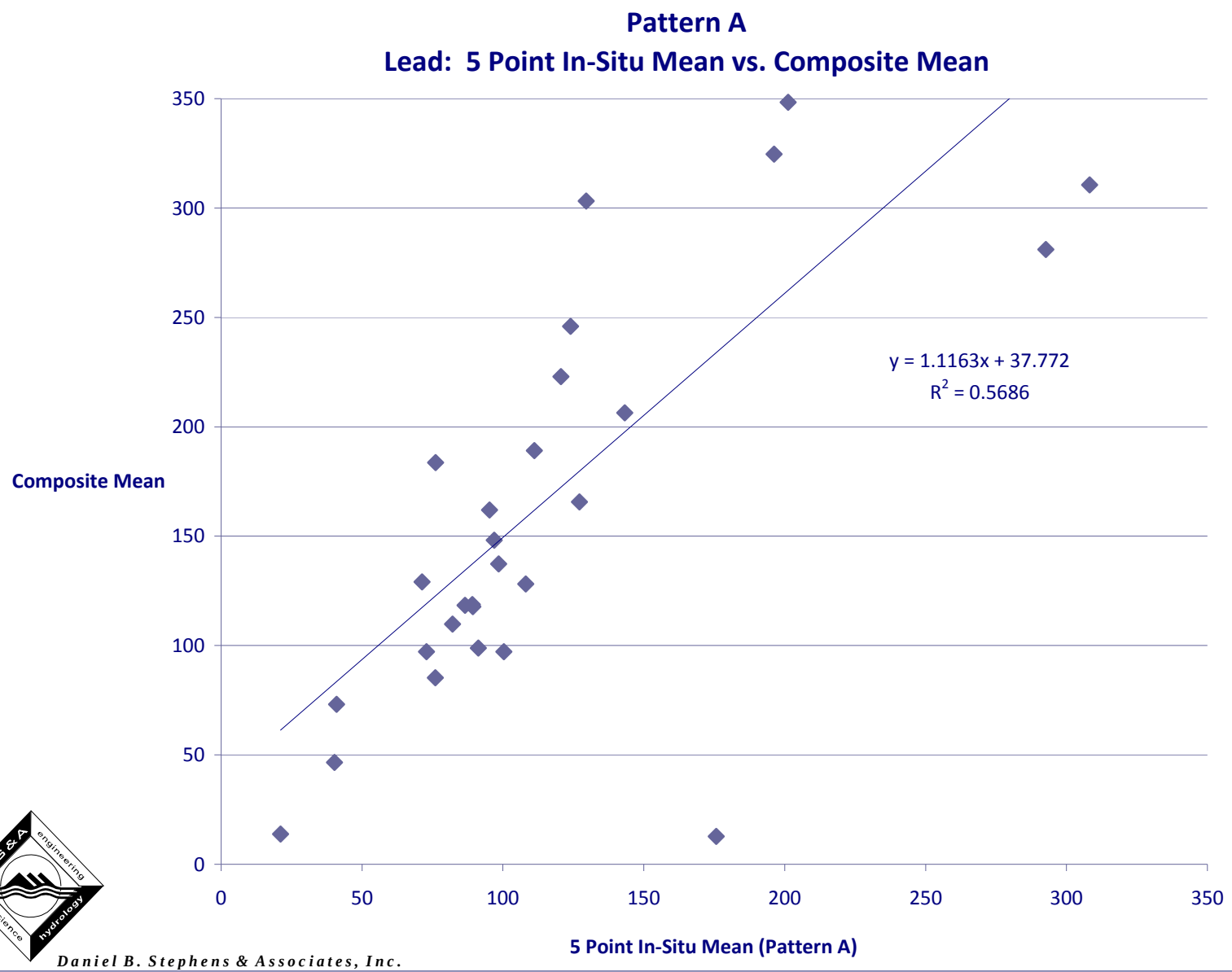
Daniel B. Stephens & Associates, Inc.



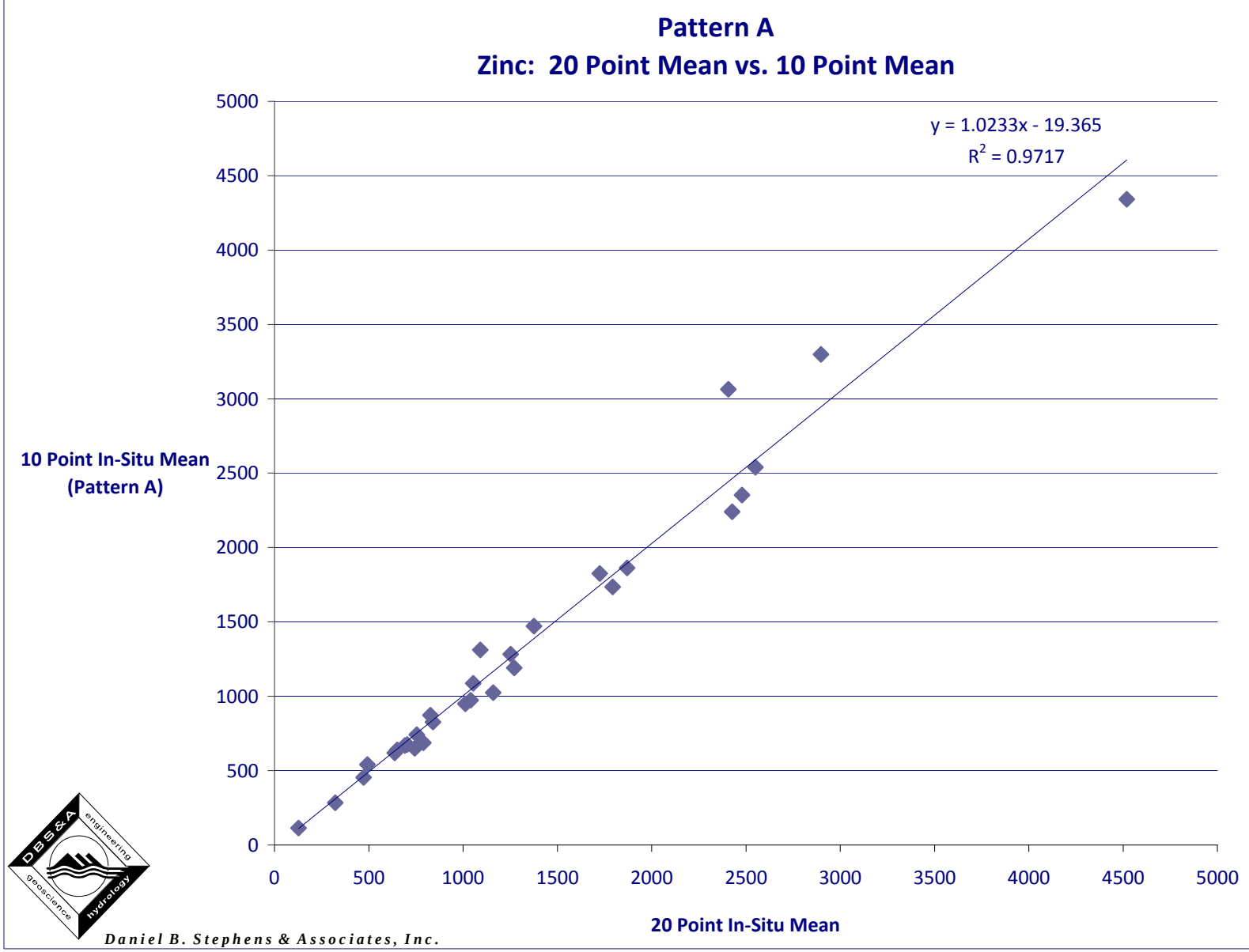
Daniel B. Stephens & Associates, Inc.



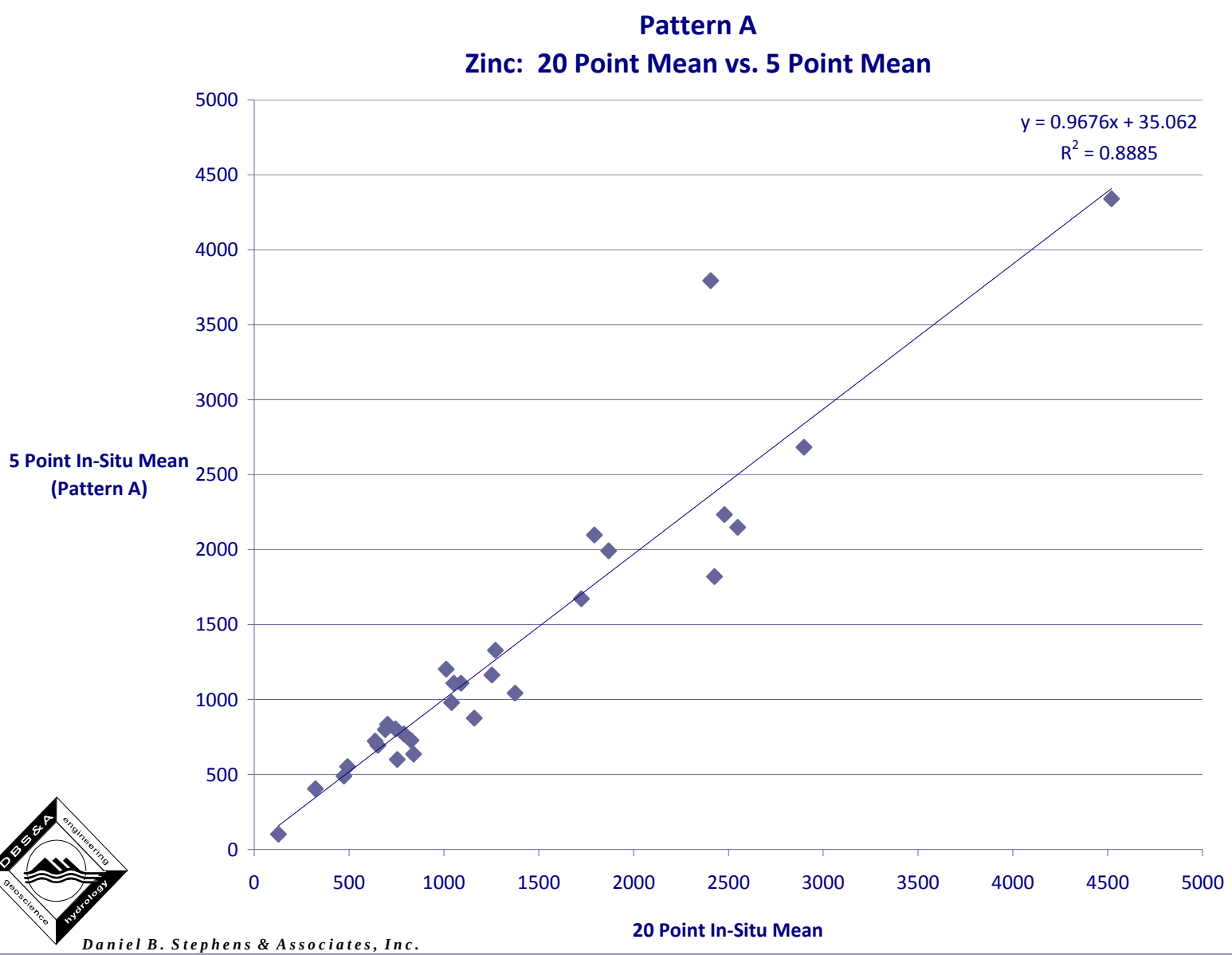
Daniel B. Stephens & Associates, Inc.



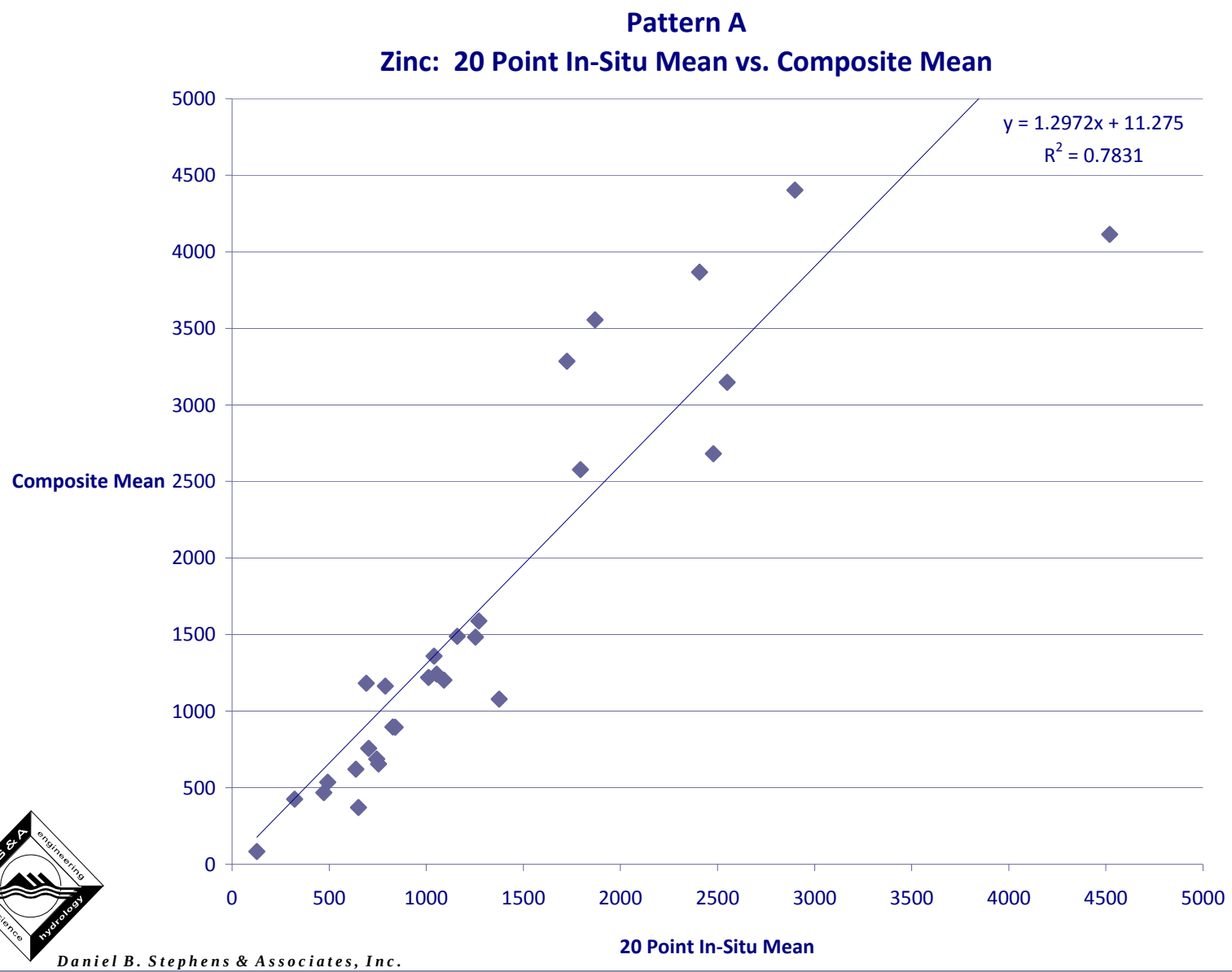
Daniel B. Stephens & Associates, Inc.



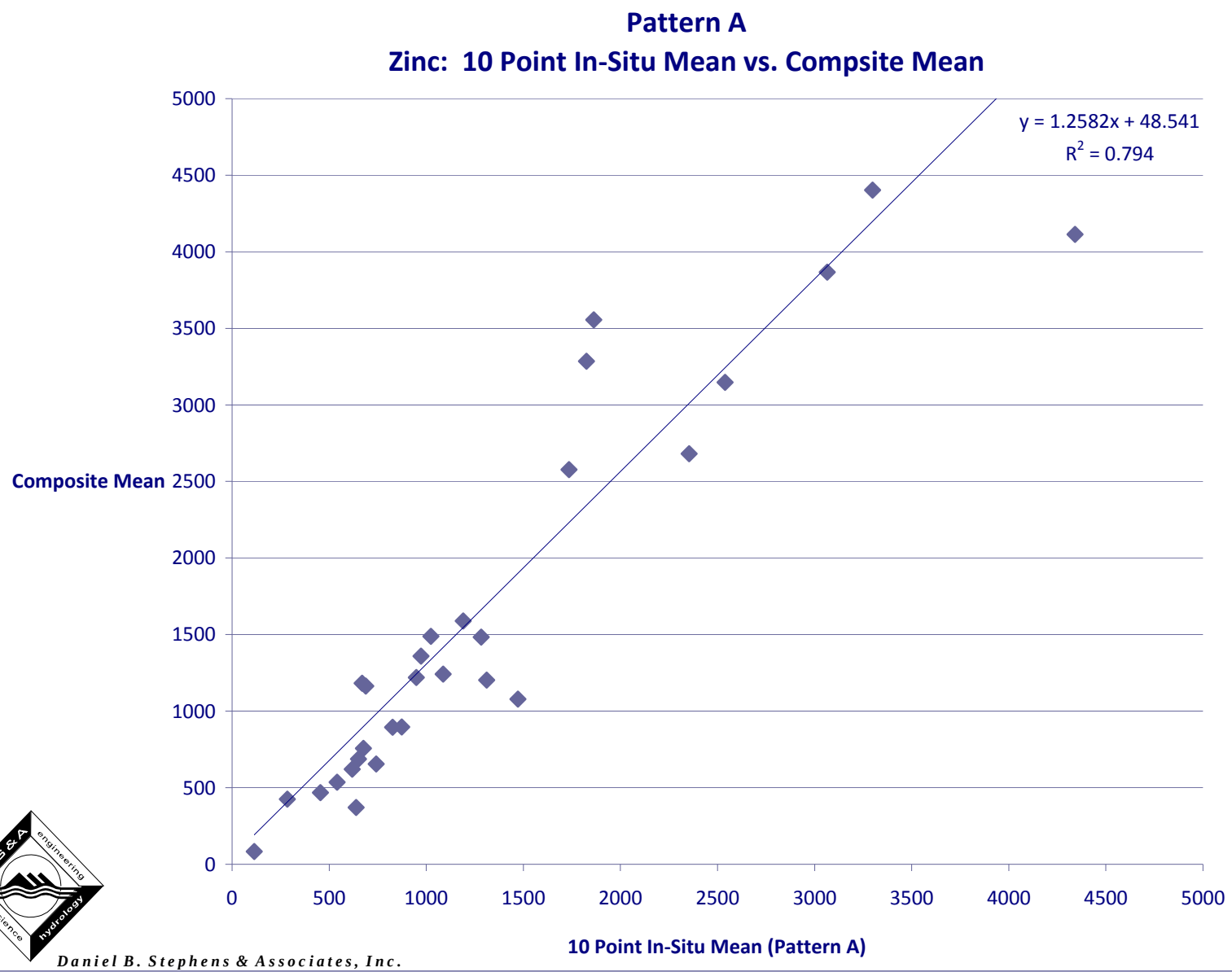
Daniel B. Stephens & Associates, Inc.



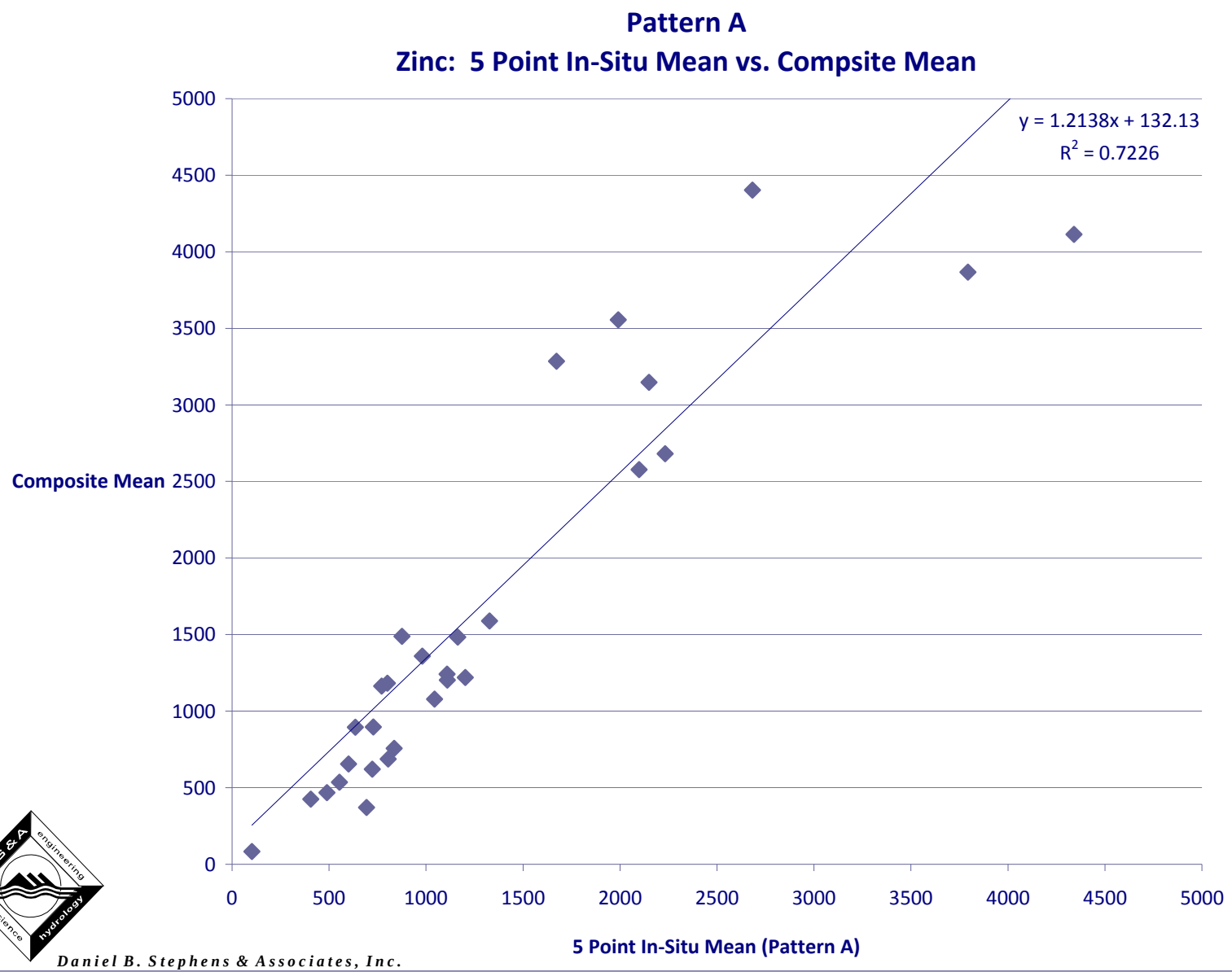
Daniel B. Stephens & Associates, Inc.



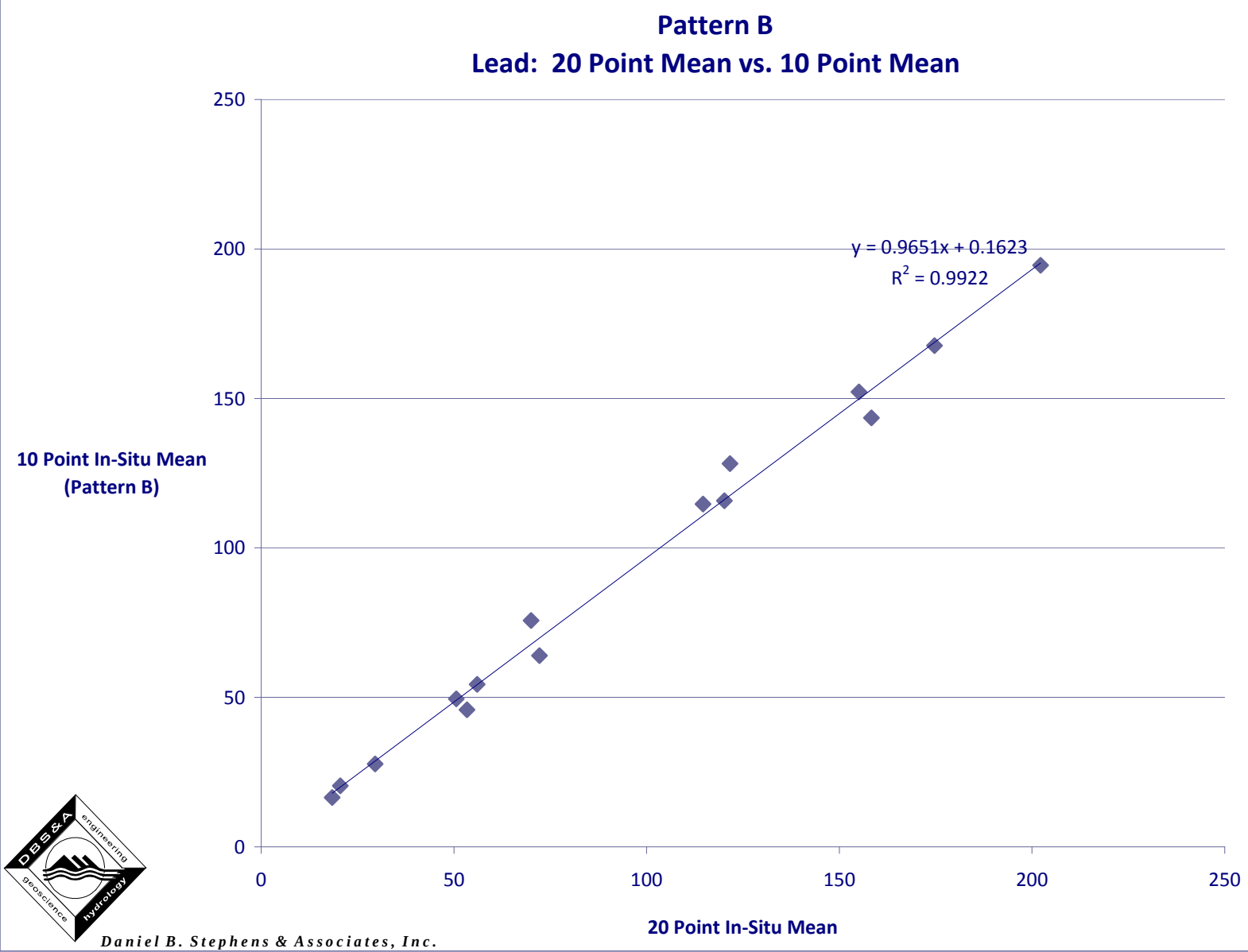
Daniel B. Stephens & Associates, Inc.



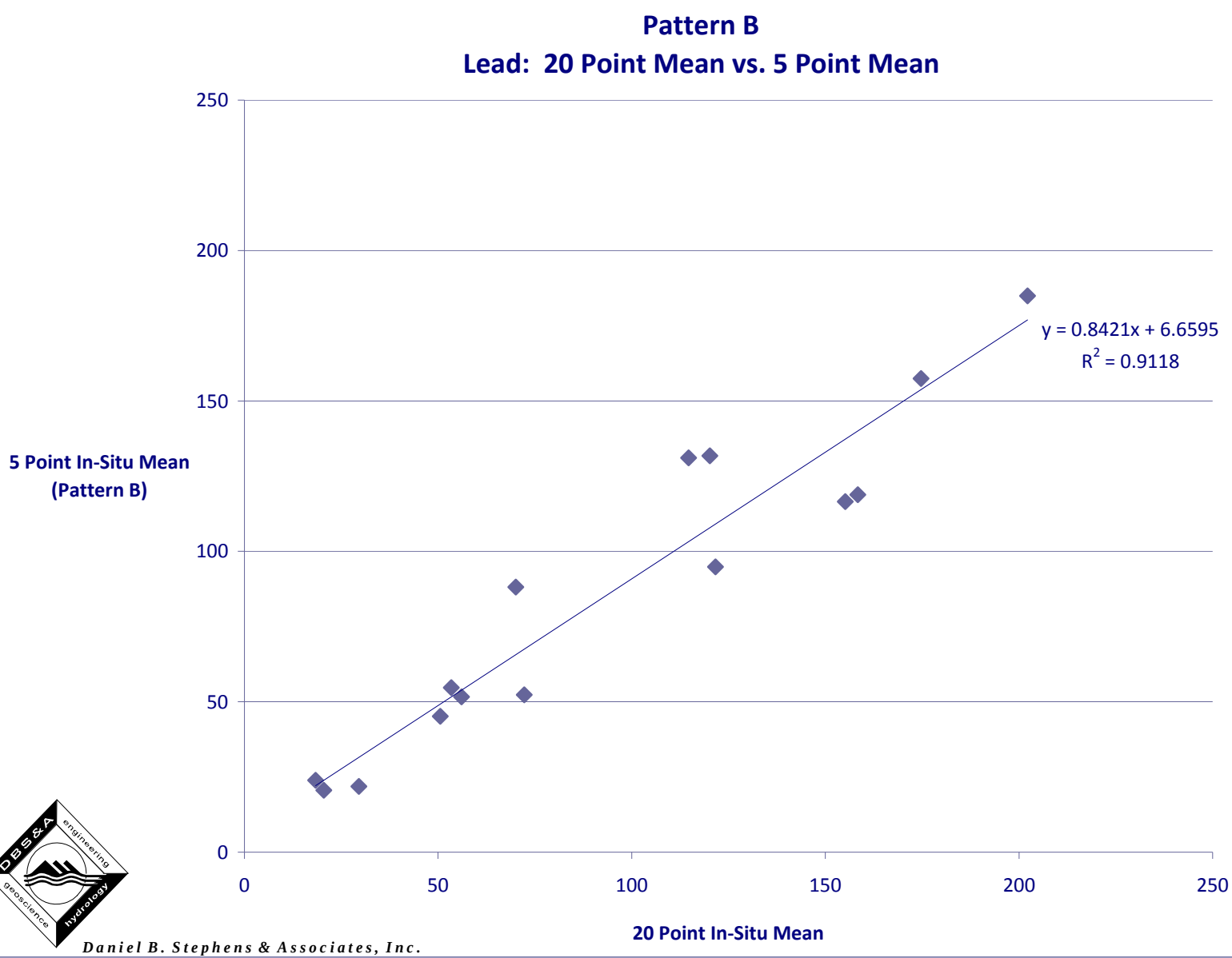
Daniel B. Stephens & Associates, Inc.



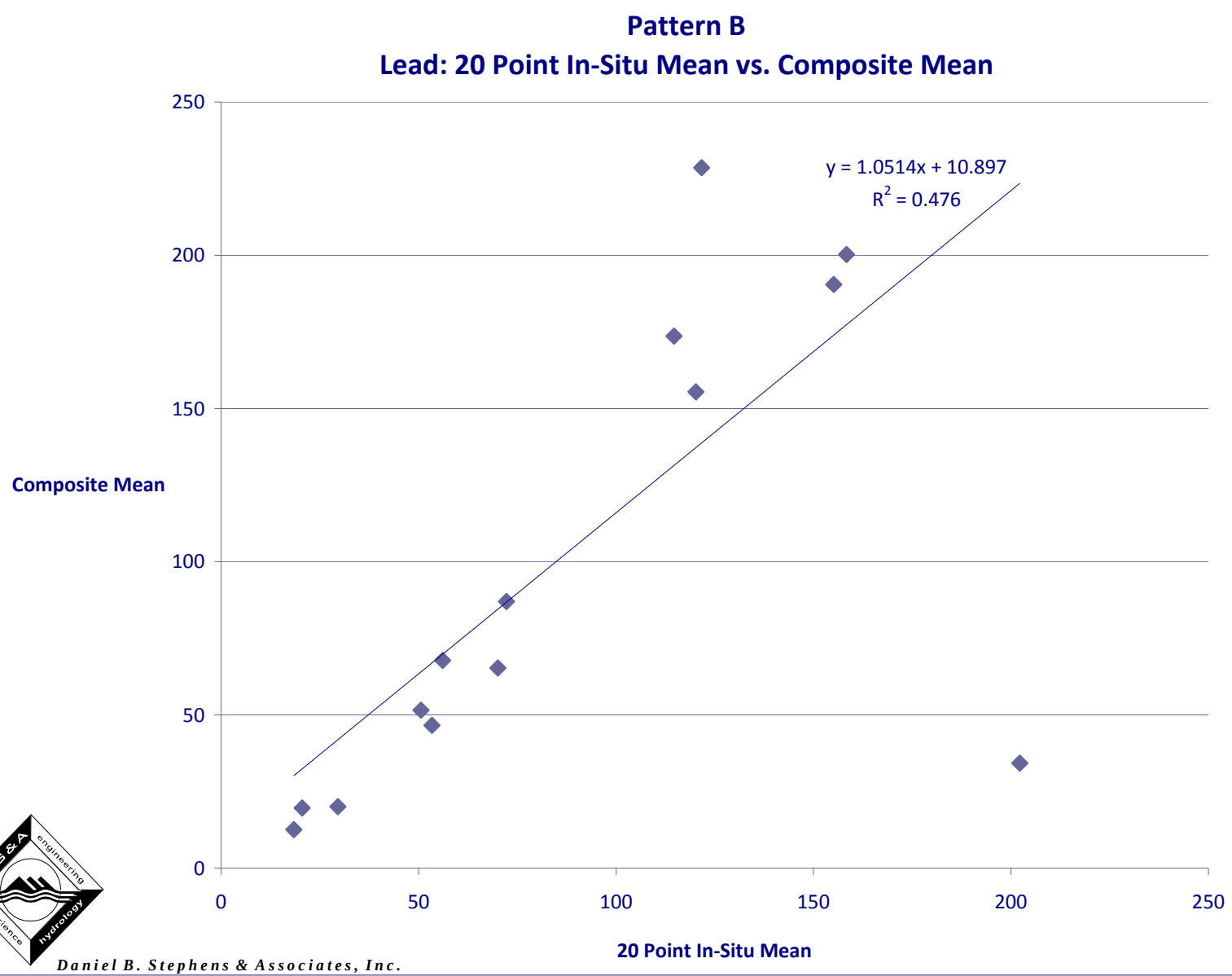
Daniel B. Stephens & Associates, Inc.



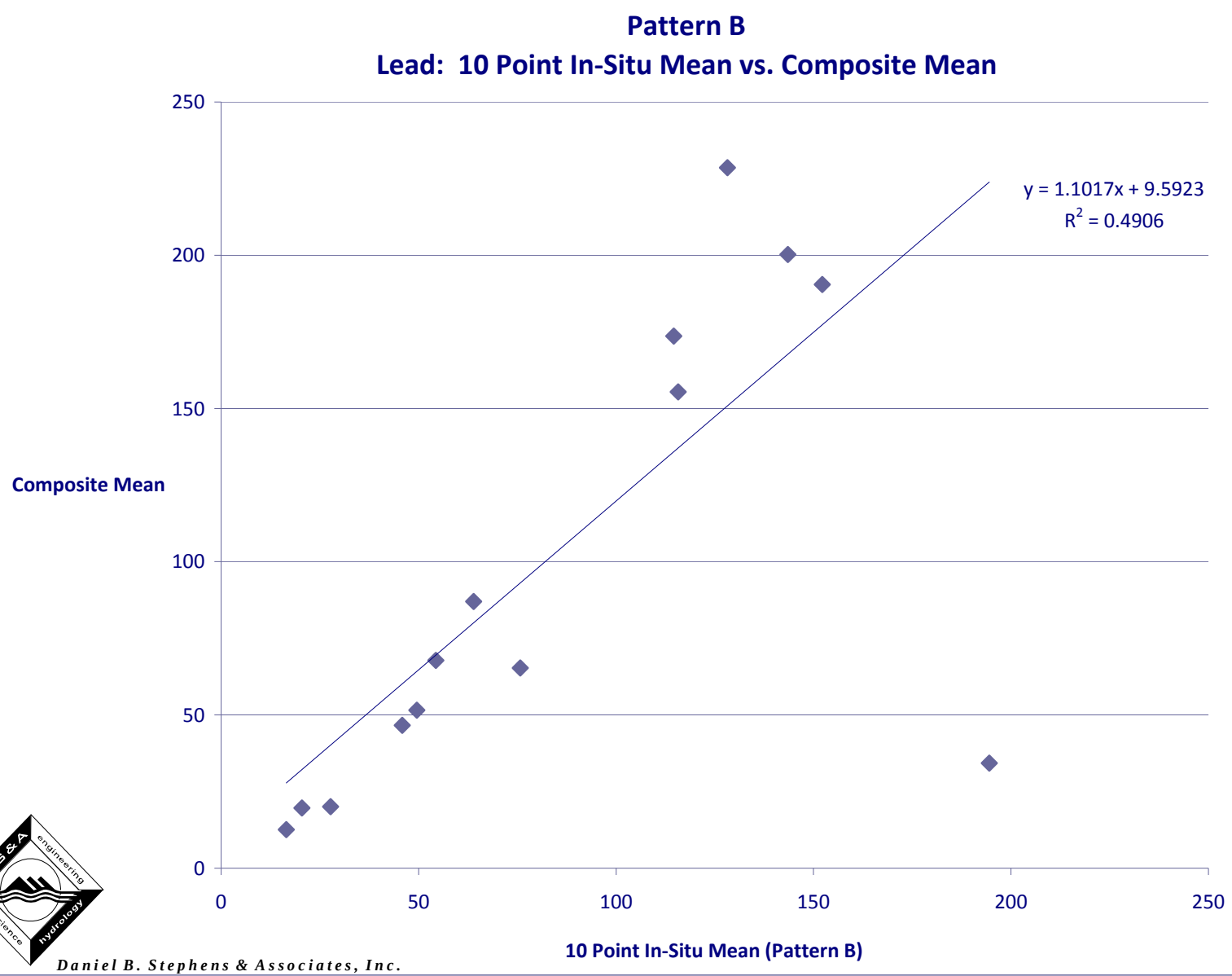
Daniel B. Stephens & Associates, Inc.



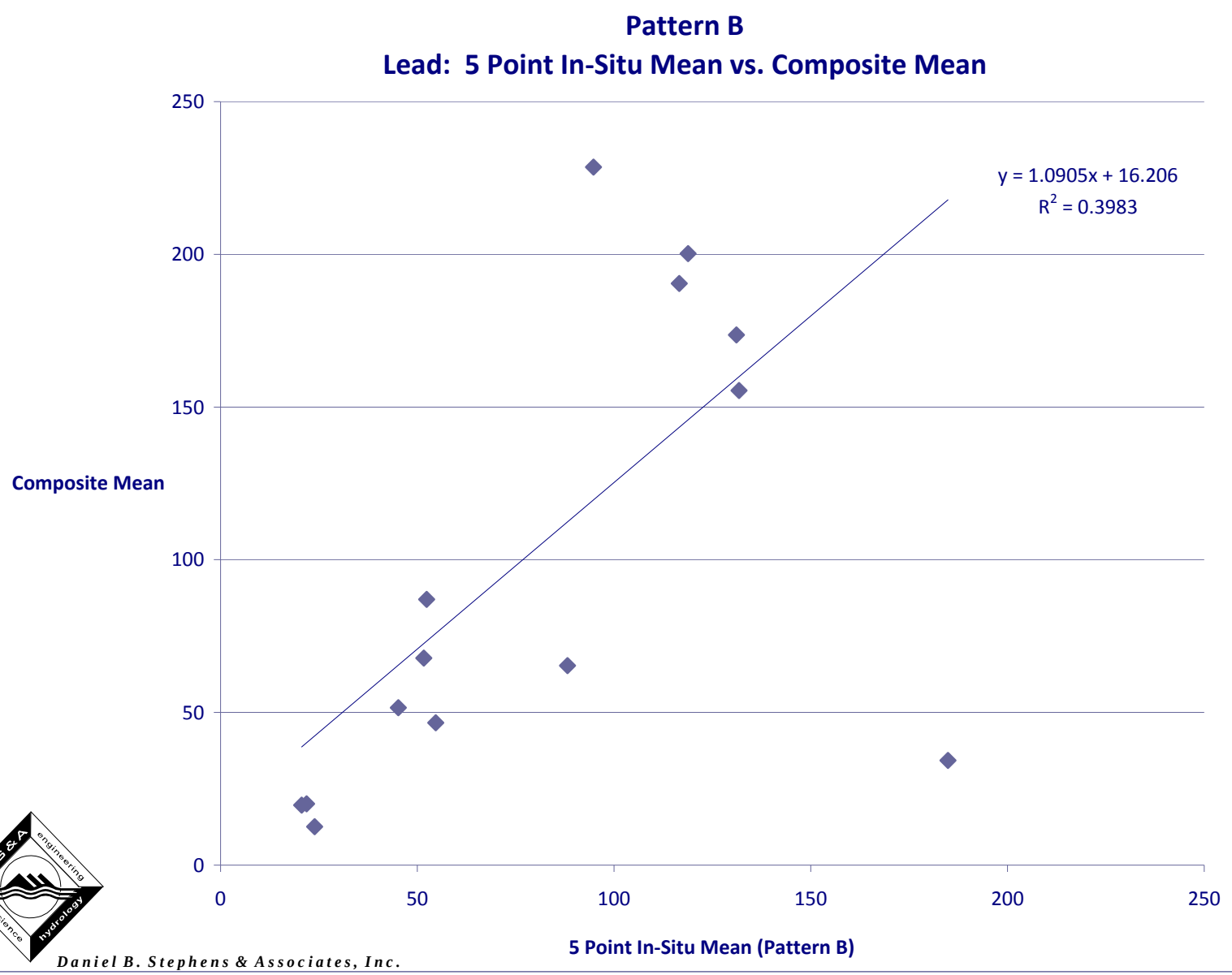
Daniel B. Stephens & Associates, Inc.



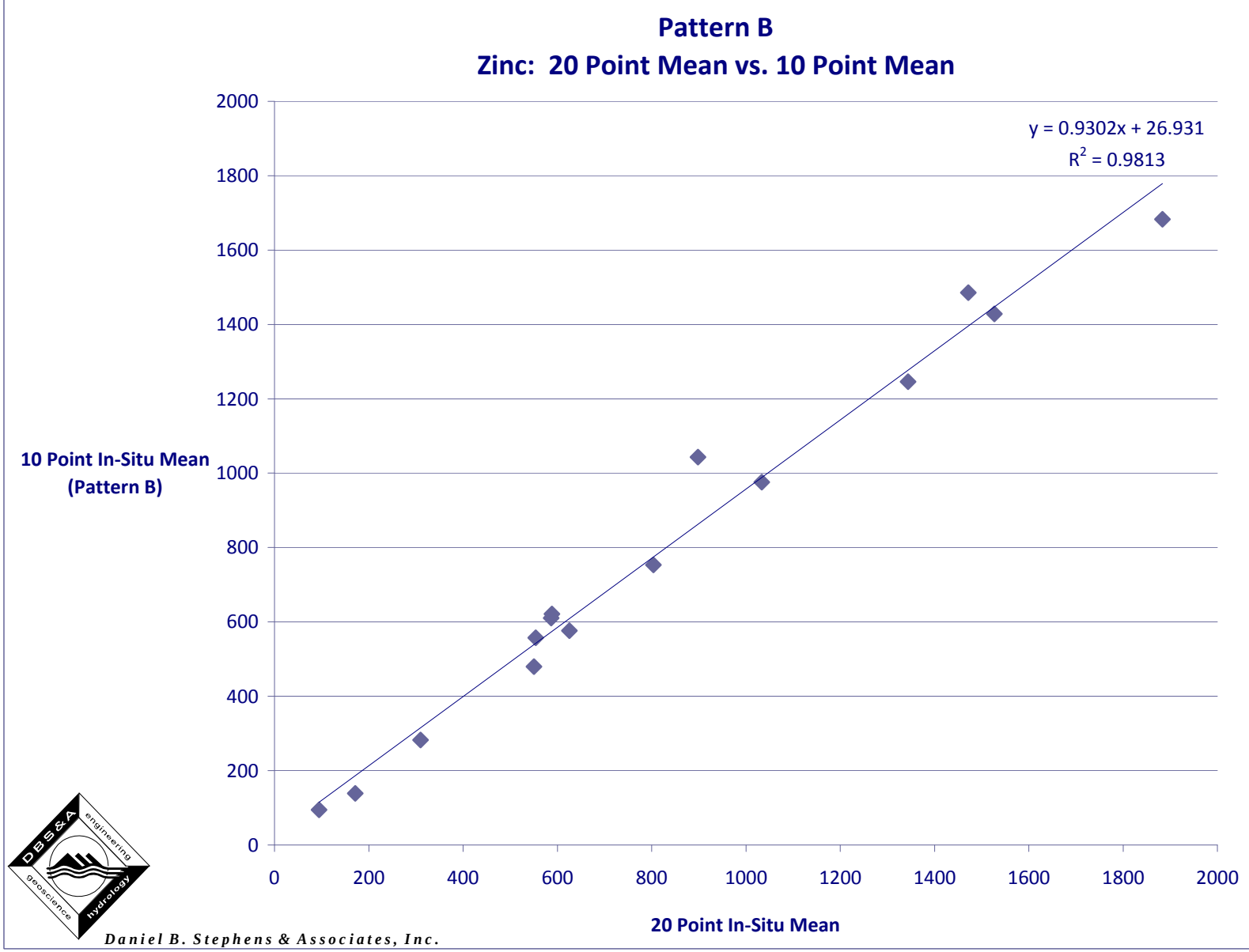
Daniel B. Stephens & Associates, Inc.



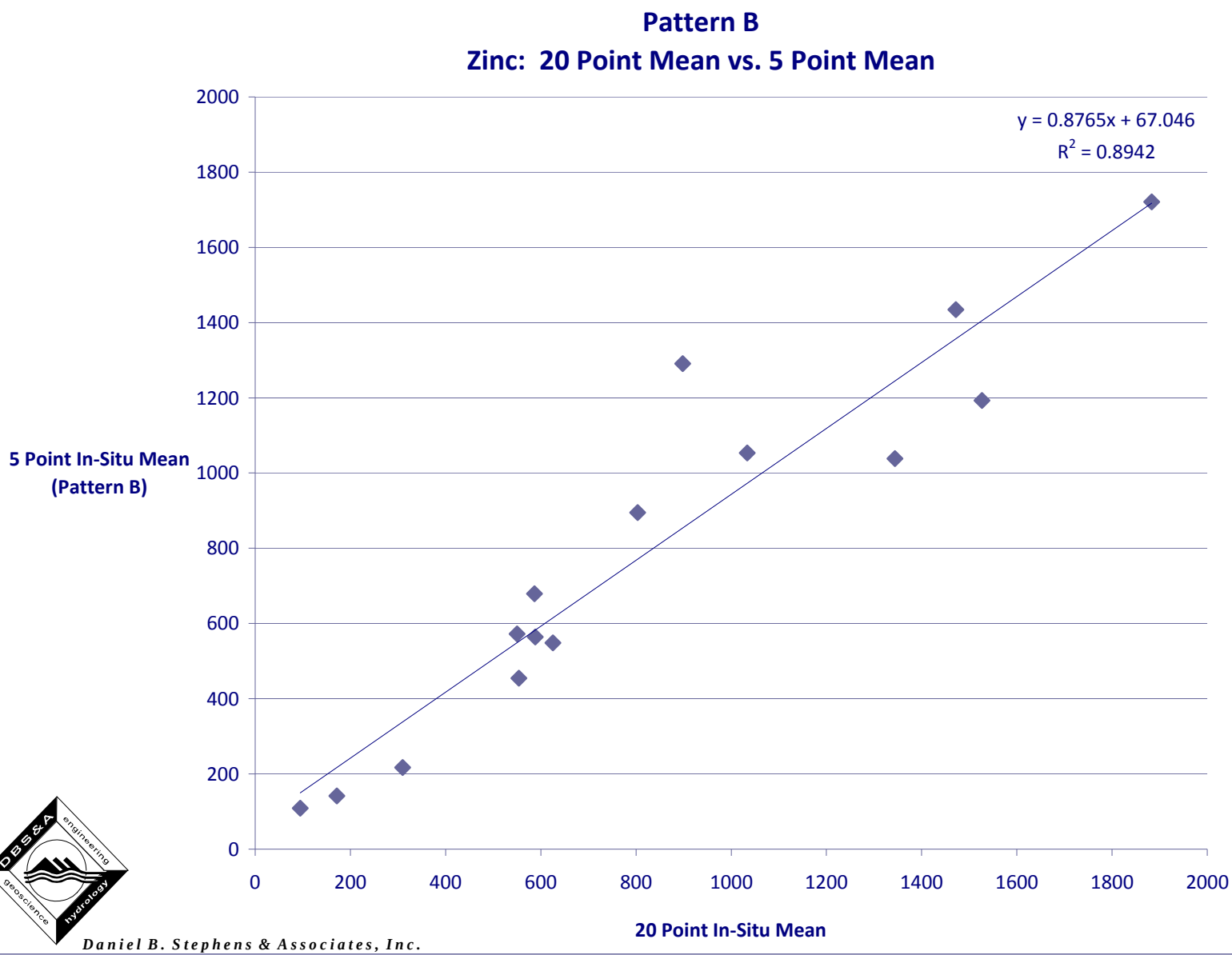
Daniel B. Stephens & Associates, Inc.



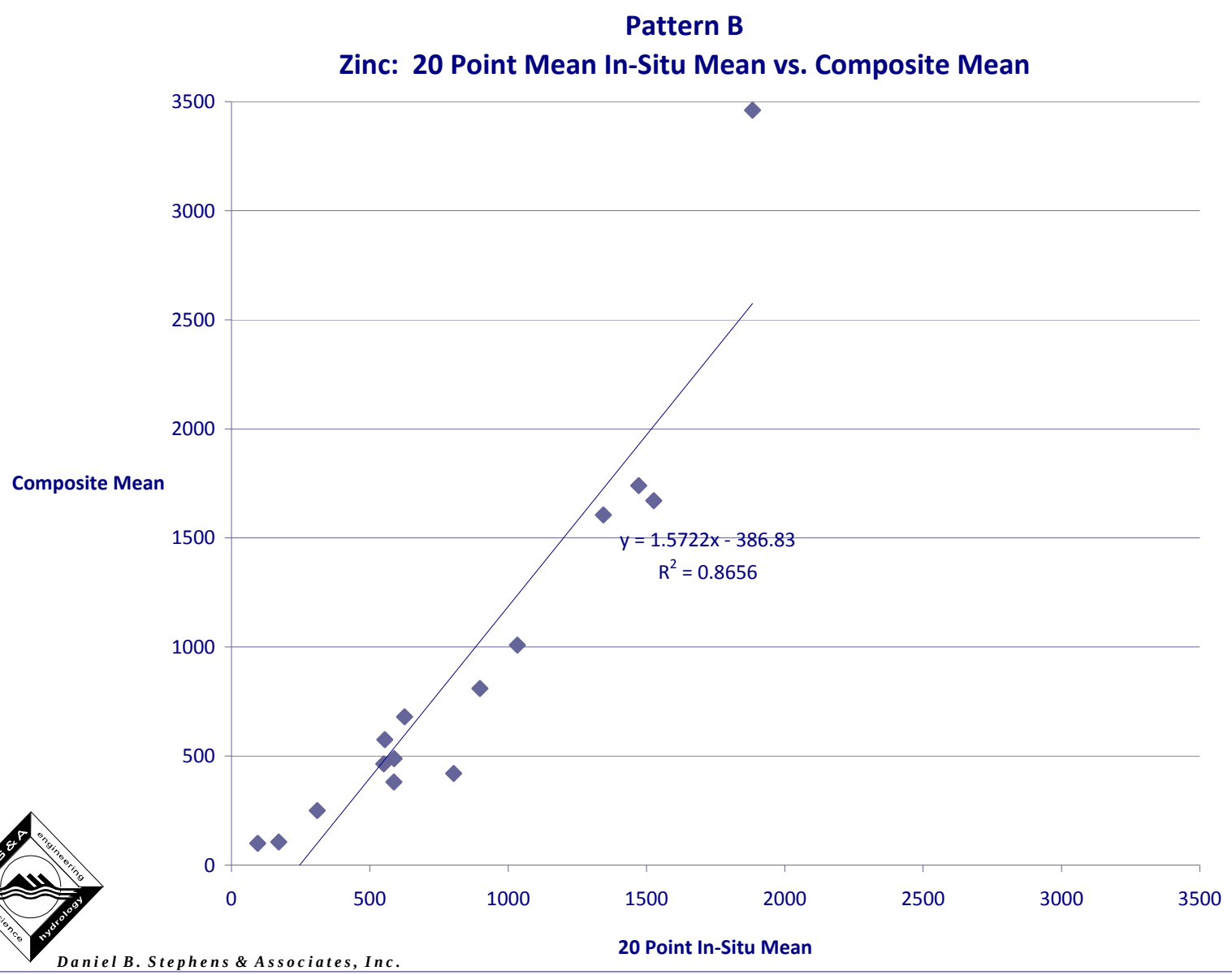
Daniel B. Stephens & Associates, Inc.



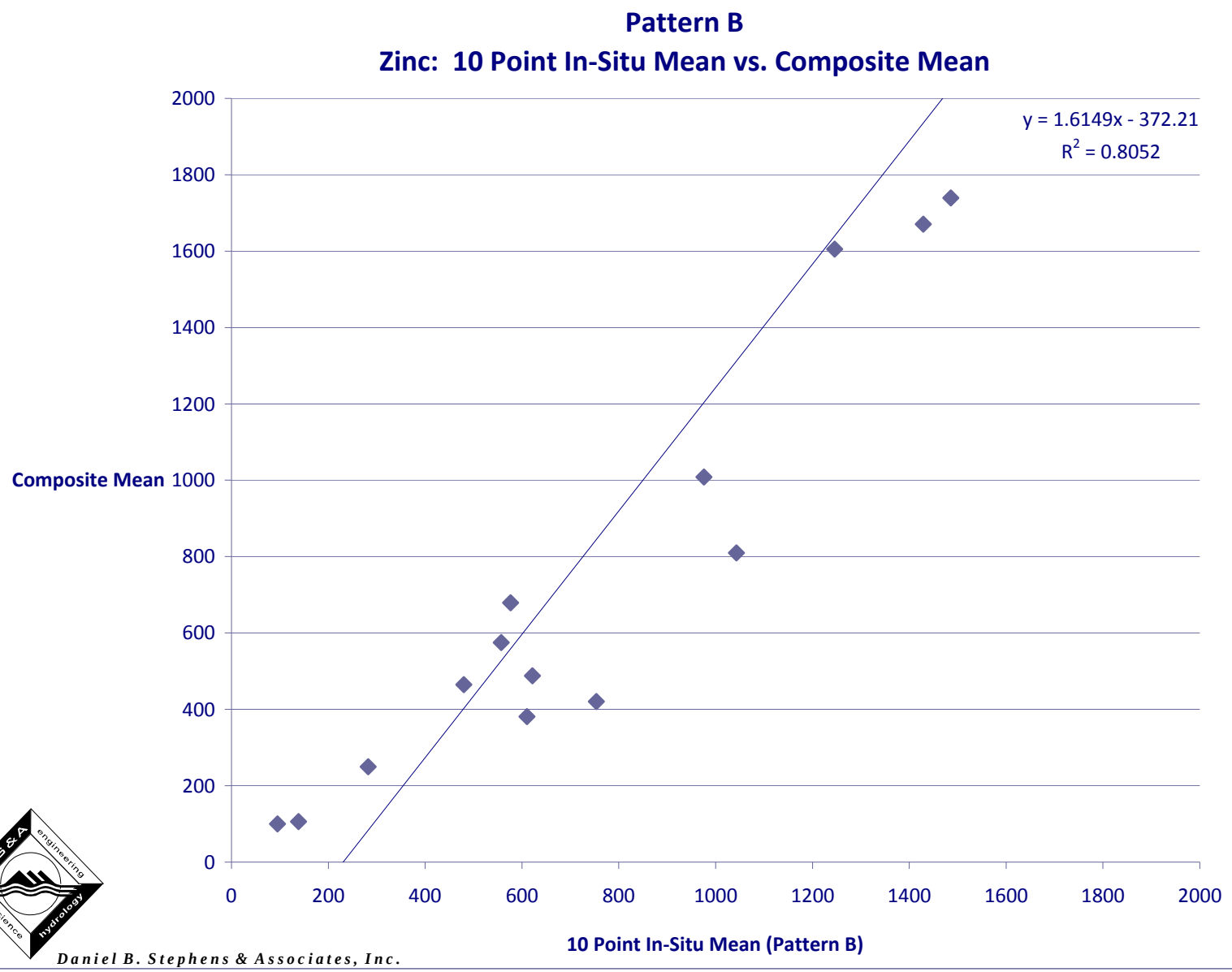
Daniel B. Stephens & Associates, Inc.



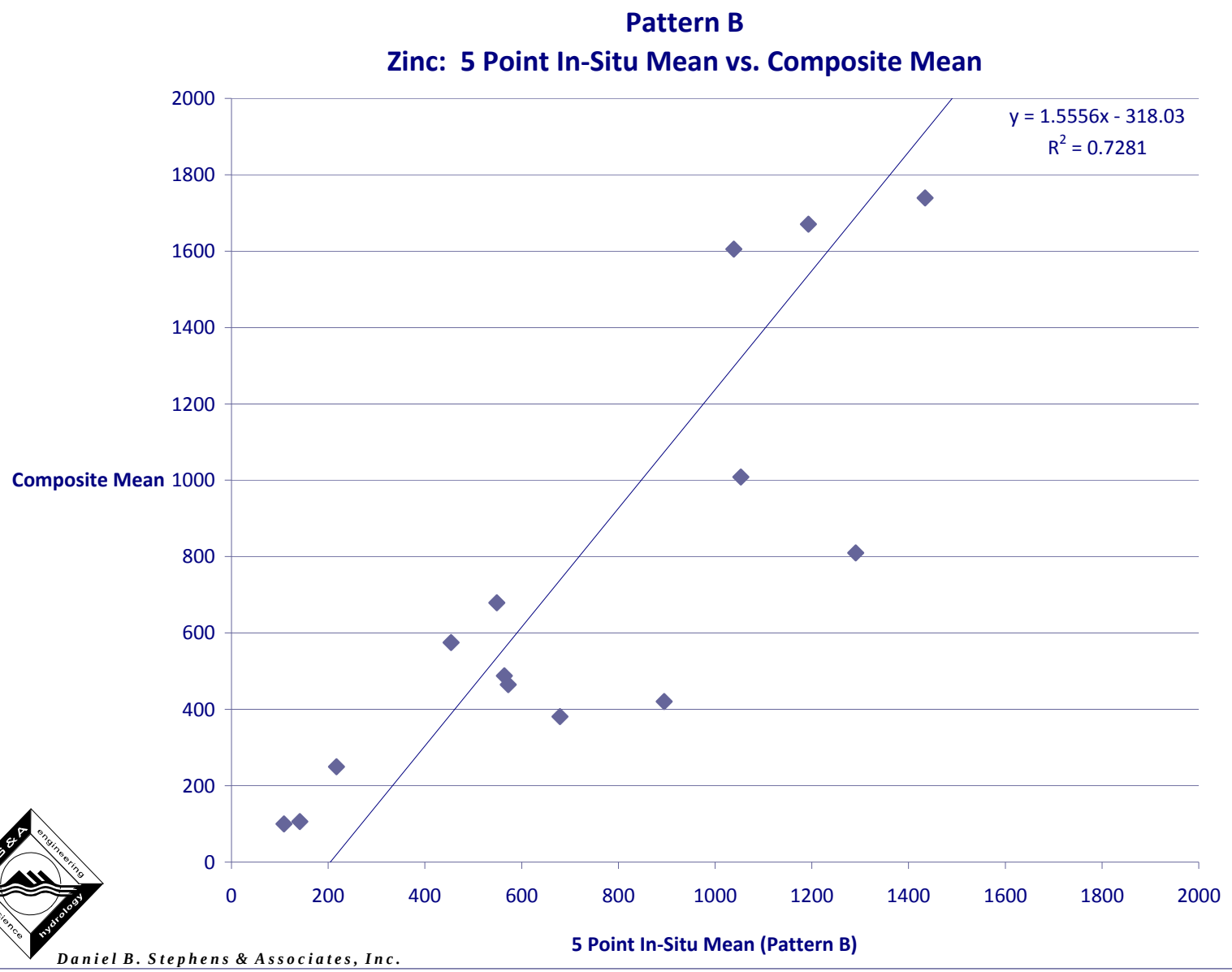
Daniel B. Stephens & Associates, Inc.



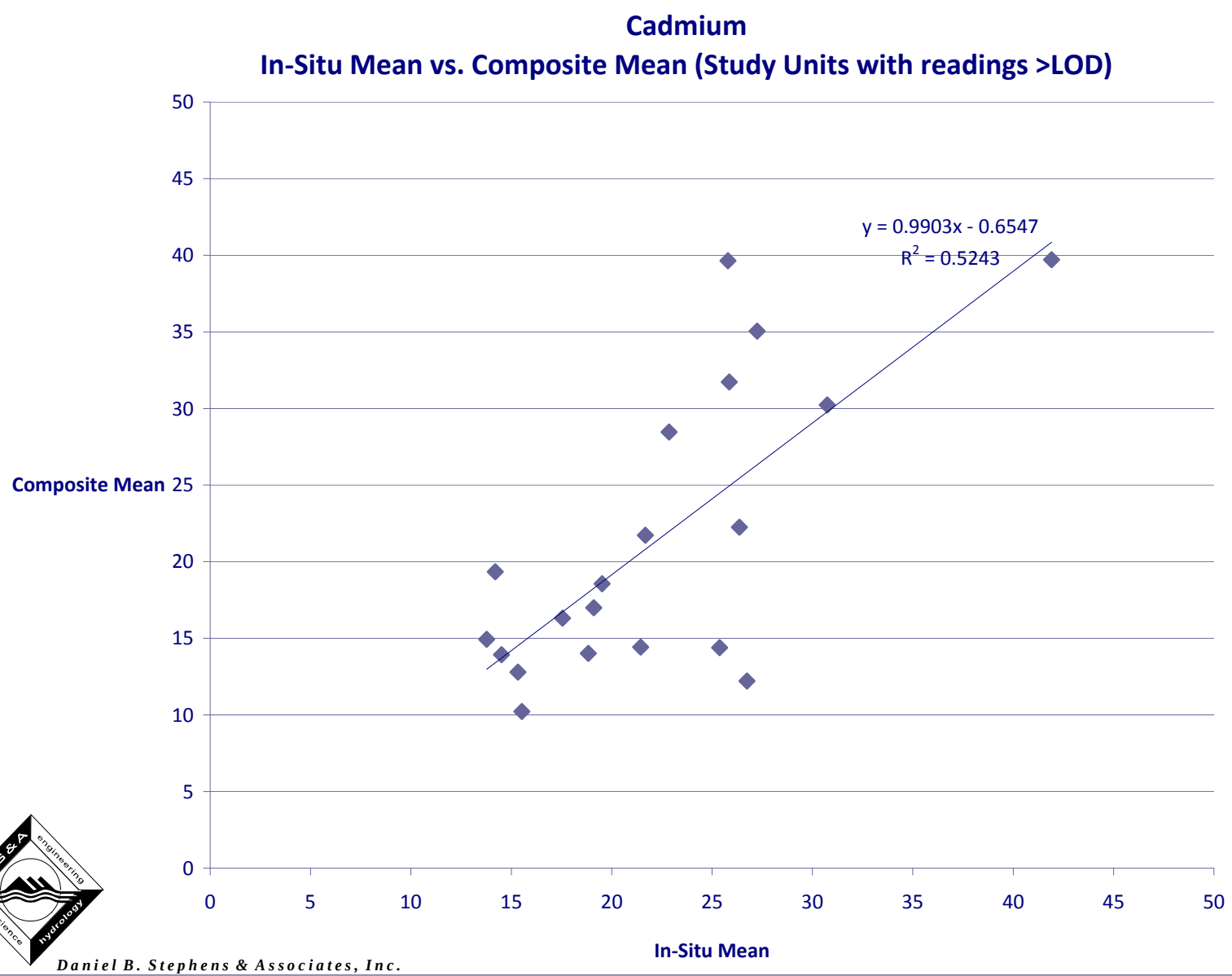
Daniel B. Stephens & Associates, Inc.



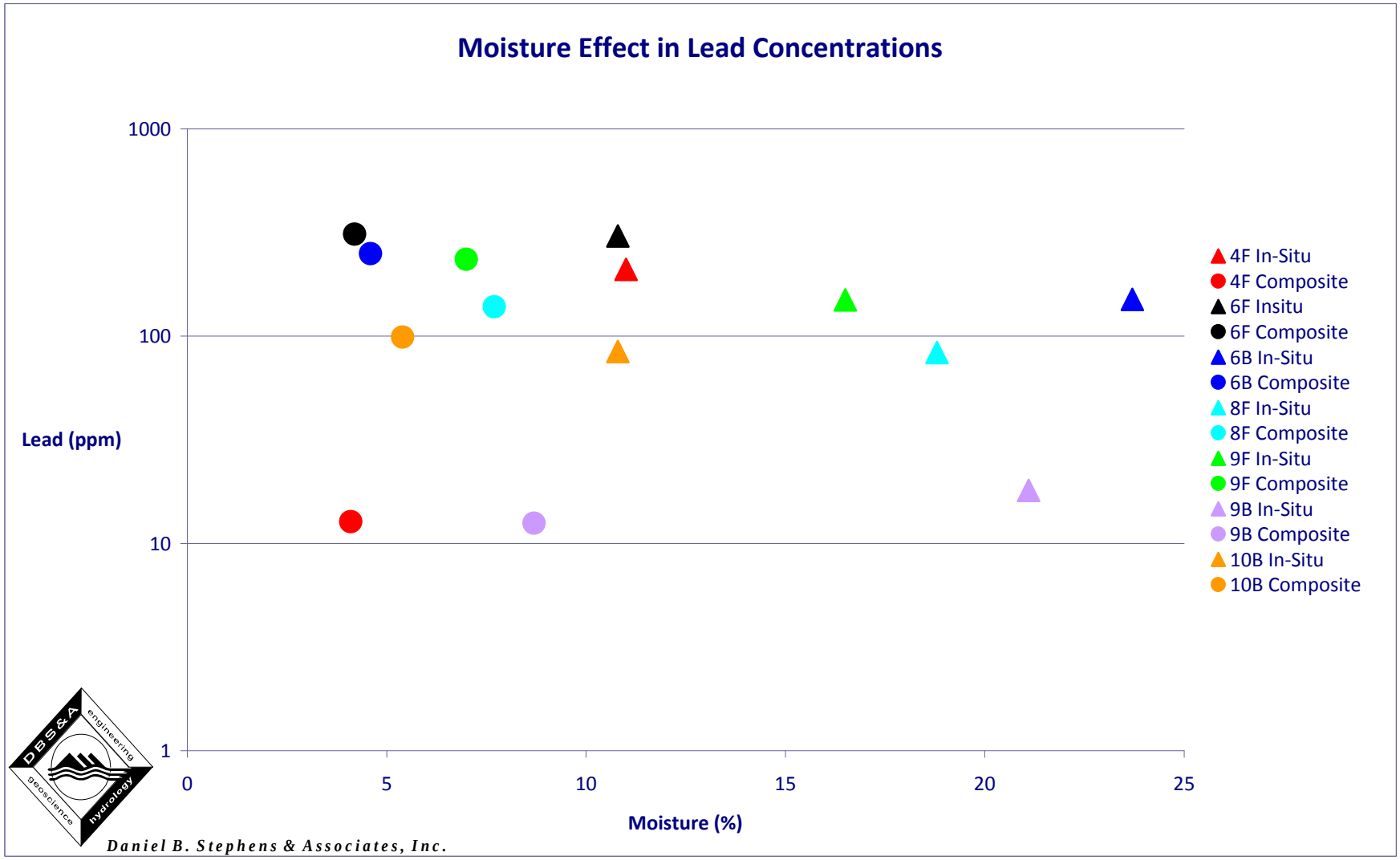
Daniel B. Stephens & Associates, Inc.



Daniel B. Stephens & Associates, Inc.



Daniel B. Stephens & Associates, Inc.


Moisture Effect in Lead Concentrations
1000
100
10
1
Lead (ppm)
0
5
10
15
20
25
Moisture (%)
4F In-Situ
4F Composite
6F Insitu
6F Composite
6B In-Situ
6B Composite
8F In-Situ
8F Composite
9F In-Situ
9F Composite
9B In-Situ
9B Composite
10B In-Situ
10B Composite
DBS&A
engineering
geoscience
hydrology
Daniel B. Stephens & Associates, Inc.

Appendix C

ThermoFisher
SCIENTIFIC

January 10, 2011

Beronica Lee-Brand
Daniel B Stephens & Associates Inc
4030 West Braker Lane
Suite 325
Austin, TX 78759

Subject: Operator's Training Certificate – Thermo Scientific Niton XRF Analyzers

Dear Beronica:

Congratulations on having successfully completed the Thermo Fisher Scientific Operational Training Course for our handheld Thermo Scientific Niton x-ray florescence (XRF) analyzers. We admire your effort in attending this course and have enclosed your certificate of completion. This document certifies that you have been trained in device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance pertaining to the use of the Thermo Scientific Niton XRF analyzer.

Please feel free to contact us to discuss your testing and analysis needs. Our trained, technical staff will help you identify best practices and testing methods that can increase productivity and help save you time and money.

We also welcome any comments you might have regarding the quality of the training you received. What did you like? How can we improve? Please e-mail your comments to me at william.radosevich@thermofisher.com. If you have any questions regarding the enclosed certificate, please contact Dorothy Callihan at (800) 875-1578 or by e-mail at dorothy.callihan@thermofisher.com .

Be sure to visit our web site at www.thermo.com/niton for the latest news about our products, applications, and scheduled events. We are committed to solving your analysis needs.

Best regards,

William Radosevich
Director of Customer Training
Thermo Scientific Niton Analyzers

CUSTOMER TRAINING

Thermo Scientific Niton XRF Analyzer Operator's Training Certificate

This is to certify that

Beronica Lee-Brand

has successfully completed the Thermo Fisher Scientific Niton XRF Analyzer Operational Training Course. The topics of this course include device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance of the Thermo Scientific Niton XRF Analyzer.

Course date: 2010 November 3
Location: Austin, TX
Certificate Number: 10:1700380000012fyPo

Dorothy Callihan
Operational Training Coordinator

Customer Training Certificate

William Radosevich
Director of Customer Training

ThermoFisher
SCIENTIFIC

January 10, 2011

Christopher Wolf
Daniel B. Stephens & Associates, Inc.
4030 W. Braker Lane Suite 325
Austin,, TX 78759

Subject: Operator's Training Certificate – Thermo Scientific Niton XRF Analyzers

Dear Chris:

Congratulations on having successfully completed the Thermo Fisher Scientific Operational Training Course for our handheld Thermo Scientific Niton x-ray florescence (XRF) analyzers. We admire your effort in attending this course and have enclosed your certificate of completion. This document certifies that you have been trained in device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance pertaining to the use of the Thermo Scientific Niton XRF analyzer.

Please feel free to contact us to discuss your testing and analysis needs. Our trained, technical staff will help you identify best practices and testing methods that can increase productivity and help save you time and money.

We also welcome any comments you might have regarding the quality of the training you received. What did you like? How can we improve? Please e-mail your comments to me at william.radosevich@thermofisher.com. If you have any questions regarding the enclosed certificate, please contact Dorothy Callihan at (800) 875-1578 or by e-mail at dorothy.callihan@thermofisher.com .

Be sure to visit our web site at www.thermo.com/niton for the latest news about our products, applications, and scheduled events. We are committed to solving your analysis needs.

Best regards,

William Radosevich
Director of Customer Training
Thermo Scientific Niton Analyzers

CUSTOMER TRAINING

Thermo Scientific Niton XRF Analyzer Operator's Training Certificate

This is to certify that

Christopher Wolf

has successfully completed the Thermo Fisher Scientific Niton XRF Analyzer Operational Training Course. The topics of this course include device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance of the Thermo Scientific Niton XRF Analyzer.

Course date: 2010 November 3
Location: Austin, TX
Certificate Number: 10:26003800000fGJxD

Dorothy Callihan
Operational Training Coordinator

Customer Training Certificate

William Radosevich
Director of Customer Training

ThermoFisher
SCIENTIFIC

January 10, 2011

Craig Watts
Daniel B Stephens & Associates Inc
4030 West Braker Lane
Suite 325
Austin, TX 78759

Subject: Operator's Training Certificate – Thermo Scientific Niton XRF Analyzers

Dear Craig:

Congratulations on having successfully completed the Thermo Fisher Scientific Operational Training Course for our handheld Thermo Scientific Niton x-ray florescence (XRF) analyzers. We admire your effort in attending this course and have enclosed your certificate of completion. This document certifies that you have been trained in device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance pertaining to the use of the Thermo Scientific Niton XRF analyzer.

Please feel free to contact us to discuss your testing and analysis needs. Our trained, technical staff will help you identify best practices and testing methods that can increase productivity and help save you time and money.

We also welcome any comments you might have regarding the quality of the training you received. What did you like? How can we improve? Please e-mail your comments to me at william.radosevich@thermofisher.com. If you have any questions regarding the enclosed certificate, please contact Dorothy Callihan at (800) 875-1578 or by e-mail at dorothy.callihan@thermofisher.com .

Be sure to visit our web site at www.thermo.com/niton for the latest news about our products, applications, and scheduled events. We are committed to solving your analysis needs.

Best regards,

William Radosevich
Director of Customer Training
Thermo Scientific Niton Analyzers

CUSTOMER TRAINING

Thermo Scientific Niton XRF Analyzer Operator's Training Certificate

This is to certify that

Craig Watts

has successfully completed the Thermo Fisher Scientific Niton XRF Analyzer Operational Training Course. The topics of this course include device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance of the Thermo Scientific Niton XRF Analyzer.

Course date: 2010 November 3
Location: Austin, TX
Certificate Number: 10:2500380000014N3MC

Dorothy Callihan
Operational Training Coordinator

Customer Training Certificate

William Radosevich
Director of Customer Training

ThermoFisher
SCIENTIFIC

January 10, 2011

Elizabeth Simmons
Daniel B Stephens & Associates Inc
4030 West Braker Lane
Suite 325
Austin, TX 78759

Subject: Operator's Training Certificate – Thermo Scientific Niton XRF Analyzers

Dear Elizabeth:

Congratulations on having successfully completed the Thermo Fisher Scientific Operational Training Course for our handheld Thermo Scientific Niton x-ray florescence (XRF) analyzers. We admire your effort in attending this course and have enclosed your certificate of completion. This document certifies that you have been trained in device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance pertaining to the use of the Thermo Scientific Niton XRF analyzer.

Please feel free to contact us to discuss your testing and analysis needs. Our trained, technical staff will help you identify best practices and testing methods that can increase productivity and help save you time and money.

We also welcome any comments you might have regarding the quality of the training you received. What did you like? How can we improve? Please e-mail your comments to me at william.radosevich@thermofisher.com. If you have any questions regarding the enclosed certificate, please contact Dorothy Callihan at (800) 875-1578 or by e-mail at dorothy.callihan@thermofisher.com .

Be sure to visit our web site at www.thermo.com/niton for the latest news about our products, applications, and scheduled events. We are committed to solving your analysis needs.

Best regards,

William Radosevich
Director of Customer Training
Thermo Scientific Niton Analyzers

CUSTOMER TRAINING

Thermo Scientific Niton XRF Analyzer Operator's Training Certificate

This is to certify that

Elizabeth Simmons

has successfully completed the Thermo Fisher Scientific Niton XRF Analyzer Operational Training Course. The topics of this course include device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance of the Thermo Scientific Niton XRF Analyzer.

Course date: 2010 November 3
Location: Austin, TX
Certificate Number: 10:1900380000014N3MH

Dorothy Callihan
Operational Training Coordinator

William Radosevich
Director of Customer Training

Customer Training Certificate

ThermoFisher
SCIENTIFIC

January 10, 2011

Jeffrey E. Patterson
Daniel B Stephens & Associates Inc
4030 West Braker Lane
Suite 325
Austin, TX 78759

Subject: Operator's Training Certificate – Thermo Scientific Niton XRF Analyzers

Dear Jeffrey E.:

Congratulations on having successfully completed the Thermo Fisher Scientific Operational Training Course for our handheld Thermo Scientific Niton x-ray florescence (XRF) analyzers. We admire your effort in attending this course and have enclosed your certificate of completion. This document certifies that you have been trained in device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance pertaining to the use of the Thermo Scientific Niton XRF analyzer.

Please feel free to contact us to discuss your testing and analysis needs. Our trained, technical staff will help you identify best practices and testing methods that can increase productivity and help save you time and money.

We also welcome any comments you might have regarding the quality of the training you received. What did you like? How can we improve? Please e-mail your comments to me at william.radosevich@thermofisher.com. If you have any questions regarding the enclosed certificate, please contact Dorothy Callihan at (800) 875-1578 or by e-mail at dorothy.callihan@thermofisher.com .

Be sure to visit our web site at www.thermo.com/niton for the latest news about our products, applications, and scheduled events. We are committed to solving your analysis needs.

Best regards,

William Radosevich
Director of Customer Training
Thermo Scientific Niton Analyzers

CUSTOMER TRAINING

Thermo Scientific Niton XRF Analyzer Operator's Training Certificate

This is to certify that

Jeffrey E. Patterson

has successfully completed the Thermo Fisher Scientific Niton XRF Analyzer Operational Training Course. The topics of this course include device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance of the Thermo Scientific Niton XRF Analyzer.

Course date: 2010 November 3
Location: Austin, TX
Certificate Number: 10:1800380000014N3JB

Dorothy Callihan
Operational Training Coordinator

Customer Training Certificate

William Radosevich
Director of Customer Training

Part of Thermo Fisher Scientific

Thermo SCIENTIFIC

ThermoFisher
SCIENTIFIC

January 10, 2011

Joel B. Stone
Daniel B Stephens & Associates Inc
4030 West Braker Lane
Suite 325
Austin, TX 78759

Subject: Operator's Training Certificate – Thermo Scientific Niton XRF Analyzers

Dear Joel B.:

Congratulations on having successfully completed the Thermo Fisher Scientific Operational Training Course for our handheld Thermo Scientific Niton x-ray florescence (XRF) analyzers. We admire your effort in attending this course and have enclosed your certificate of completion. This document certifies that you have been trained in device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance pertaining to the use of the Thermo Scientific Niton XRF analyzer.

Please feel free to contact us to discuss your testing and analysis needs. Our trained, technical staff will help you identify best practices and testing methods that can increase productivity and help save you time and money.

We also welcome any comments you might have regarding the quality of the training you received. What did you like? How can we improve? Please e-mail your comments to me at william.radosevich@thermofisher.com. If you have any questions regarding the enclosed certificate, please contact Dorothy Callihan at (800) 875-1578 or by e-mail at dorothy.callihan@thermofisher.com .

Be sure to visit our web site at www.thermo.com/niton for the latest news about our products, applications, and scheduled events. We are committed to solving your analysis needs.

Best regards,

William Radosevich
Director of Customer Training
Thermo Scientific Niton Analyzers

CUSTOMER TRAINING

Thermo Scientific Niton XRF Analyzer Operator's Training Certificate

This is to certify that

Joel B. Stone

has successfully completed the Thermo Fisher Scientific Niton XRF Analyzer Operational Training Course. The topics of this course include device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance of the Thermo Scientific Niton XRF Analyzer.

Course date: 2010 November 3
Location: Austin, TX
Certificate Number: 10:2100380000014N3Li

Dorothy Callihan
Operational Training Coordinator

Customer Training Certificate

William Radosevich
Director of Customer Training

ThermoFisher
SCIENTIFIC

The world leader
in serving science

January 10, 2011

Kevin S. Hopson
Daniel B Stephens & Associates Inc
4030 West Braker Lane
Suite 325
Austin, TX 78759

Subject: Operator's Training Certificate – Thermo Scientific Niton XRF Analyzers

Dear Kevin S.:

Congratulations on having successfully completed the Thermo Fisher Scientific Operational Training Course for our handheld Thermo Scientific Niton x-ray florescence (XRF) analyzers. We admire your effort in attending this course and have enclosed your certificate of completion. This document certifies that you have been trained in device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance pertaining to the use of the Thermo Scientific Niton XRF analyzer.

Please feel free to contact us to discuss your testing and analysis needs. Our trained, technical staff will help you identify best practices and testing methods that can increase productivity and help save you time and money.

We also welcome any comments you might have regarding the quality of the training you received. What did you like? How can we improve? Please e-mail your comments to me at william.radosevich@thermofisher.com. If you have any questions regarding the enclosed certificate, please contact Dorothy Callihan at (800) 875-1578 or by e-mail at dorothy.callihan@thermofisher.com .

Be sure to visit our web site at www.thermo.com/niton for the latest news about our products, applications, and scheduled events. We are committed to solving your analysis needs.

Best regards,

William Radosevich
Director of Customer Training
Thermo Scientific Niton Analyzers

CUSTOMER TRAINING

Thermo Scientific Niton XRF Analyzer Operator's Training Certificate

This is to certify that

Kevin S. Hopson

has successfully completed the Thermo Fisher Scientific Niton XRF Analyzer Operational Training Course. The topics of this course include device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance of the Thermo Scientific Niton XRF Analyzer.

Course date: 2010 November 3
Location: Austin, TX
Certificate Number: 10:0700380000014N3Ld

Dorothy Callihan
Operational Training Coordinator

William Radosevich
Director of Customer Training

Customer Training Certificate

Part of Thermo Fisher Scientific

Thermo SCIENTIFIC

ThermoFisher
SCIENTIFIC

January 10, 2011

Omar Valdez
Daniel B Stephens & Associates Inc
4030 West Braker Lane
Suite 325
Austin, TX 78759

Subject: Operator's Training Certificate – Thermo Scientific Niton XRF Analyzers

Dear Omar:

Congratulations on having successfully completed the Thermo Fisher Scientific Operational Training Course for our handheld Thermo Scientific Niton x-ray florescence (XRF) analyzers. We admire your effort in attending this course and have enclosed your certificate of completion. This document certifies that you have been trained in device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance pertaining to the use of the Thermo Scientific Niton XRF analyzer.

Please feel free to contact us to discuss your testing and analysis needs. Our trained, technical staff will help you identify best practices and testing methods that can increase productivity and help save you time and money.

We also welcome any comments you might have regarding the quality of the training you received. What did you like? How can we improve? Please e-mail your comments to me at william.radosevich@thermofisher.com. If you have any questions regarding the enclosed certificate, please contact Dorothy Callihan at (800) 875-1578 or by e-mail at dorothy.callihan@thermofisher.com .

Be sure to visit our web site at www.thermo.com/niton for the latest news about our products, applications, and scheduled events. We are committed to solving your analysis needs.

Best regards,

William Radosevich
Director of Customer Training
Thermo Scientific Niton Analyzers

CUSTOMER TRAINING

Thermo Scientific Niton XRF Analyzer Operator's Training Certificate

This is to certify that

Omar Valdez

has successfully completed the Thermo Fisher Scientific Niton XRF Analyzer Operational Training Course. The topics of this course include device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance of the Thermo Scientific Niton XRF Analyzer.

Course date: 2010 November 3
Location: Austin, TX
Certificate Number: 10:2400380000014N3G7

Dorothy Callihan
Operational Training Coordinator

Customer Training Certificate

William Radosevich
Director of Customer Training

ThermoFisher
SCIENTIFIC

January 10, 2011

Paul Kirby
Daniel B Stephens & Associates Inc
4030 West Braker Lane
Suite 325
Austin, TX 78759

Subject: Operator's Training Certificate – Thermo Scientific Niton XRF Analyzers

Dear Paul:

Congratulations on having successfully completed the Thermo Fisher Scientific Operational Training Course for our handheld Thermo Scientific Niton x-ray florescence (XRF) analyzers. We admire your effort in attending this course and have enclosed your certificate of completion. This document certifies that you have been trained in device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance pertaining to the use of the Thermo Scientific Niton XRF analyzer.

Please feel free to contact us to discuss your testing and analysis needs. Our trained, technical staff will help you identify best practices and testing methods that can increase productivity and help save you time and money.

We also welcome any comments you might have regarding the quality of the training you received. What did you like? How can we improve? Please e-mail your comments to me at william.radosevich@thermofisher.com. If you have any questions regarding the enclosed certificate, please contact Dorothy Callihan at (800) 875-1578 or by e-mail at dorothy.callihan@thermofisher.com .

Be sure to visit our web site at www.thermo.com/niton for the latest news about our products, applications, and scheduled events. We are committed to solving your analysis needs.

Best regards,

William Radosevich
Director of Customer Training
Thermo Scientific Niton Analyzers

CUSTOMER TRAINING

Thermo Scientific Niton XRF Analyzer Operator's Training Certificate

This is to certify that

Paul Kirby

has successfully completed the Thermo Fisher Scientific Niton XRF Analyzer Operational Training Course. The topics of this course include device configuration, sample preparation, safe operation and analysis, interpretation of results, and routine maintenance of the Thermo Scientific Niton XRF Analyzer.

Course date: 2010 November 3
Location: Austin, TX
Certificate Number: 10:1600380000014N3M2

Dorothy Callihan
Operational Training Coordinator

Customer Training Certificate

William Radosevich
Director of Customer Training

Thermo SCIENTIFIC

THE LEADER IN XRF TECHNOLOGY

ThermoFisher SCIENTIFIC

Thermo Scientific NITON Analyzers Installation and Training Checklist

Company Name: D.B. Stephens and Associates

Address: 4030 W. Braker Lane Suite 325 Austin, TX 78759

Date of Training: 11/3/10 Instrument Model: XL3t 500 Serial Number: Rental Units

Modes Available: (1a)

- ___ Alloy Mode
- ✓ Lead-in-Paint Analysis
- ✓ Bulk Sample Analysis Mode
- ✓ Thin Sample Analysis Mode
- ___ Precious Metal Analysis
- ✓ Industrial Bulk (mining)Mode
- ___ RoHS /Consumer Goods Mode
- ___ Helium Purge Configuration
- ___ Other: _____

Training Checklist (2a)

- ✓ Turn on/off analyzer
- ✓ Adjust date and time on instrument
- ✓ Explain a detector calibration
- ✓ Select appropriate mode of analysis for appropriate sample
- ✓ Enter sample data via keyboard/barcode scanner
- ✓ Analyze samples (start/stop)
- ✓ Replace/charge batteries
- ✓ Adjust the contrast on screen
- ✓ Replace Kapton window
- ✓ Understands and accepts the analyzer's performance on NITON Reference sample.
- N/A Understand RoHS /Consumer Goods SOP as included with instrument.
- ✓ Explained transportation requirements
- ✓ Use NDT/NDTr
- ✓ Download/delete data on analyzer
- N/A Add/modify/save alloy library
- ✓ Access/use SpectraView to further verify presence/absence of elements
- ✓ Understands proximity sensors (activate/not activated)
- ✓ Understand how to set and adjust element thresholds
- ✓ Bulk/Soil Preparation
- N/A Thin Sample Preparation
- N/A Helium Connection/Usage
- ✓ Understands what the results indicate (i.e. elements out of Specification; level of detection; below the level of detection)
- ✓ Understand how to use the analyzer safely (ALARA).
- ✓ Shipping and transportation of Radioactive isotope analyzers training

1410 Gillingham Lane
Sugar Land, Texas
800.875.1578 www.thermofisher.com/niton

Thermo SCIENTIFIC THE LEADER IN XRF TECHNOLOGY ThermoFisher SCIENTIFIC

I understand that the Thermo Scientific. NITON analyzer produces ionized radiation via a radioactive isotope or X-ray tube. I agree to comply with all required state/federal regulations including proper registration, reciprocity (inter-state travel) and semi-annual wipe test (if required). I also agree to fulfill all necessary requirements for radiation safety including attending an authorized NITON radiation training class (if required).

My signature below indicates that all the items checked off in sections 1a and 2a have been covered in this training.

Date: 11/3/2010 Company Name: D.B. STEPHENS & ASSOCIATES

Training Class Participants:

Print Name	Signature
Christopher Wolf	Christopher Wolf
BERONICA LEE-BRAND	Beronica Lee-Brand
Kevin S. Hopson	[illegible]
Joel B. Stone	[illegible]
Paul Kirby	[illegible]
Omar Vadet	[illegible]
Craig Watts	Craig Watts
Elizabeth Simmons	E Simmons

Training Class Participants agreement confirmed by their Signatures Above

Thermo NITON Representative Signature: Robert Lynn Miller

Important Contact info:

Technical Sales Engineer:	Robert Lynn Miller	Phone# 281-229-1299
Regional Sales Manager:	Mike Crowley	Phone# 512-251-1436
Techncal Support:		Phone# 800-875-1578

1410 Gillingham Lane
Sugar Land, Texas 77478
800.875.1578 www.thermofisher.com/niton

Appendix D

METHOD 6200

FIELD PORTABLE X-RAY FLUORESCENCE SPECTROMETRY FOR THE DETERMINATION OF ELEMENTAL CONCENTRATIONS IN SOIL AND SEDIMENT

SW-846 is not intended to be an analytical training manual. Therefore, method procedures are written based on the assumption that they will be performed by analysts who are formally trained in at least the basic principles of chemical analysis and in the use of the subject technology.

In addition, SW-846 methods, with the exception of required method use for the analysis of method-defined parameters, are intended to be guidance methods which contain general information on how to perform an analytical procedure or technique which a laboratory can use as a basic starting point for generating its own detailed Standard Operating Procedure (SOP), either for its own general use or for a specific project application. The performance data included in this method are for guidance purposes only, and are not intended to be and must not be used as absolute QC acceptance criteria for purposes of laboratory accreditation.

1.0 SCOPE AND APPLICATION

1.1 This method is applicable to the in situ and intrusive analysis of the 26 analytes listed below for soil and sediment samples. Some common elements are not listed in this method because they are considered "light" elements that cannot be detected by field portable x-ray fluorescence (FPXRF). These light elements are: lithium, beryllium, sodium, magnesium, aluminum, silicon, and phosphorus. Most of the analytes listed below are of environmental concern, while a few others have interference effects or change the elemental composition of the matrix, affecting quantitation of the analytes of interest. Generally elements of atomic number 16 or greater can be detected and quantitated by FPXRF. The following RCRA analytes have been determined by this method:

Analytes	CAS Registry No.
Antimony (Sb)	7440-36-0
Arsenic (As)	7440-38-0
Barium (Ba)	7440-39-3
Cadmium (Cd)	7440-43-9
Chromium (Cr)	7440-47-3
Cobalt (Co)	7440-48-4
Copper (Cu)	7440-50-8
Lead (Pb)	7439-92-1
Mercury (Hg)	7439-97-6
Nickel (Ni)	7440-02-0
Selenium (Se)	7782-49-2
Silver (Ag)	7440-22-4
Thallium (Tl)	7440-28-0
Tin (Sn)	7440-31-5

Analytes	CAS Registry No.
Vanadium (V)	7440-62-2
Zinc (Zn)	7440-66-6

In addition, the following non-RCRA analytes have been determined by this method:

Analytes	CAS Registry No.
Calcium (Ca)	7440-70-2
Iron (Fe)	7439-89-6
Manganese (Mn)	7439-96-5
Molybdenum (Mo)	7439-93-7
Potassium (K)	7440-09-7
Rubidium (Rb)	7440-17-7
Strontium (Sr)	7440-24-6
Thorium (Th)	7440-29-1
Titanium (Ti)	7440-32-6
Zirconium (Zr)	7440-67-7

1.2 This method is a screening method to be used with confirmatory analysis using other techniques (e.g., flame atomic absorption spectrometry (FLAA), graphite furnance atomic absorption spectrometry (GFAA), inductively coupled plasma-atomic emission spectrometry, (ICP-AES), or inductively coupled plasma-mass spectrometry, (ICP-MS)). This method's main strength is that it is a rapid field screening procedure. The method's lower limits of detection are typically above the toxicity characteristic regulatory level for most RCRA analytes. However, when the obtainable values for precision, accuracy, and laboratory-established sensitivity of this method meet project-specific data quality objectives (DQOs), FPXRF is a fast, powerful, cost effective technology for site characterization.

1.3 The method sensitivity or lower limit of detection depends on several factors, including the analyte of interest, the type of detector used, the type of excitation source, the strength of the excitation source, count times used to irradiate the sample, physical matrix effects, chemical matrix effects, and interelement spectral interferences. Example lower limits of detection for analytes of interest in environmental applications are shown in Table 1. These limits apply to a clean spiked matrix of quartz sand (silicon dioxide) free of interelement spectral interferences using long (100 -600 second) count times. These sensitivity values are given for guidance only and may not always be achievable, since they will vary depending on the sample matrix, which instrument is used, and operating conditions. A discussion of performance-based sensitivity is presented in Sec. 9.6.

1.4 Analysts should consult the disclaimer statement at the front of the manual and the information in Chapter Two for guidance on the intended flexibility in the choice of methods, apparatus, materials, reagents, and supplies, and on the responsibilities of the analyst for demonstrating that the techniques employed are appropriate for the analytes of interest, in the matrix of interest, and at the levels of concern.

In addition, analysts and data users are advised that, except where explicitly specified in a regulation, the use of SW-846 methods is *not* mandatory in response to Federal testing requirements. The information contained in this method is provided by EPA as guidance to be used by the analyst and the regulated community in making judgments necessary to generate results that meet the data quality objectives for the intended application.

1.5 Use of this method is restricted to use by, or under supervision of, personnel appropriately experienced and trained in the use and operation of an XRF instrument. Each analyst must demonstrate the ability to generate acceptable results with this method.

2.0 SUMMARY OF METHOD

2.1 The FPXRF technologies described in this method use either sealed radioisotope sources or x-ray tubes to irradiate samples with x-rays. When a sample is irradiated with x-rays, the source x-rays may undergo either scattering or absorption by sample atoms. This latter process is known as the photoelectric effect. When an atom absorbs the source x-rays, the incident radiation dislodges electrons from the innermost shells of the atom, creating vacancies. The electron vacancies are filled by electrons cascading in from outer electron shells. Electrons in outer shells have higher energy states than inner shell electrons, and the outer shell electrons give off energy as they cascade down into the inner shell vacancies. This rearrangement of electrons results in emission of x-rays characteristic of the given atom. The emission of x-rays, in this manner, is termed x-ray fluorescence.

Three electron shells are generally involved in emission of x-rays during FPXRF analysis of environmental samples. The three electron shells include the K, L, and M shells. A typical emission pattern, also called an emission spectrum, for a given metal has multiple intensity peaks generated from the emission of K, L, or M shell electrons. The most commonly measured x-ray emissions are from the K and L shells; only metals with an atomic number greater than 57 have measurable M shell emissions.

Each characteristic x-ray line is defined with the letter K, L, or M, which signifies which shell had the original vacancy and by a subscript alpha (α), beta (β), or gamma (γ) etc., which indicates the higher shell from which electrons fell to fill the vacancy and produce the x-ray. For example, a K_α line is produced by a vacancy in the K shell filled by an L shell electron, whereas a K_β line is produced by a vacancy in the K shell filled by an M shell electron. The K_α transition is on average 6 to 7 times more probable than the K_β transition; therefore, the K_α line is approximately 7 times more intense than the K_β line for a given element, making the K_α line the choice for quantitation purposes.

The K lines for a given element are the most energetic lines and are the preferred lines for analysis. For a given atom, the x-rays emitted from L transitions are always less energetic than those emitted from K transitions. Unlike the K lines, the main L emission lines (L_α and L_β) for an element are of nearly equal intensity. The choice of one or the other depends on what interfering element lines might be present. The L emission lines are useful for analyses involving elements of atomic number (Z) 58 (cerium) through 92 (uranium).

An x-ray source can excite characteristic x-rays from an element only if the source energy is greater than the absorption edge energy for the particular line group of the element, that is, the K absorption edge, L absorption edge, or M absorption edge energy. The absorption edge energy is somewhat greater than the corresponding line energy. Actually, the K absorption edge energy is approximately the sum of the K, L, and M line energies of the particular element, and the L absorption edge energy is approximately the sum of the L and M line energies. FPXRF is more sensitive to an element with an absorption edge energy close to but less than

the excitation energy of the source. For example, when using a cadmium-109 source, which has an excitation energy of 22.1 kiloelectron volts (keV), FPXRF would exhibit better sensitivity for zirconium which has a K line energy of 15.77 keV than to chromium, which has a K line energy of 5.41 keV.

2.2 Under this method, inorganic analytes of interest are identified and quantitated using a field portable energy-dispersive x-ray fluorescence spectrometer. Radiation from one or more radioisotope sources or an electrically excited x-ray tube is used to generate characteristic x-ray emissions from elements in a sample. Up to three sources may be used to irradiate a sample. Each source emits a specific set of primary x-rays that excite a corresponding range of elements in a sample. When more than one source can excite the element of interest, the source is selected according to its excitation efficiency for the element of interest.

For measurement, the sample is positioned in front of the probe window. This can be done in two manners using FPXRF instruments, specifically, in situ or intrusive. If operated in the in situ mode, the probe window is placed in direct contact with the soil surface to be analyzed. When an FPXRF instrument is operated in the intrusive mode, a soil or sediment sample must be collected, prepared, and placed in a sample cup. The sample cup is then placed on top of the window inside a protective cover for analysis.

Sample analysis is then initiated by exposing the sample to primary radiation from the source. Fluorescent and backscattered x-rays from the sample enter through the detector window and are converted into electric pulses in the detector. The detector in FPXRF instruments is usually either a solid-state detector or a gas-filled proportional counter. Within the detector, energies of the characteristic x-rays are converted into a train of electric pulses, the amplitudes of which are linearly proportional to the energy of the x-rays. An electronic multichannel analyzer (MCA) measures the pulse amplitudes, which is the basis of qualitative x-ray analysis. The number of counts at a given energy per unit of time is representative of the element concentration in a sample and is the basis for quantitative analysis. Most FPXRF instruments are menu-driven from software built into the units or from personal computers (PC).

The measurement time of each source is user-selectable. Shorter source measurement times (30 seconds) are generally used for initial screening and hot spot delineation, and longer measurement times (up to 300 seconds) are typically used to meet higher precision and accuracy requirements.

FPXRF instruments can be calibrated using the following methods: internally using fundamental parameters determined by the manufacturer, empirically based on site-specific calibration standards (SSCS), or based on Compton peak ratios. The Compton peak is produced by backscattering of the source radiation. Some FPXRF instruments can be calibrated using multiple methods.

3.0 DEFINITIONS

3.1 FPXRF -- Field portable x-ray fluorescence.

3.2 MCA -- Multichannel analyzer for measuring pulse amplitude.

3.3 SSCS -- Site-specific calibration standards.

3.4 FP -- Fundamental parameter.

3.5 ROI -- Region of interest.

3.6 SRM -- Standard reference material; a standard containing certified amounts of metals in soil or sediment.

3.7 eV -- Electron volt; a unit of energy equivalent to the amount of energy gained by an electron passing through a potential difference of one volt.

3.8 Refer to Chapter One, Chapter Three, and the manufacturer's instructions for other definitions that may be relevant to this procedure.

4.0 INTERFERENCES

4.1 The total method error for FPXRF analysis is defined as the square root of the sum of squares of both instrument precision and user- or application-related error. Generally, instrument precision is the least significant source of error in FPXRF analysis. User- or application-related error is generally more significant and varies with each site and method used. Some sources of interference can be minimized or controlled by the instrument operator, but others cannot. Common sources of user- or application-related error are discussed below.

4.2 Physical matrix effects result from variations in the physical character of the sample. These variations may include such parameters as particle size, uniformity, homogeneity, and surface condition. For example, if any analyte exists in the form of very fine particles in a coarser-grained matrix, the analyte's concentration measured by the FPXRF will vary depending on how fine particles are distributed within the coarser-grained matrix. If the fine particles "settle" to the bottom of the sample cup (i.e., against the cup window), the analyte concentration measurement will be higher than if the fine particles are not mixed in well and stay on top of the coarser-grained particles in the sample cup. One way to reduce such error is to grind and sieve all soil samples to a uniform particle size thus reducing sample-to-sample particle size variability. Homogeneity is always a concern when dealing with soil samples. Every effort should be made to thoroughly mix and homogenize soil samples before analysis. Field studies have shown heterogeneity of the sample generally has the largest impact on comparability with confirmatory samples.

4.3 Moisture content may affect the accuracy of analysis of soil and sediment sample analyses. When the moisture content is between 5 and 20 percent, the overall error from moisture may be minimal. However, moisture content may be a major source of error when analyzing samples of surface soil or sediment that are saturated with water. This error can be minimized by drying the samples in a convection or toaster oven. Microwave drying is not recommended because field studies have shown that microwave drying can increase variability between FPXRF data and confirmatory analysis and because metal fragments in the sample can cause arcing to occur in a microwave.

4.4 Inconsistent positioning of samples in front of the probe window is a potential source of error because the x-ray signal decreases as the distance from the radioactive source increases. This error is minimized by maintaining the same distance between the window and each sample. For the best results, the window of the probe should be in direct contact with the sample, which means that the sample should be flat and smooth to provide a good contact surface.

4.5 Chemical matrix effects result from differences in the concentrations of interfering elements. These effects occur as either spectral interferences (peak overlaps) or as x-ray absorption and enhancement phenomena. Both effects are common in soils contaminated with heavy metals. As examples of absorption and enhancement effects; iron (Fe) tends to absorb copper (Cu) x-rays, reducing the intensity of the Cu measured by the detector, while chromium (Cr) will be enhanced at the expense of Fe because the absorption edge of Cr is slightly lower in energy than the fluorescent peak of iron. The effects can be corrected mathematically through the use of fundamental parameter (FP) coefficients. The effects also can be compensated for using SSCS, which contain all the elements present on site that can interfere with one another.

4.6 When present in a sample, certain x-ray lines from different elements can be very close in energy and, therefore, can cause interference by producing a severely overlapped spectrum. The degree to which a detector can resolve the two different peaks depends on the energy resolution of the detector. If the energy difference between the two peaks in electron volts is less than the resolution of the detector in electron volts, then the detector will not be able to fully resolve the peaks.

The most common spectrum overlaps involve the K_β line of element Z-1 with the K_α line of element Z. This is called the K_α/K_β interference. Because the K_α:K_β intensity ratio for a given element usually is about 7:1, the interfering element, Z-1, must be present at large concentrations to cause a problem. Two examples of this type of spectral interference involve the presence of large concentrations of vanadium (V) when attempting to measure Cr or the presence of large concentrations of Fe when attempting to measure cobalt (Co). The V K_α and K_β energies are 4.95 and 5.43 keV, respectively, and the Cr K_α energy is 5.41 keV. The Fe K_α and K_β energies are 6.40 and 7.06 keV, respectively, and the Co K_α energy is 6.92 keV. The difference between the V K_β and Cr K_α energies is 20 eV, and the difference between the Fe K_β and the Co K_α energies is 140 eV. The resolution of the highest-resolution detectors in FPXRF instruments is 170 eV. Therefore, large amounts of V and Fe will interfere with quantitation of Cr or Co, respectively. The presence of Fe is a frequent problem because it is often found in soils at tens of thousands of parts per million (ppm).

4.7 Other interferences can arise from K/L, K/M, and L/M line overlaps, although these overlaps are less common. Examples of such overlap involve arsenic (As) K_α/lead (Pb) L_α and sulfur (S) K_α/Pb M_α. In the As/Pb case, Pb can be measured from the Pb L_β line, and As can be measured from either the As K_α or the As K_β line; in this way the interference can be corrected. If the As K_β line is used, sensitivity will be decreased by a factor of two to five times because it is a less intense line than the As K_α line. If the As K_α line is used in the presence of Pb, mathematical corrections within the instrument software can be used to subtract out the Pb interference. However, because of the limits of mathematical corrections, As concentrations cannot be efficiently calculated for samples with Pb:As ratios of 10:1 or more. This high ratio of Pb to As may result in reporting of a "nondetect" or a "less than" value (e.g., <300 ppm) for As, regardless of the actual concentration present.

No instrument can fully compensate for this interference. It is important for an operator to understand this limitation of FPXRF instruments and consult with the manufacturer of the FPXRF instrument to evaluate options to minimize this limitation. The operator's decision will be based on action levels for metals in soil established for the site, matrix effects, capabilities of the instrument, data quality objectives, and the ratio of lead to arsenic known to be present at the site. If a site is encountered that contains lead at concentrations greater than ten times the concentration of arsenic it is advisable that all critical soil samples be sent off site for confirmatory analysis using other techniques (e.g., flame atomic absorption spectrometry (FLAA), graphite furnance atomic absorption spectrometry (GFAA), inductively coupled plasma-

atomic emission spectrometry, (ICP-AES), or inductively coupled plasma-mass spectrometry, (ICP-MS)).

4.8 If SSCS are used to calibrate an FPXRF instrument, the samples collected must be representative of the site under investigation. Representative soil sampling ensures that a sample or group of samples accurately reflects the concentrations of the contaminants of concern at a given time and location. Analytical results for representative samples reflect variations in the presence and concentration ranges of contaminants throughout a site. Variables affecting sample representativeness include differences in soil type, contaminant concentration variability, sample collection and preparation variability, and analytical variability, all of which should be minimized as much as possible.

4.9 Soil physical and chemical effects may be corrected using SSCS that have been analyzed by inductively coupled plasma (ICP) or atomic absorption (AA) methods. However, a major source of error can be introduced if these samples are not representative of the site or if the analytical error is large. Another concern is the type of digestion procedure used to prepare the soil samples for the reference analysis. Analytical results for the confirmatory method will vary depending on whether a partial digestion procedure, such as Method 3050, or a total digestion procedure, such as Method 3052, is used. It is known that depending on the nature of the soil or sediment, Method 3050 will achieve differing extraction efficiencies for different analytes of interest. The confirmatory method should meet the project-specific data quality objectives (DQOs).

XRF measures the total concentration of an element; therefore, to achieve the greatest comparability of this method with the reference method (reduced bias), a total digestion procedure should be used for sample preparation. However, in the study used to generate the performance data for this method (see Table 8), the confirmatory method used was Method 3050, and the FPXRF data compared very well with regression correlation coefficients (r often exceeding 0.95, except for barium and chromium). The critical factor is that the digestion procedure and analytical reference method used should meet the DQOs of the project and match the method used for confirmation analysis.

4.10 Ambient temperature changes can affect the gain of the amplifiers producing instrument drift. Gain or drift is primarily a function of the electronics (amplifier or preamplifier) and not the detector as most instrument detectors are cooled to a constant temperature. Most FPXRF instruments have a built-in automatic gain control. If the automatic gain control is allowed to make periodic adjustments, the instrument will compensate for the influence of temperature changes on its energy scale. If the FPXRF instrument has an automatic gain control function, the operator will not have to adjust the instrument's gain unless an error message appears. If an error message appears, the operator should follow the manufacturer's procedures for troubleshooting the problem. Often, this involves performing a new energy calibration. The performance of an energy calibration check to assess drift is a quality control measure discussed in Sec. 9.2.

If the operator is instructed by the manufacturer to manually conduct a gain check because of increasing or decreasing ambient temperature, it is standard to perform a gain check after every 10 to 20 sample measurements or once an hour whichever is more frequent. It is also suggested that a gain check be performed if the temperature fluctuates more than 10° F. The operator should follow the manufacturer's recommendations for gain check frequency.

5.0 SAFETY

5.1 This method does not address all safety issues associated with its use. The user is responsible for maintaining a safe work environment and a current awareness file of OSHA regulations regarding the safe handling of the chemicals listed in this method. A reference file of material safety data sheets (MSDSs) should be available to all personnel involved in these analyses.

NOTE: No MSDS applies directly to the radiation-producing instrument because that is covered under the Nuclear Regulatory Commission (NRC) or applicable state regulations.

5.2 Proper training for the safe operation of the instrument and radiation training should be completed by the analyst prior to analysis. Radiation safety for each specific instrument can be found in the operator's manual. Protective shielding should never be removed by the analyst or any personnel other than the manufacturer. The analyst should be aware of the local state and national regulations that pertain to the use of radiation-producing equipment and radioactive materials with which compliance is required. There should be a person appointed within the organization that is solely responsible for properly instructing all personnel, maintaining inspection records, and monitoring x-ray equipment at regular intervals.

Licenses for radioactive materials are of two types, specifically: (1) a general license which is usually initiated by the manufacturer for receiving, acquiring, owning, possessing, using, and transferring radioactive material incorporated in a device or equipment, and (2) a specific license which is issued to named persons for the operation of radioactive instruments as required by local, state, or federal agencies. A copy of the radioactive material license (for specific licenses only) and leak tests should be present with the instrument at all times and available to local and national authorities upon request.

X-ray tubes do not require radioactive material licenses or leak tests, but do require approvals and licenses which vary from state to state. In addition, fail-safe x-ray warning lights should be illuminated whenever an x-ray tube is energized. Provisions listed above concerning radiation safety regulations, shielding, training, and responsible personnel apply to x-ray tubes just as to radioactive sources. In addition, a log of the times and operating conditions should be kept whenever an x-ray tube is energized. An additional hazard present with x-ray tubes is the danger of electric shock from the high voltage supply, however, if the tube is properly positioned within the instrument, this is only a negligible risk. Any instrument (x-ray tube or radioisotope based) is capable of delivering an electric shock from the basic circuitry when the system is inappropriately opened.

5.3 Radiation monitoring equipment should be used with the handling and operation of the instrument. The operator and the surrounding environment should be monitored continually for analyst exposure to radiation. Thermal luminescent detectors (TLD) in the form of badges and rings are used to monitor operator radiation exposure. The TLDs or badges should be worn in the area of maximum exposure. The maximum permissible whole-body dose from occupational exposure is 5 Roentgen Equivalent Man (REM) per year. Possible exposure pathways for radiation to enter the body are ingestion, inhaling, and absorption. The best precaution to prevent radiation exposure is distance and shielding.

6.0 EQUIPMENT AND SUPPLIES

The mention of trade names or commercial products in this manual is for illustrative purposes only, and does not constitute an EPA endorsement or exclusive recommendation for

use. The products and instrument settings cited in SW-846 methods represent those products and settings used during method development or subsequently evaluated by the Agency. Glassware, reagents, supplies, equipment, and settings other than those listed in this manual may be employed provided that method performance appropriate for the intended application has been demonstrated and documented.

6.1 FPXRF spectrometer -- An FPXRF spectrometer consists of four major components: (1) a source that provides x-rays; (2) a sample presentation device; (3) a detector that converts x-ray-generated photons emitted from the sample into measurable electronic signals; and (4) a data processing unit that contains an emission or fluorescence energy analyzer, such as an MCA, that processes the signals into an x-ray energy spectrum from which elemental concentrations in the sample may be calculated, and a data display and storage system. These components and additional, optional items, are discussed below.

6.1.1 Excitation sources -- FPXRF instruments use either a sealed radioisotope source or an x-ray tube to provide the excitation source. Many FPXRF instruments use sealed radioisotope sources to produce x-rays in order to irradiate samples. The FPXRF instrument may contain between one and three radioisotope sources. Common radioisotope sources used for analysis for metals in soils are iron Fe-55 (^{55}Fe), cadmium Cd-109 (^{109}Cd), americium Am-241 (^{241}Am), and curium Cm-244 (^{244}Cm). These sources may be contained in a probe along with a window and the detector; the probe may be connected to a data reduction and handling system by means of a flexible cable. Alternatively, the sources, window, and detector may be included in the same unit as the data reduction and handling system.

The relative strength of the radioisotope sources is measured in units of millicuries (mCi). All other components of the FPXRF system being equal, the stronger the source, the greater the sensitivity and precision of a given instrument. Radioisotope sources undergo constant decay. In fact, it is this decay process that emits the primary x-rays used to excite samples for FPXRF analysis. The decay of radioisotopes is measured in "half-lives." The half-life of a radioisotope is defined as the length of time required to reduce the radioisotopes strength or activity by half. Developers of FPXRF technologies recommend source replacement at regular intervals based on the source's half-life. This is due to the ever increasing time required for the analysis rather than a decrease in instrument performance. The characteristic x-rays emitted from each of the different sources have energies capable of exciting a certain range of analytes in a sample. Table 2 summarizes the characteristics of four common radioisotope sources.

X-ray tubes have higher radiation output, no intrinsic lifetime limit, produce constant output over their lifetime, and do not have the disposal problems of radioactive sources but are just now appearing in FPXRF instruments. An electrically-excited x-ray tube operates by bombarding an anode with electrons accelerated by a high voltage. The electrons gain an energy in electron volts equal to the accelerating voltage and can excite atomic transitions in the anode, which then produces characteristic x-rays. These characteristic x-rays are emitted through a window which contains the vacuum necessary for the electron acceleration. An important difference between x-ray tubes and radioactive sources is that the electrons which bombard the anode also produce a continuum of x-rays across a broad range of energies in addition to the characteristic x-rays. This continuum is weak compared to the characteristic x-rays but can provide substantial excitation since it covers a broad energy range. It has the undesired property of producing background in the spectrum near the analyte x-ray lines when it is scattered by the sample. For this reason a filter is often used between the x-ray tube and the sample to suppress the continuum radiation while passing the characteristic x-rays from the anode. This filter is sometimes incorporated into the window of the x-ray tube. The choice of

accelerating voltage is governed both by the anode material, since the electrons must have sufficient energy to excite the anode, which requires a voltage greater than the absorption edge of the anode material and by the instrument's ability to cool the x-ray tube. The anode is most efficiently excited by voltages 2 to 2.5 times the edge energy (most x-rays per unit power to the tube), although voltages as low as 1.5 times the absorption edge energy will work. The characteristic x-rays emitted by the anode are capable of exciting a range of elements in the sample just as with a radioactive source. Table 3 gives the recommended operating voltages and the sample elements excited for some common anodes.

6.1.2 Sample presentation device -- FPXRF instruments can be operated in two modes: in situ and intrusive. If operated in the in situ mode, the probe window is placed in direct contact with the soil surface to be analyzed. When an FPXRF instrument is operated in the intrusive mode, a soil or sediment sample must be collected, prepared, and placed in a sample cup. For FPXRF instruments operated in the intrusive mode, the probe may be rotated so that the window faces either upward or downward. A protective sample cover is placed over the window, and the sample cup is placed on top of the window inside the protective sample cover for analysis.

6.1.3 Detectors -- The detectors in the FPXRF instruments can be either solid-state detectors or gas-filled, proportional counter detectors. Common solid-state detectors include mercuric iodide (HgI_2), silicon pin diode and lithium-drifted silicon Si(Li). The HgI_2 detector is operated at a moderately subambient temperature controlled by a low power thermoelectric cooler. The silicon pin diode detector also is cooled via the thermoelectric Peltier effect. The Si(Li) detector must be cooled to at least -90 °C either with liquid nitrogen or by thermoelectric cooling via the Peltier effect. Instruments with a Si(Li) detector have an internal liquid nitrogen dewar with a capacity of 0.5 to 1.0 L. Proportional counter detectors are rugged and lightweight, which are important features of a field portable detector. However, the resolution of a proportional counter detector is not as good as that of a solid-state detector. The energy resolution of a detector for characteristic x-rays is usually expressed in terms of full width at half-maximum (FWHM) height of the manganese K_α peak at 5.89 keV. The typical resolutions of the above mentioned detectors are as follows: HgI_2-270 eV; silicon pin diode-250 eV; Si(Li)–170 eV; and gas-filled, proportional counter-750 eV.

During operation of a solid-state detector, an x-ray photon strikes a biased, solid-state crystal and loses energy in the crystal by producing electron-hole pairs. The electric charge produced is collected and provides a current pulse that is directly proportional to the energy of the x-ray photon absorbed by the crystal of the detector. A gas-filled, proportional counter detector is an ionization chamber filled with a mixture of noble and other gases. An x-ray photon entering the chamber ionizes the gas atoms. The electric charge produced is collected and provides an electric signal that is directly proportional to the energy of the x-ray photon absorbed by the gas in the detector.

6.1.4 Data processing units -- The key component in the data processing unit of an FPXRF instrument is the MCA. The MCA receives pulses from the detector and sorts them by their amplitudes (energy level). The MCA counts pulses per second to determine the height of the peak in a spectrum, which is indicative of the target analyte's concentration. The spectrum of element peaks are built on the MCA. The MCAs in FPXRF instruments have from 256 to 2,048 channels. The concentrations of target analytes are usually shown in ppm on a liquid crystal display (LCD) in the instrument. FPXRF instruments can store both spectra and from 3,000 to 5,000 sets of numerical analytical results. Most FPXRF instruments are menu-driven from software built into the

units or from PCs. Once the data–storage memory of an FPXRF unit is full or at any other time, data can be downloaded by means of an RS-232 port and cable to a PC.

6.2 Spare battery and battery charger.

6.3 Polyethylene sample cups -- 31 to 40 mm in diameter with collar, or equivalent (appropriate for FPXRF instrument).

6.4 X-ray window film -- Mylar™, Kapton™, Spectrolene™, polypropylene, or equivalent; 2.5 to 6.0 µm thick.

6.5 Mortar and pestle -- Glass, agate, or aluminum oxide; for grinding soil and sediment samples.

6.6 Containers -- Glass or plastic to store samples.

6.7 Sieves -- 60-mesh (0.25 mm), stainless-steel, Nylon, or equivalent for preparing soil and sediment samples.

6.8 Trowels -- For smoothing soil surfaces and collecting soil samples.

6.9 Plastic bags -- Used for collection and homogenization of soil samples.

6.10 Drying oven -- Standard convection or toaster oven, for soil and sediment samples that require drying.

7.0 REAGENTS AND STANDARDS

7.1 Reagent grade chemicals must be used in all tests. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available. Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

7.2 Pure element standards -- Each pure, single-element standard is intended to produce strong characteristic x-ray peaks of the element of interest only. Other elements present must not contribute to the fluorescence spectrum. A set of pure element standards for commonly sought analytes is supplied by the instrument manufacturer, if designated for the instrument; not all instruments require the pure element standards. The standards are used to set the region of interest (ROI) for each element. They also can be used as energy calibration and resolution check samples.

7.3 Site-specific calibration standards -- Instruments that employ fundamental parameters (FP) or similar mathematical models in minimizing matrix effects may not require SSCS. If the FP calibration model is to be optimized or if empirical calibration is necessary, then SSCSs must be collected, prepared, and analyzed.

7.3.1 The SSCS must be representative of the matrix to be analyzed by FPXRF. These samples must be well homogenized. A minimum of 10 samples spanning the concentration ranges of the analytes of interest and of the interfering elements must be obtained from the site. A sample size of 4 to 8 ounces is recommended, and standard glass sampling jars should be used.

7.3.2 Each sample should be oven-dried for 2 to 4 hr at a temperature of less than 150 °C. If mercury is to be analyzed, a separate sample portion should be dried at ambient temperature as heating may volatilize the mercury. When the sample is dry, all large, organic debris and nonrepresentative material, such as twigs, leaves, roots, insects, asphalt, and rock should be removed. The sample should be homogenized (see Sec. 7.3.3) and then a representative portion ground with a mortar and pestle or other mechanical means, prior to passing through a 60-mesh sieve. Only the coarse rock fraction should remain on the screen.

7.3.3 The sample should be homogenized by using a riffle splitter or by placing 150 to 200 g of the dried, sieved sample on a piece of kraft or butcher paper about 1.5 by 1.5 feet in size. Each corner of the paper should be lifted alternately, rolling the soil over on itself and toward the opposite corner. The soil should be rolled on itself 20 times. Approximately 5 g of the sample should then be removed and placed in a sample cup for FPXRF analysis. The rest of the prepared sample should be sent off site for ICP or AA analysis. The method use for confirmatory analysis should meet the data quality objectives of the project.

7.4 Blank samples -- The blank samples should be from a "clean" quartz or silicon dioxide matrix that is free of any analytes at concentrations above the established lower limit of detection. These samples are used to monitor for cross-contamination and laboratory-induced contaminants or interferences.

7.5 Standard reference materials -- Standard reference materials (SRMs) are standards containing certified amounts of metals in soil or sediment. These standards are used for accuracy and performance checks of FPXRF analyses. SRMs can be obtained from the National Institute of Standards and Technology (NIST), the U.S. Geological Survey (USGS), the Canadian National Research Council, and the national bureau of standards in foreign nations. Pertinent NIST SRMs for FPXRF analysis include 2704, Buffalo River Sediment; 2709, San Joaquin Soil; and 2710 and 2711, Montana Soil. These SRMs contain soil or sediment from actual sites that has been analyzed using independent inorganic analytical methods by many different laboratories. When these SRMs are unavailable, alternate standards may be used (e.g., NIST 2702).

8.0 SAMPLE COLLECTION, PRESERVATION, AND STORAGE

Sample handling and preservation procedures used in FPXRF analyses should follow the guidelines in Chapter Three, "Inorganic Analytes."

9.0 QUALITY CONTROL

9.1 Follow the manufacturer’s instructions for the quality control procedures specific to use of the testing product. Refer to Chapter One for additional guidance on quality assurance (QA) and quality control (QC) protocols. Any effort involving the collection of analytical data should include development of a structured and systematic planning document, such as a Quality Assurance Project Plan (QAPP) or a Sampling and Analysis Plan (SAP), which translates project objectives and specifications into directions for those that will implement the project and assess the results.

9.2 Energy calibration check -- To determine whether an FPXRF instrument is operating within resolution and stability tolerances, an energy calibration check should be run. The energy calibration check determines whether the characteristic x-ray lines are shifting,

which would indicate drift within the instrument. As discussed in Sec. 4.10, this check also serves as a gain check in the event that ambient temperatures are fluctuating greatly (more than 10 °F).

9.2.1 The energy calibration check should be run at a frequency consistent with manufacturer's recommendations. Generally, this would be at the beginning of each working day, after the batteries are changed or the instrument is shut off, at the end of each working day, and at any other time when the instrument operator believes that drift is occurring during analysis. A pure element such as iron, manganese, copper, or lead is often used for the energy calibration check. A manufacturer-recommended count time per source should be used for the check.

9.2.2 The instrument manufacturer's manual specifies the channel or kiloelectron volt level at which a pure element peak should appear and the expected intensity of the peak. The intensity and channel number of the pure element as measured using the source should be checked and compared to the manufacturer's recommendation. If the energy calibration check does not meet the manufacturer's criteria, then the pure element sample should be repositioned and reanalyzed. If the criteria are still not met, then an energy calibration should be performed as described in the manufacturer's manual. With some FPXRF instruments, once a spectrum is acquired from the energy calibration check, the peak can be optimized and realigned to the manufacturer's specifications using their software.

9.3 Blank samples -- Two types of blank samples should be analyzed for FPXRF analysis, specifically, instrument blanks and method blanks.

9.3.1 An instrument blank is used to verify that no contamination exists in the spectrometer or on the probe window. The instrument blank can be silicon dioxide, a polytetraflurorethylene (PTFE) block, a quartz block, "clean" sand, or lithium carbonate. This instrument blank should be analyzed on each working day before and after analyses are conducted and once per every twenty samples. An instrument blank should also be analyzed whenever contamination is suspected by the analyst. The frequency of analysis will vary with the data quality objectives of the project. A manufacturer-recommended count time per source should be used for the blank analysis. No element concentrations above the established lower limit of detection should be found in the instrument blank. If concentrations exceed these limits, then the probe window and the check sample should be checked for contamination. If contamination is not a problem, then the instrument must be "zeroed" by following the manufacturer's instructions.

9.3.2 A method blank is used to monitor for laboratory-induced contaminants or interferences. The method blank can be "clean" silica sand or lithium carbonate that undergoes the same preparation procedure as the samples. A method blank must be analyzed at least daily. The frequency of analysis will depend on the data quality objectives of the project. If the method blank does not contain the target analyte at a level that interferes with the project-specific data quality objectives then the method blank would be considered acceptable. In the absence of project-specific data quality objectives, if the blank is less than the lowest level of detection or less than 10% of the lowest sample concentration for the analyte, whichever is greater, then the method blank would be considered acceptable. If the method blank cannot be considered acceptable, the cause of the problem must be identified, and all samples analyzed with the method blank must be reanalyzed.

9.4 Calibration verification checks -- A calibration verification check sample is used to check the accuracy of the instrument and to assess the stability and consistency of the analysis for the analytes of interest. A check sample should be analyzed at the beginning of each working day, during active sample analyses, and at the end of each working day. The frequency of calibration checks during active analysis will depend on the data quality objectives of the project. The check sample should be a well characterized soil sample from the site that is representative of site samples in terms of particle size and degree of homogeneity and that contains contaminants at concentrations near the action levels. If a site-specific sample is not available, then an NIST or other SRM that contains the analytes of interest can be used to verify the accuracy of the instrument. The measured value for each target analyte should be within ±20 percent (%D) of the true value for the calibration verification check to be acceptable. If a measured value falls outside this range, then the check sample should be reanalyzed. If the value continues to fall outside the acceptance range, the instrument should be recalibrated, and the batch of samples analyzed before the unacceptable calibration verification check must be reanalyzed.

9.5 Precision measurements -- The precision of the method is monitored by analyzing a sample with low, moderate, or high concentrations of target analytes. The frequency of precision measurements will depend on the data quality objectives for the data. A minimum of one precision sample should be run per day. Each precision sample should be analyzed 7 times in replicate. It is recommended that precision measurements be obtained for samples with varying concentration ranges to assess the effect of concentration on method precision. Determining method precision for analytes at concentrations near the site action levels can be extremely important if the FPXRF results are to be used in an enforcement action; therefore, selection of at least one sample with target analyte concentrations at or near the site action levels or levels of concern is recommended. A precision sample is analyzed by the instrument for the same field analysis time as used for other project samples. The relative standard deviation (RSD) of the sample mean is used to assess method precision. For FPXRF data to be considered adequately precise, the RSD should not be greater than 20 percent with the exception of chromium. RSD values for chromium should not be greater than 30 percent. If both in situ and intrusive analytical techniques are used during the course of one day, it is recommended that separate precision calculations be performed for each analysis type.

The equation for calculating RSD is as follows:

$$RSD = (SD/\text{Mean Concentration}) \times 100$$

where:

RSD	=	Relative standard deviation for the precision measurement for the analyte
SD	=	Standard deviation of the concentration for the analyte
Mean concentration	=	Mean concentration for the analyte

The precision or reproducibility of a measurement will improve with increasing count time, however, increasing the count time by a factor of 4 will provide only 2 times better precision, so there is a point of diminishing return. Increasing the count time also improves the sensitivity, but decreases sample throughput.

9.6 The lower limits of detection should be established from actual measured performance based on spike recoveries in the matrix of concern or from acceptable method performance on a certified reference material of the appropriate matrix and within the appropriate calibration range for the application. This is considered the best estimate of the true method sensitivity as opposed to a statistical determination based on the standard deviation of

replicate analyses of a low-concentration sample. While the statistical approach demonstrates the potential data variability for a given sample matrix at one point in time, it does not represent what can be detected or most importantly the lowest concentration that can be calibrated. For this reason the sensitivity should be established as the lowest point of detection based on acceptable target analyte recovery in the desired sample matrix.

9.7 Confirmatory samples -- The comparability of the FPXRF analysis is determined by submitting FPXRF-analyzed samples for analysis at a laboratory. The method of confirmatory analysis must meet the project and XRF measurement data quality objectives. The confirmatory samples must be splits of the well homogenized sample material. In some cases the prepared sample cups can be submitted. A minimum of 1 sample for each 20 FPXRF-analyzed samples should be submitted for confirmatory analysis. This frequency will depend on project-specific data quality objectives. The confirmatory analyses can also be used to verify the quality of the FPXRF data. The confirmatory samples should be selected from the lower, middle, and upper range of concentrations measured by the FPXRF. They should also include samples with analyte concentrations at or near the site action levels. The results of the confirmatory analysis and FPXRF analyses should be evaluated with a least squares linear regression analysis. If the measured concentrations span more than one order of magnitude, the data should be log-transformed to standardize variance which is proportional to the magnitude of measurement. The correlation coefficient (r) for the results should be 0.7 or greater for the FPXRF data to be considered screening level data. If the r is 0.9 or greater and inferential statistics indicate the FPXRF data and the confirmatory data are statistically equivalent at a 99 percent confidence level, the data could potentially meet definitive level data criteria.

10.0 CALIBRATION AND STANDARDIZATION

10.1 Instrument calibration -- Instrument calibration procedures vary among FPXRF instruments. Users of this method should follow the calibration procedures outlined in the operator's manual for each specific FPXRF instrument. Generally, however, three types of calibration procedures exist for FPXRF instruments, namely: FP calibration, empirical calibration, and the Compton peak ratio or normalization method. These three types of calibration are discussed below.

10.2 Fundamental parameters calibration -- FP calibration procedures are extremely variable. An FP calibration provides the analyst with a "standardless" calibration. The advantages of FP calibrations over empirical calibrations include the following:

- No previously collected site-specific samples are necessary, although site-specific samples with confirmed and validated analytical results for all elements present could be used.

- Cost is reduced because fewer confirmatory laboratory results or calibration standards are necessary.

However, the analyst should be aware of the limitations imposed on FP calibration by particle size and matrix effects. These limitations can be minimized by adhering to the preparation procedure described in Sec. 7.3. The two FP calibration processes discussed below are based on an effective energy FP routine and a back scatter with FP (BFP) routine. Each FPXRF FP calibration process is based on a different iterative algorithmic method. The calibration procedure for each routine is explained in detail in the manufacturer's user manual for each FPXRF instrument; in addition, training courses are offered for each instrument.

10.2.1 Effective energy FP calibration -- The effective energy FP calibration is performed by the manufacturer before an instrument is sent to the analyst. Although SSCS can be used, the calibration relies on pure element standards or SRMs such as those obtained from NIST for the FP calibration. The effective energy routine relies on the spectrometer response to pure elements and FP iterative algorithms to compensate for various matrix effects.

Alpha coefficients are calculated using a variation of the Sherman equation, which calculates theoretical intensities from the measurement of pure element samples. These coefficients indicate the quantitative effect of each matrix element on an analyte's measured x-ray intensity. Next, the Lachance Traill algorithm is solved as a set of simultaneous equations based on the theoretical intensities. The alpha coefficients are then downloaded into the specific instrument.

The working effective energy FP calibration curve must be verified before sample analysis begins on each working day, after every 20 samples are analyzed, and at the end of sampling. This verification is performed by analyzing either an NIST SRM or an SSCS that is representative of the site-specific samples. This SRM or SSCS serves as a calibration check. A manufacturer-recommended count time per source should be used for the calibration check. The analyst must then adjust the y-intercept and slope of the calibration curve to best fit the known concentrations of target analytes in the SRM or SSCS.

A percent difference (%D) is then calculated for each target analyte. The %D should be within ±20 percent of the certified value for each analyte. If the %D falls outside this acceptance range, then the calibration curve should be adjusted by varying the slope of the line or the y-intercept value for the analyte. The SRM or SSCS is reanalyzed until the %D falls within ±20 percent. The group of 20 samples analyzed before an out-of-control calibration check should be reanalyzed.

The equation to calibrate %D is as follows:

$$\%D = ((C_s - C_k) / C_k) \times 100$$

where:

%D = Percent difference
C_k = Certified concentration of standard sample
C_s = Measured concentration of standard sample

10.2.2 BFP calibration -- BFP calibration relies on the ability of the liquid nitrogen-cooled, Si(Li) solid-state detector to separate the coherent (Compton) and incoherent (Rayleigh) backscatter peaks of primary radiation. These peak intensities are known to be a function of sample composition, and the ratio of the Compton to Rayleigh peak is a function of the mass absorption of the sample. The calibration procedure is explained in detail in the instrument manufacturer's manual. Following is a general description of the BFP calibration procedure.

The concentrations of all detected and quantified elements are entered into the computer software system. Certified element results for an NIST SRM or confirmed and validated results for an SSCS can be used. In addition, the concentrations of oxygen and silicon must be entered; these two concentrations are not found in standard metals analyses. The manufacturer provides silicon and oxygen concentrations for typical soil types. Pure element standards are then analyzed using a manufacturer-recommended

count time per source. The results are used to calculate correction factors in order to adjust for spectrum overlap of elements.

The working BFP calibration curve must be verified before sample analysis begins on each working day, after every 20 samples are analyzed, and at the end of the analysis. This verification is performed by analyzing either an NIST SRM or an SSCS that is representative of the site-specific samples. This SRM or SSCS serves as a calibration check. The standard sample is analyzed using a manufacturer-recommended count time per source to check the calibration curve. The analyst must then adjust the y-intercept and slope of the calibration curve to best fit the known concentrations of target analytes in the SRM or SSCS.

A %D is then calculated for each target analyte. The %D should fall within ±20 percent of the certified value for each analyte. If the %D falls outside this acceptance range, then the calibration curve should be adjusted by varying the slope of the line the y-intercept value for the analyte. The standard sample is reanalyzed until the %D falls within ±20 percent. The group of 20 samples analyzed before an out-of-control calibration check should be reanalyzed.

10.3 Empirical calibration -- An empirical calibration can be performed with SSCS, site-typical standards, or standards prepared from metal oxides. A discussion of SSCS is included in Sec. 7.3; if no previously characterized samples exist for a specific site, site-typical standards can be used. Site-typical standards may be selected from commercially available characterized soils or from SSCS prepared for another site. The site-typical standards should closely approximate the site's soil matrix with respect to particle size distribution, mineralogy, and contaminant analytes. If neither SSCS nor site-typical standards are available, it is possible to make gravimetric standards by adding metal oxides to a "clean" sand or silicon dioxide matrix that simulates soil. Metal oxides can be purchased from various chemical vendors. If standards are made on site, a balance capable of weighing items to at least two decimal places is necessary. Concentrated ICP or AA standard solutions can also be used to make standards. These solutions are available in concentrations of 10,000 parts per million, thus only small volumes have to be added to the soil.

An empirical calibration using SSCS involves analysis of SSCS by the FPXRF instrument and by a conventional analytical method such as ICP or AA. A total acid digestion procedure should be used by the laboratory for sample preparation. Generally, a minimum of 10 and a maximum of 30 well characterized SSCS, site-typical standards, or prepared metal oxide standards are necessary to perform an adequate empirical calibration. The exact number of standards depends on the number of analytes of interest and interfering elements. Theoretically, an empirical calibration with SSCS should provide the most accurate data for a site because the calibration compensates for site-specific matrix effects.

The first step in an empirical calibration is to analyze the pure element standards for the elements of interest. This enables the instrument to set channel limits for each element for spectral deconvolution. Next the SSCS, site-typical standards, or prepared metal oxide standards are analyzed using a count time of 200 seconds per source or a count time recommended by the manufacturer. This will produce a spectrum and net intensity of each analyte in each standard. The analyte concentrations for each standard are then entered into the instrument software; these concentrations are those obtained from the laboratory, the certified results, or the gravimetrically determined concentrations of the prepared standards. This gives the instrument analyte values to regress against corresponding intensities during the modeling stage. The regression equation correlates the concentrations of an analyte with its net intensity.

The calibration equation is developed using a least squares fit regression analysis. After the regression terms to be used in the equation are defined, a mathematical equation can be developed to calculate the analyte concentration in an unknown sample. In some FPXRF instruments, the software of the instrument calculates the regression equation. The software uses calculated intercept and slope values to form a multiterm equation. In conjunction with the software in the instrument, the operator can adjust the multiterm equation to minimize interelement interferences and optimize the intensity calibration curve.

It is possible to define up to six linear or nonlinear terms in the regression equation. Terms can be added and deleted to optimize the equation. The goal is to produce an equation with the smallest regression error and the highest correlation coefficient. These values are automatically computed by the software as the regression terms are added, deleted, or modified. It is also possible to delete data points from the regression line if these points are significant outliers or if they are heavily weighing the data. Once the regression equation has been selected for an analyte, the equation can be entered into the software for quantitation of analytes in subsequent samples. For an empirical calibration to be acceptable, the regression equation for a specific analyte should have a correlation coefficient of 0.98 or greater or meet the DQOs of the project.

In an empirical calibration, one must apply the DQOs of the project and ascertain critical or action levels for the analytes of interest. It is within these concentration ranges or around these action levels that the FPXRF instrument should be calibrated most accurately. It may not be possible to develop a good regression equation over several orders of analyte concentration.

10.4 Compton normalization method -- The Compton normalization method is based on analysis of a single, certified standard and normalization for the Compton peak. The Compton peak is produced from incoherent backscattering of x-ray radiation from the excitation source and is present in the spectrum of every sample. The Compton peak intensity changes with differing matrices. Generally, matrices dominated by lighter elements produce a larger Compton peak, and those dominated by heavier elements produce a smaller Compton peak. Normalizing to the Compton peak can reduce problems with varying matrix effects among samples. Compton normalization is similar to the use of internal standards in organics analysis. The Compton normalization method may not be effective when analyte concentrations exceed a few percent.

The certified standard used for this type of calibration could be an NIST SRM such as 2710 or 2711. The SRM must be a matrix similar to the samples and must contain the analytes of interests at concentrations near those expected in the samples. First, a response factor has to be determined for each analyte. This factor is calculated by dividing the net peak intensity by the analyte concentration. The net peak intensity is gross intensity corrected for baseline reading. Concentrations of analytes in samples are then determined by multiplying the baseline corrected analyte signal intensity by the normalization factor and by the response factor. The normalization factor is the quotient of the baseline corrected Compton K_α peak intensity of the SRM divided by that of the samples. Depending on the FPXRF instrument used, these calculations may be done manually or by the instrument software.

11.0 PROCEDURE

11.1 Operation of the various FPXRF instruments will vary according to the manufacturers' protocols. Before operating any FPXRF instrument, one should consult the manufacturer's manual. Most manufacturers recommend that their instruments be allowed to warm up for 15 to 30 minutes before analysis of samples. This will help alleviate drift or energy calibration problems later during analysis.

11.2 Each FPXRF instrument should be operated according to the manufacturer's recommendations. There are two modes in which FPXRF instruments can be operated: in situ and intrusive. The in situ mode involves analysis of an undisturbed soil sediment or sample. Intrusive analysis involves collection and preparation of a soil or sediment sample before analysis. Some FPXRF instruments can operate in both modes of analysis, while others are designed to operate in only one mode. The two modes of analysis are discussed below.

11.3 For in situ analysis, remove any large or nonrepresentative debris from the soil surface before analysis. This debris includes rocks, pebbles, leaves, vegetation, roots, and concrete. Also, the soil surface must be as smooth as possible so that the probe window will have good contact with the surface. This may require some leveling of the surface with a stainless-steel trowel. During the study conducted to provide example performance data for this method, this modest amount of sample preparation was found to take less than 5 min per sample location. The last requirement is that the soil or sediment not be saturated with water. Manufacturers state that their FPXRF instruments will perform adequately for soils with moisture contents of 5 to 20 percent but will not perform well for saturated soils, especially if ponded water exists on the surface. Another recommended technique for in situ analysis is to tamp the soil to increase soil density and compactness for better repeatability and representativeness. This condition is especially important for heavy element analysis, such as barium. Source count times for in situ analysis usually range from 30 to 120 seconds, but source count times will vary among instruments and depending on the desired method sensitivity. Due to the heterogeneous nature of the soil sample, in situ analysis can provide only “screening” type data.

11.4 For intrusive analysis of surface or sediment, it is recommended that a sample be collected from a 4- by 4-inch square that is 1 inch deep. This will produce a soil sample of approximately 375 g or 250 cm^3, which is enough soil to fill an 8-ounce jar. However, the exact dimensions and sample depth should take into consideration the heterogeneous deposition of contaminants and will ultimately depend on the desired project-specific data quality objectives. The sample should be homogenized, dried, and ground before analysis. The sample can be homogenized before or after drying. The homogenization technique to be used after drying is discussed in Sec. 4.2. If the sample is homogenized before drying, it should be thoroughly mixed in a beaker or similar container, or if the sample is moist and has a high clay content, it can be kneaded in a plastic bag. One way to monitor homogenization when the sample is kneaded in a plastic bag is to add sodium fluorescein dye to the sample. After the moist sample has been homogenized, it is examined under an ultraviolet light to assess the distribution of sodium fluorescein throughout the sample. If the fluorescent dye is evenly distributed in the sample, homogenization is considered complete; if the dye is not evenly distributed, mixing should continue until the sample has been thoroughly homogenized. During the study conducted to provide data for this method, the time necessary for homogenization procedure using the fluorescein dye ranged from 3 to 5 min per sample. As demonstrated in Secs. 13.5 and 13.7, homogenization has the greatest impact on the reduction of sampling variability. It produces little or no contamination. Often, the direct analysis through the plastic bag is possible without the more labor intensive steps of drying, grinding, and sieving given in Secs. 11.5 and 11.6. Of course, to achieve the best data quality possible all four steps should be followed.

11.5 Once the soil or sediment sample has been homogenized, it should be dried. This can be accomplished with a toaster oven or convection oven. A small aliquot of the sample (20 to 50 g) is placed in a suitable container for drying. The sample should be dried for 2 to 4 hr in the convection or toaster oven at a temperature not greater than 150 °C. Samples may also be air dried under ambient temperature conditions using a 10- to 20-g portion. Regardless of what drying mechanism is used, the drying process is considered complete when a constant sample weight can be obtained. Care should be taken to avoid sample cross-contamination and these measures can be evaluated by including an appropriate method blank sample along with any sample preparation process.

CAUTION: Microwave drying is not a recommended procedure. Field studies have shown that microwave drying can increase variability between the FPXRF data and confirmatory analysis. High levels of metals in a sample can cause arcing in the microwave oven, and sometimes slag forms in the sample. Microwave oven drying can also melt plastic containers used to hold the sample.

11.6 The homogenized dried sample material should be ground with a mortar and pestle and passed through a 60-mesh sieve to achieve a uniform particle size. Sample grinding should continue until at least 90 percent of the original sample passes through the sieve. The grinding step normally takes an average of 10 min per sample. An aliquot of the sieved sample should then be placed in a 31.0-mm polyethylene sample cup (or equivalent) for analysis. The sample cup should be one-half to three-quarters full at a minimum. The sample cup should be covered with a 2.5 µm Mylar (or equivalent) film for analysis. The rest of the soil sample should be placed in a jar, labeled, and archived for possible confirmation analysis. All equipment including the mortar, pestle, and sieves must be thoroughly cleaned so that any cross-contamination is below the established lower limit of detection of the procedure or DQOs of the analysis. If all recommended sample preparation steps are followed, there is a high probability the desired laboratory data quality may be obtained.

12.0 DATA ANALYSIS AND CALCULATIONS

Most FPXRF instruments have software capable of storing all analytical results and spectra. The results are displayed in ppm and can be downloaded to a personal computer, which can be used to provide a hard copy printout. Individual measurements that are smaller than three times their associated SD should not be used for quantitation. See the manufacturer's instructions regarding data analysis and calculations.

13.0 METHOD PERFORMANCE

13.1 Performance data and related information are provided in SW-846 methods only as examples and guidance. The data do not represent required performance criteria for users of the methods. Instead, performance criteria should be developed on a project-specific basis, and the laboratory should establish in-house QC performance criteria for the application of this method. These performance data are not intended to be and must not be used as absolute QC acceptance criteria for purposes of laboratory accreditation.

13.2 The sections to follow discuss three performance evaluation factors; namely, precision, accuracy, and comparability. The example data presented in Tables 4 through 8 were generated from results obtained from six FPXRF instruments (see Sec. 13.3). The soil samples analyzed by the six FPXRF instruments were collected from two sites in the United States. The soil samples contained several of the target analytes at concentrations ranging from "nondetect" to tens of thousands of mg/kg. These data are provided for guidance purposes only.

13.3 The six FPXRF instruments included the TN 9000 and TN Lead Analyzer manufactured by TN Spectrace; the X-MET 920 with a SiLi detector and X-MET 920 with a gas-filled proportional detector manufactured by Metorex, Inc.; the XL Spectrum Analyzer manufactured by Niton; and the MAP Spectrum Analyzer manufactured by Scitec. The TN 9000 and TN Lead Analyzer both have a HgI_2 detector. The TN 9000 utilized an Fe-55, Cd-109, and Am-241 source. The TN Lead Analyzer had only a Cd-109 source. The X-Met 920 with the SiLi detector had a Cd-109 and Am-241 source. The X-MET 920 with the gas-filled proportional detector had only a Cd-109 source. The XL Spectrum Analyzer utilized a silicon pin-diode

detector and a Cd-109 source. The MAP Spectrum Analyzer utilized a solid-state silicon detector and a Cd-109 source.

13.4 All example data presented in Tables 4 through 8 were generated using the following calibrations and source count times. The TN 9000 and TN Lead Analyzer were calibrated using fundamental parameters using NIST SRM 2710 as a calibration check sample. The TN 9000 was operated using 100, 60, and 60 second count times for the Cd-109, Fe-55, and Am-241 sources, respectively. The TN Lead analyzer was operated using a 60 second count time for the Cd-109 source. The X-MET 920 with the Si(Li) detector was calibrated using fundamental parameters and one well characterized site-specific soil standard as a calibration check. It used 140 and 100 second count times for the Cd-109 and Am-241 sources, respectively. The X-MET 920 with the gas-filled proportional detector was calibrated empirically using between 10 and 20 well characterized site-specific soil standards. It used 120 second times for the Cd-109 source. The XL Spectrum Analyzer utilized NIST SRM 2710 for calibration and the Compton peak normalization procedure for quantitation based on 60 second count times for the Cd-109 source. The MAP Spectrum Analyzer was internally calibrated by the manufacturer. The calibration was checked using a well-characterized site-specific soil standard. It used 240 second times for the Cd-109 source.

13.5 Precision measurements -- The example precision data are presented in Table 4. These data are provided for guidance purposes only. Each of the six FPXRF instruments performed 10 replicate measurements on 12 soil samples that had analyte concentrations ranging from "nondetects" to thousands of mg/kg. Each of the 12 soil samples underwent 4 different preparation techniques from in situ (no preparation) to dried and ground in a sample cup. Therefore, there were 48 precision data points for five of the instruments and 24 precision points for the MAP Spectrum Analyzer. The replicate measurements were taken using the source count times discussed at the beginning of this section.

For each detectable analyte in each precision sample a mean concentration, standard deviation, and RSD was calculated for each analyte. The data presented in Table 4 is an average RSD for the precision samples that had analyte concentrations at 5 to 10 times the lower limit of detection for that analyte for each instrument. Some analytes such as mercury, selenium, silver, and thorium were not detected in any of the precision samples so these analytes are not listed in Table 4. Some analytes such as cadmium, nickel, and tin were only detected at concentrations near the lower limit of detection so that an RSD value calculated at 5 to 10 times this limit was not possible.

One FPXRF instrument collected replicate measurements on an additional nine soil samples to provide a better assessment of the effect of sample preparation on precision. Table 5 shows these results. These data are provided for guidance purposes only. The additional nine soil samples were comprised of three from each texture and had analyte concentrations ranging from near the lower limit of detection for the FPXRF analyzer to thousands of mg/kg. The FPXRF analyzer only collected replicate measurements from three of the preparation methods; no measurements were collected from the in situ homogenized samples. The FPXRF analyzer conducted five replicate measurements of the in situ field samples by taking measurements at five different points within the 4-inch by 4-inch sample square. Ten replicate measurements were collected for both the intrusive undried and unground and intrusive dried and ground samples contained in cups. The cups were shaken between each replicate measurement.

Table 5 shows that the precision dramatically improved from the in situ to the intrusive measurements. In general there was a slight improvement in precision when the sample was dried and ground. Two factors caused the precision for the in situ measurements to be poorer. The major factor is soil heterogeneity. By moving the probe within the 4-inch by 4-inch square,

measurements of different soil samples were actually taking place within the square. Table 5 illustrates the dominant effect of soil heterogeneity. It overwhelmed instrument precision when the FPXRF analyzer was used in this mode. The second factor that caused the RSD values to be higher for the in situ measurements is the fact that only five instead of ten replicates were taken. A lesser number of measurements caused the standard deviation to be larger which in turn elevated the RSD values.

13.6 Accuracy measurements -- Five of the FPXRF instruments (not including the MAP Spectrum Analyzer) analyzed 18 SRMs using the source count times and calibration methods given at the beginning of this section. The 18 SRMs included 9 soil SRMs, 4 stream or river sediment SRMs, 2 sludge SRMs, and 3 ash SRMs. Each of the SRMs contained known concentrations of certain target analytes. A percent recovery was calculated for each analyte in each SRM for each FPXRF instrument. Table 6 presents a summary of this data. With the exception of cadmium, chromium, and nickel, the values presented in Table 6 were generated from the 13 soil and sediment SRMs only. The 2 sludge and 3 ash SRMs were included for cadmium, chromium, and nickel because of the low or nondetectable concentrations of these three analytes in the soil and sediment SRMs.

Only 12 analytes are presented in Table 6. These are the analytes that are of environmental concern and provided a significant number of detections in the SRMs for an accuracy assessment. No data is presented for the X-MET 920 with the gas-filled proportional detector. This FPXRF instrument was calibrated empirically using site-specific soil samples. The percent recovery values from this instrument were very sporadic and the data did not lend itself to presentation in Table 6.

Table 7 provides a more detailed summary of accuracy data for one particular FPXRF instrument (TN 9000) for the 9 soil SRMs and 4 sediment SRMs. These data are provided for guidance purposes only. Table 7 shows the certified value, measured value, and percent recovery for five analytes. These analytes were chosen because they are of environmental concern and were most prevalently certified for in the SRM and detected by the FPXRF instrument. The first nine SRMs are soil and the last 4 SRMs are sediment. Percent recoveries for the four NIST SRMs were often between 90 and 110 percent for all analytes.

13.7 Comparability -- Comparability refers to the confidence with which one data set can be compared to another. In this case, FPXRF data generated from a large study of six FPXRF instruments was compared to SW-846 Methods 3050 and 6010 which are the standard soil extraction for metals and analysis by inductively coupled plasma. An evaluation of comparability was conducted by using linear regression analysis. Three factors were determined using the linear regression. These factors were the y-intercept, the slope of the line, and the coefficient of determination (r^2).

As part of the comparability assessment, the effects of soil type and preparation methods were studied. Three soil types (textures) and four preparation methods were examined during the study. The preparation methods evaluated the cumulative effect of particle size, moisture, and homogenization on comparability. Due to the large volume of data produced during this study, linear regression data for six analytes from only one FPXRF instrument is presented in Table 8. Similar trends in the data were seen for all instruments. These data are provided for guidance purposes only.

Table 8 shows the regression parameters for the whole data set, broken out by soil type, and by preparation method. These data are provided for guidance purposes only. The soil types are as follows: soil 1--sand; soil 2--loam; and soil 3--silty clay. The preparation methods are as follows: preparation 1--in situ in the field; preparation 2--intrusive, sample collected and homogenized; preparation 3--intrusive, with sample in a sample cup but sample still wet and not

ground; and preparation 4–intrusive, with sample dried, ground, passed through a 40-mesh sieve, and placed in sample cup.

For arsenic, copper, lead, and zinc, the comparability to the confirmatory laboratory was excellent with r^2 values ranging from 0.80 to 0.99 for all six FPXRF instruments. The slopes of the regression lines for arsenic, copper, lead, and zinc, were generally between 0.90 and 1.00 indicating the data would need to be corrected very little or not at all to match the confirmatory laboratory data. The r^2 values and slopes of the regression lines for barium and chromium were not as good as for the other for analytes, indicating the data would have to be corrected to match the confirmatory laboratory.

Table 8 demonstrates that there was little effect of soil type on the regression parameters for any of the six analytes. The only exceptions were for barium in soil 1 and copper in soil 3. In both of these cases, however, it is actually a concentration effect and not a soil effect causing the poorer comparability. All barium and copper concentrations in soil 1 and 3, respectively, were less than 350 mg/kg.

Table 8 shows there was a preparation effect on the regression parameters for all six analytes. With the exception of chromium, the regression parameters were primarily improved going from preparation 1 to preparation 2. In this step, the sample was removed from the soil surface, all large debris was removed, and the sample was thoroughly homogenized. The additional two preparation methods did little to improve the regression parameters. This data indicates that homogenization is the most critical factor when comparing the results. It is essential that the sample sent to the confirmatory laboratory match the FPXRF sample as closely as possible.

Sec. 11.0 of this method discusses the time necessary for each of the sample preparation techniques. Based on the data quality objectives for the project, an analyst must decide if it is worth the extra time necessary to dry and grind the sample for small improvements in comparability. Homogenization requires 3 to 5 min. Drying the sample requires one to two hours. Grinding and sieving requires another 10 to 15 min per sample. Lastly, when grinding and sieving is conducted, time has to be allotted to decontaminate the mortars, pestles, and sieves. Drying and grinding the samples and decontamination procedures will often dictate that an extra person be on site so that the analyst can keep up with the sample collection crew. The cost of requiring an extra person on site to prepare samples must be balanced with the gain in data quality and sample throughput.

13.8 The following documents may provide additional guidance and insight on this method and technique:

13.8.1 A. D. Hewitt, "Screening for Metals by X-ray Fluorescence Spectrometry/Response Factor/Compton K_α Peak Normalization Analysis," American Environmental Laboratory, pp 24-32, 1994.

13.8.2 S. Piorek and J. R. Pasmore, "Standardless, In Situ Analysis of Metallic Contaminants in the Natural Environment With a PC-Based, High Resolution Portable X-Ray Analyzer," Third International Symposium on Field Screening Methods for Hazardous Waste and Toxic Chemicals, Las Vegas, Nevada, February 24-26, 1993, Vol 2, pp 1135-1151, 1993.

13.8.3 S. Shefsky, "Sample Handling Strategies for Accurate Lead-in-soil Measurements in the Field and Laboratory," *International Symposium of Field Screening Methods for Hazardous Waste and Toxic Chemicals*, Las Vegas, NV, January 29-31, 1997.

14.0 POLLUTION PREVENTION

14.1 Pollution prevention encompasses any technique that reduces or eliminates the quantity and/or toxicity of waste at the point of generation. Numerous opportunities for pollution prevention exist in laboratory operation. The EPA has established a preferred hierarchy of environmental management techniques that places pollution prevention as the management option of first choice. Whenever feasible, laboratory personnel should use pollution prevention techniques to address their waste generation. When wastes cannot be feasibly reduced at the source, the Agency recommends recycling as the next best option.

14.2 For information about pollution prevention that may be applicable to laboratories and research institutions consult *Less is Better: Laboratory Chemical Management for Waste Reduction* available from the American Chemical Society's Department of Government Relations and Science Policy, 1155 16th St., N.W. Washington, D.C. 20036, http://www.acs.org.

15.0 WASTE MANAGEMENT

The Environmental Protection Agency requires that laboratory waste management practices be conducted consistent with all applicable rules and regulations. The Agency urges laboratories to protect the air, water, and land by minimizing and controlling all releases from hoods and bench operations, complying with the letter and spirit of any sewer discharge permits and regulations, and by complying with all solid and hazardous waste regulations, particularly the hazardous waste identification rules and land disposal restrictions. For further information on waste management, consult *The Waste Management Manual for Laboratory Personnel* available from the American Chemical Society at the address listed in Sec. 14.2.

16.0 REFERENCES

1. Metorex, X-MET 920 User's Manual.

2. Spectrace Instruments, "Energy Dispersive X-ray Fluorescence Spectrometry: An Introduction," 1994.

3. TN Spectrace, Spectrace 9000 Field Portable/Benchtop XRF Training and Applications Manual.

4. Unpublished SITE data, received from PRC Environment Management, Inc.

17.0 TABLES, DIAGRAMS, FLOWCHARTS, AND VALIDATION DATA

The following pages contain the tables referenced by this method. A flow diagram of the procedure follows the tables.

TABLE 1

EXAMPLE INTERFERENCE FREE LOWER LIMITS OF DETECTION

Analyte	Chemical Abstract Series Number	Lower Limit of Detection in Quartz Sand (milligrams per kilogram)
Antimony (Sb)	7440-36-0	40
Arsenic (As)	7440-38-0	40
Barium (Ba)	7440-39-3	20
Cadmium (Cd)	7440-43-9	100
Calcium (Ca)	7440-70-2	70
Chromium (Cr)	7440-47-3	150
Cobalt (Co)	7440-48-4	60
Copper (Cu)	7440-50-8	50
Iron (Fe)	7439-89-6	60
Lead (Pb)	7439-92-1	20
Manganese (Mn)	7439-96-5	70
Mercury (Hg)	7439-97-6	30
Molybdenum (Mo)	7439-93-7	10
Nickel (Ni)	7440-02-0	50
Potassium (K)	7440-09-7	200
Rubidium (Rb)	7440-17-7	10
Selenium (Se)	7782-49-2	40
Silver (Ag)	7440-22-4	70
Strontium (Sr)	7440-24-6	10
Thallium (Tl)	7440-28-0	20
Thorium (Th)	7440-29-1	10
Tin (Sn)	7440-31-5	60
Titanium (Ti)	7440-32-6	50
Vanadium (V)	7440-62-2	50
Zinc (Zn)	7440-66-6	50
Zirconium (Zr)	7440-67-7	10

Source: Refs. 1, 2, and 3
These data are provided for guidance purposes only.

TABLE 2

SUMMARY OF RADIOISOTOPE SOURCE CHARACTERISTICS

Source	Activity (mCi)	Half-Life (Years)	Excitation Energy (keV)	Elemental Analysis Range	
Fe-55	20-50	2.7	5.9	Sulfur to Chromium Molybdenum to Barium	K Lines L Lines
Cd-109	5-30	1.3	22.1 and 87.9	Calcium to Rhodium Tantalum to Lead Barium to Uranium	K Lines K Lines L Lines
Am-241	5-30	432	26.4 and 59.6	Copper to Thulium Tungsten to Uranium	K Lines L Lines
Cm-244	60-100	17.8	14.2	Titanium to Selenium Lanthanum to Lead	K Lines L Lines

Source: Refs. 1, 2, and 3

TABLE 3

SUMMARY OF X-RAY TUBE SOURCE CHARACTERISTICS

Anode Material	Recommended Voltage Range (kV)	K-alpha Emission (keV)	Elemental Analysis Range	
Cu	18-22	8.04	Potassium to Cobalt Silver to Gadolinium	K Lines L Lines
Mo	40-50	17.4	Cobalt to Yttrium Europium to Radon	K Lines L Lines
Ag	50-65	22.1	Zinc to Technicium Ytterbium to Neptunium	K Lines L Lines

Source: Ref. 4

Notes: The sample elements excited are chosen by taking as the lower limit the same ratio of excitation line energy to element absorption edge as in Table 2 (approximately 0.45) and the requirement that the excitation line energy be above the element absorption edge as the upper limit (L2 edges used for L lines). K-beta excitation lines were ignored.

TABLE 4

EXAMPLE PRECISION VALUES

Analyte	Average Relative Standard Deviation for Each Instrument at 5 to 10 Times the Lower Limit of Detection					
	TN 9000	TN Lead Analyzer	X-MET 920 (SiLi Detector)	X-MET 920 (Gas-Filled Detector)	XL Spectrum Analyzer	MAP Spectrum Analyzer
Antimony	6.54	NR	NR	NR	NR	NR
Arsenic	5.33	4.11	3.23	1.91	12.47	6.68
Barium	4.02	NR	3.31	5.91	NR	NR
Cadmium	29.84[a]	NR	24.80[a]	NR	NR	NR
Calcium	2.16	NR	NR	NR	NR	NR
Chromium	22.25	25.78	22.72	3.91	30.25	NR
Cobalt	33.90	NR	NR	NR	NR	NR
Copper	7.03	9.11	8.49	9.12	12.77	14.86
Iron	1.78	1.67	1.55	NR	2.30	NR
Lead	6.45	5.93	5.05	7.56	6.97	12.16
Manganese	27.04	24.75	NR	NR	NR	NR
Molybdenum	6.95	NR	NR	NR	12.60	NR
Nickel	30.85[a]	NR	24.92[a]	20.92[a]	NA	NR
Potassium	3.90	NR	NR	NR	NR	NR
Rubidium	13.06	NR	NR	NR	32.69[a]	NR
Strontium	4.28	NR	NR	NR	8.86	NR
Tin	24.32[a]	NR	NR	NR	NR	NR
Titanium	4.87	NR	NR	NR	NR	NR
Zinc	7.27	7.48	4.26	2.28	10.95	0.83
Zirconium	3.58	NR	NR	NR	6.49	NR

These data are provided for guidance purposes only.
Source: Ref. 4

[a] These values are biased high because the concentration of these analytes in the soil samples was near the lower limit of detection for that particular FPXRF instrument.

NR Not reported.

NA Not applicable; analyte was reported but was below the established lower limit detection.

TABLE 5

EXAMPLES OF PRECISION AS AFFECTED BY SAMPLE PREPARATION

Analyte	Average Relative Standard Deviation for Each Preparation Method		
	In Situ-Field	Intrusive-Undried and Unground	Intrusive-Dried and Ground
Antimony	30.1	15.0	14.4
Arsenic	22.5	5.36	3.76
Barium	17.3	3.38	2.90
Cadmium[a]	41.2	30.8	28.3
Calcium	17.5	1.68	1.24
Chromium	17.6	28.5	21.9
Cobalt	28.4	31.1	28.4
Copper	26.4	10.2	7.90
Iron	10.3	1.67	1.57
Lead	25.1	8.55	6.03
Manganese	40.5	12.3	13.0
Mercury	ND	ND	ND
Molybdenum	21.6	20.1	19.2
Nickel[a]	29.8	20.4	18.2
Potassium	18.6	3.04	2.57
Rubidium	29.8	16.2	18.9
Selenium	ND	20.2	19.5
Silver[a]	31.9	31.0	29.2
Strontium	15.2	3.38	3.98
Thallium	39.0	16.0	19.5
Thorium	NR	NR	NR
Tin	ND	14.1	15.3
Titanium	13.3	4.15	3.74
Vanadium	NR	NR	NR
Zinc	26.6	13.3	11.1
Zirconium	20.2	5.63	5.18

These data are provided for guidance purposes only.
Source: Ref. 4

[a] These values may be biased high because the concentration of these analytes in the soil samples was near the lower limit of detection.

ND Not detected.

NR Not reported.

TABLE 6

EXAMPLE ACCURACY VALUES

Analyte	Instrument															
	TN 9000				TN Lead Analyzer				X-MET 920 (SiLi Detector)				XL Spectrum Analyzer			
	n	Range of % Rec.	Mean % Rec.	SD	n	Range of % Rec.	Mean % Rec.	SD	n	Range of % Rec.	Mean % Rec	SD	n	Range of % Rec.	Mean % Rec.	SD
Sb	2	100-149	124.3	NA	--	--	--	--	--	--	--	--	--	--	--	--
As	5	68-115	92.8	17.3	5	44-105	83.4	23.2	4	9.7-91	47.7	39.7	5	38-535	189.8	206
Ba	9	98-198	135.3	36.9	--	--	--	--	9	18-848	168.2	262	--	--	--	--
Cd	2	99-129	114.3	NA	--	--	--	--	6	81-202	110.5	45.7	--	--	--	--
Cr	2	99-178	138.4	NA	--	--	--	--	7	22-273	143.1	93.8	3	98-625	279.2	300
Cu	8	61-140	95.0	28.8	6	38-107	79.1	27.0	11	10-210	111.8	72.1	8	95-480	203.0	147
Fe	6	78-155	103.7	26.1	6	89-159	102.3	28.6	6	48-94	80.4	16.2	6	26-187	108.6	52.9
Pb	11	66-138	98.9	19.2	11	68-131	97.4	18.4	12	23-94	72.7	20.9	13	80-234	107.3	39.9
Mn	4	81-104	93.1	9.70	3	92-152	113.1	33.8	--	--	--	--	--	--	--	--
Ni	3	99-122	109.8	12.0	--	--	--	--	--	--	--	--	3	57-123	87.5	33.5
Sr	8	110-178	132.6	23.8	--	--	--	--	--	--	--	--	7	86-209	125.1	39.5
Zn	11	41-130	94.3	24.0	10	81-133	100.0	19.7	12	46-181	106.6	34.7	11	31-199	94.6	42.5

Source: Ref. 4. These data are provided for guidance purposes only.
n: Number of samples that contained a certified value for the analyte and produced a detectable concentration from the FPXRF instrument.
SD: Standard deviation; NA: Not applicable; only two data points, therefore, a SD was not calculated.
%Rec.: Percent recovery.
-- No data.

TABLE 7

EXAMPLE ACCURACY FOR TN 9000[a]

Standard Reference Material	Arsenic			Barium			Copper			Lead			Zinc		
	Cert. Conc.	Meas. Conc.	%Rec.	Cert. Conc.	Meas. Conc.	%Rec.	Cert. Conc.	Meas. Conc.	%Rec.	Cert. Conc.	Meas. Conc.	%Rec.	Cert. Conc.	Meas. Conc.	%Rec.
RTC CRM-021	24.8	ND	NA	586	1135	193.5	4792	2908	60.7	144742	149947	103.6	546	224	40.9
RTC CRM-020	397	429	92.5	22.3	ND	NA	753	583	77.4	5195	3444	66.3	3022	3916	129.6
BCR CRM 143R	--	--	--	--	--	--	131	105	80.5	180	206	114.8	1055	1043	99.0
BCR CRM 141	--	--	--	--	--	--	32.6	ND	NA	29.4	ND	NA	81.3	ND	NA
USGS GXR-2	25.0	ND	NA	2240	2946	131.5	76.0	106	140.2	690	742	107.6	530	596	112.4
USGS GXR-6	330	294	88.9	1300	2581	198.5	66.0	ND	NA	101	80.9	80.1	118	ND	NA
NIST 2711	105	104	99.3	726	801	110.3	114	ND	NA	1162	1172	100.9	350	333	94.9
NIST 2710	626	722	115.4	707	782	110.6	2950	2834	96.1	5532	5420	98.0	6952	6476	93.2
NIST 2709	17.7	ND	NA	968	950	98.1	34.6	ND	NA	18.9	ND	NA	106	98.5	93.0
NIST 2704	23.4	ND	NA	414	443	107.0	98.6	105	106.2	161	167	103.5	438	427	97.4
CNRC PACS-1	211	143	67.7	--	772	NA	452	302	66.9	404	332	82.3	824	611	74.2
SARM-51	--	--	--	335	466	139.1	268	373	139.2	5200	7199	138.4	2200	2676	121.6
SARM-52	--	--	--	410	527	128.5	219	193	88.1	1200	1107	92.2	264	215	81.4

Source: Ref. 4. These data are provided for guidance purposes only.
[a] All concentrations in milligrams per kilogram.
%Rec.: Percent recovery; ND: Not detected; NA: Not applicable.
-- No data.

TABLE 8

EXAMPLE REGRESSION PARAMETERS FOR COMPARABILITY[1]

	Arsenic				Barium				Copper			
	n	r^2	Int.	Slope	n	r^2	Int.	Slope	n	r^2	Int.	Slope
All Data	824	0.94	1.62	0.94	1255	0.71	60.3	0.54	984	0.93	2.19	0.93
Soil 1	368	0.96	1.41	0.95	393	0.05	42.6	0.11	385	0.94	1.26	0.99
Soil 2	453	0.94	1.51	0.96	462	0.56	30.2	0.66	463	0.92	2.09	0.95
Soil 3	—	—	—	—	400	0.85	44.7	0.59	136	0.46	16.60	0.57
Prep 1	207	0.87	2.69	0.85	312	0.64	53.7	0.55	256	0.87	3.89	0.87
Prep 2	208	0.97	1.38	0.95	315	0.67	64.6	0.52	246	0.96	2.04	0.93
Prep 3	204	0.96	1.20	0.99	315	0.78	64.6	0.53	236	0.97	1.45	0.99
Prep 4	205	0.96	1.45	0.98	313	0.81	58.9	0.55	246	0.96	1.99	0.96

	Lead				Zinc				Chromium			
	n	r^2	Int.	Slope	n	r^2	Int.	Slope	n	r^2	Int.	Slope
All Data	1205	0.92	1.66	0.95	1103	0.89	1.86	0.95	280	0.70	64.6	0.42
Soil 1	357	0.94	1.41	0.96	329	0.93	1.78	0.93	—	—	—	—
Soil 2	451	0.93	1.62	0.97	423	0.85	2.57	0.90	—	—	—	—
Soil 3	397	0.90	2.40	0.90	351	0.90	1.70	0.98	186	0.66	38.9	0.50
Prep 1	305	0.80	2.88	0.86	286	0.79	3.16	0.87	105	0.80	66.1	0.43
Prep 2	298	0.97	1.41	0.96	272	0.95	1.86	0.93	77	0.51	81.3	0.36
Prep 3	302	0.98	1.26	0.99	274	0.93	1.32	1.00	49	0.73	53.7	0.45
Prep 4	300	0.96	1.38	1.00	271	0.94	1.41	1.01	49	0.75	31.6	0.56

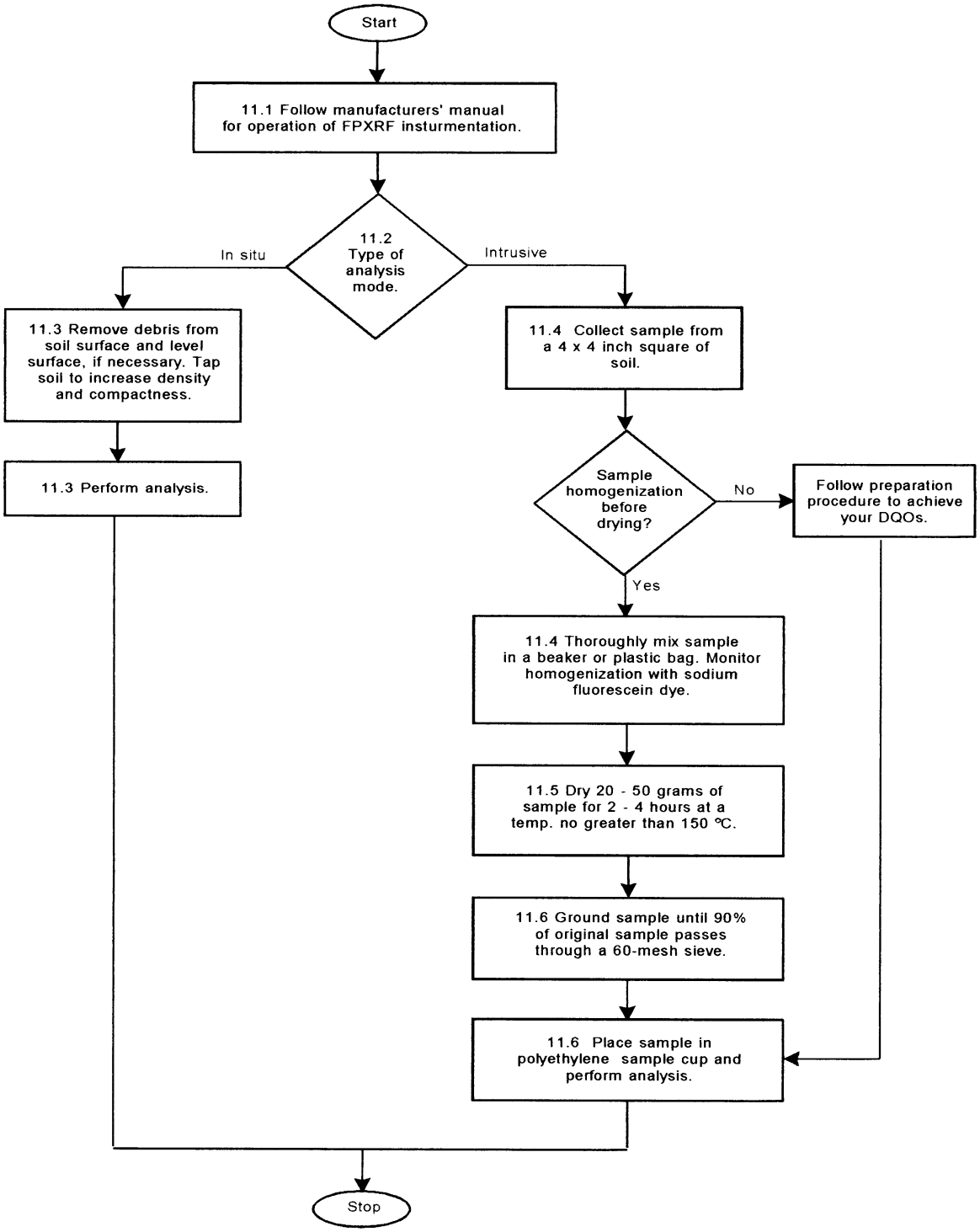
Source: Ref. 4. These data are provided for guidance purposes only.

[1] Log-transformed data

n: Number of data points; r^2: Coefficient of determination; Int.: Y-intercept

— No applicable data

FIELD PORTABLE X-RAY FLUORESCENCE SPECTROMETRY FOR THE DETERMINATION OF ELEMENTAL CONCENTRATIONS IN SOIL AND SEDIMENT



Appendix E

Texas Commission on Environmental Quality

NELAP-Recognized Laboratory Accreditation is hereby awarded to

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

in accordance with Texas Water Code Chapter 5, Subchapter R, Title 30 Texas Administrative Code Chapter 25, and the National Environmental Laboratory Accreditation Program.

The laboratory's scope of accreditation includes the fields of accreditation that accompany this certificate. Continued accreditation depends upon successful ongoing participation in the program. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Certificate Number: T104704211-11-6
Effective Date: 5/1/2011
Expiration Date: 4/30/2012

Executive Director Texas Commission on Environmental Quality

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704211-11-6**
Expiration Date:	**4/30/2012**
Issue Date:	**5/1/2011**

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non-Potable Water***

Method EPA 1010

Analyte	AB	Analyte ID	Method ID
Ignitability	TX	1780	10116606

Method EPA 120.1

Analyte	AB	Analyte ID	Method ID
Conductivity	TX	1610	10006403

Method EPA 1311

Analyte	AB	Analyte ID	Method ID
TCLP	TX	849	10118806

Method EPA 1312

Analyte	AB	Analyte ID	Method ID
SPLP	TX	850	10119003

Method EPA 150.1

Analyte	AB	Analyte ID	Method ID
pH	TX	1900	10008409

Method EPA 160.1

Analyte	AB	Analyte ID	Method ID
Residue-filterable (TDS)	TX	1955	10009208

Method EPA 160.2

Analyte	AB	Analyte ID	Method ID
Residue-nonfilterable (TSS)	TX	1960	10009606

Method EPA 180.1

Analyte	AB	Analyte ID	Method ID
Turbidity	TX	2055	10011606

Method EPA 200.8

Analyte	AB	Analyte ID	Method ID
Aluminum	TX	1000	10014605
Antimony	TX	1005	10014605
Arsenic	TX	1010	10014605
Barium	TX	1015	10014605
Beryllium	TX	1020	10014605

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704211-11-6
Expiration Date: 4/30/2012
Issue Date: 5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non-Potable Water***

Boron	TX	1025	10014605
Cadmium	TX	1030	10014605
Calcium	TX	1035	10014605
Chromium	TX	1040	10014605
Cobalt	TX	1050	10014605
Copper	TX	1055	10014605
Iron	TX	1070	10014605
Lead	TX	1075	10014605
Magnesium	TX	1085	10014605
Manganese	TX	1090	10014605
Molybdenum	TX	1100	10014605
Nickel	TX	1105	10014605
Potassium	TX	1125	10014605
Selenium	TX	1140	10014605
Silver	TX	1150	10014605
Sodium	TX	1155	10014605
Strontium	TX	1160	10014605
Thallium	TX	1165	10014605
Tin	TX	1175	10014605
Titanium	TX	1180	10014605
Vanadium	TX	1185	10014605
Zinc	TX	1190	10014605

Method EPA 245.1

Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10036609

Method EPA 300.0

Analyte	AB	Analyte ID	Method ID
Bromide	TX	1540	10053006
Chloride	TX	1575	10053006
Fluoride	TX	1730	10053006
Nitrate as N	TX	1810	10053006

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704211-11-6**
Expiration Date:	**4/30/2012**
Issue Date:	**5/1/2011**

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Non-Potable Water*

Nitrate-nitrite	TX	1820	10053006
Nitrite as N	TX	1840	10053006
Sulfate	TX	2000	10053006

Method EPA 305.1

Analyte	**AB**	**Analyte ID**	**Method ID**
Acidity, as CaCO3	TX	1500	10054203

Method EPA 310.1

Analyte	**AB**	**Analyte ID**	**Method ID**
Alkalinity as CaCO3	TX	1505	10054805

Method EPA 335.1

Analyte	**AB**	**Analyte ID**	**Method ID**
Amenable cyanide	TX	1510	10060001

Method EPA 335.2

Analyte	**AB**	**Analyte ID**	**Method ID**
Total cyanide	TX	1645	10060205

Method EPA 365.2

Analyte	**AB**	**Analyte ID**	**Method ID**
Orthophosphate as P	TX	1870	10070403
Phosphorus	TX	1910	10070403

Method EPA 370.1

Analyte	**AB**	**Analyte ID**	**Method ID**
Silica-dissolved	TX	1995	10072001

Method EPA 376.2

Analyte	**AB**	**Analyte ID**	**Method ID**
Sulfide	TX	2005	10074609

Method EPA 415.1

Analyte	**AB**	**Analyte ID**	**Method ID**
Total Organic Carbon (TOC)	TX	2040	10078407

Method EPA 602

Analyte	**AB**	**Analyte ID**	**Method ID**
Benzene	TX	4375	10102202

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non-Potable Water***

Ethylbenzene	TX	4765	10102202
m+p-xylene	TX	5240	10102202
Methyl tert-butyl ether (MTBE)	TX	5000	10102202
o-Xylene	TX	5250	10102202
Toluene	TX	5140	10102202
Xylene (total)	TX	5260	10102202

Method EPA 6020

Analyte	AB	Analyte ID	Method ID
Aluminum	TX	1000	10156204
Antimony	TX	1005	10156204
Arsenic	TX	1010	10156204
Barium	TX	1015	10156204
Beryllium	TX	1020	10156204
Boron	TX	1025	10156204
Cadmium	TX	1030	10156204
Calcium	TX	1035	10156204
Chromium	TX	1040	10156204
Cobalt	TX	1050	10156204
Copper	TX	1055	10156204
Iron	TX	1070	10156204
Lead	TX	1075	10156204
Lithium	TX	1080	10156204
Magnesium	TX	1085	10156204
Manganese	TX	1090	10156204
Molybdenum	TX	1100	10156204
Nickel	TX	1105	10156204
Potassium	TX	1125	10156204
Selenium	TX	1140	10156204
Silver	TX	1150	10156204
Sodium	TX	1155	10156204

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non-Potable Water***

Strontium	TX	1160	10156204
Thallium	TX	1165	10156204
Tin	TX	1175	10156204
Titanium	TX	1180	10156204
Vanadium	TX	1185	10156204
Zinc	TX	1190	10156204

Method EPA 608

Analyte	AB	Analyte ID	Method ID
Aroclor-1016 (PCB-1016)	TX	8880	10103603
Aroclor-1221 (PCB-1221)	TX	8885	10103603
Aroclor-1232 (PCB-1232)	TX	8890	10103603
Aroclor-1242 (PCB-1242)	TX	8895	10103603
Aroclor-1248 (PCB-1248)	TX	8900	10103603
Aroclor-1254 (PCB-1254)	TX	8905	10103603
Aroclor-1260 (PCB-1260)	TX	8910	10103603

Method EPA 624

Analyte	AB	Analyte ID	Method ID
1,1,1-Trichloroethane	TX	5160	10107207
1,1,2,2-Tetrachloroethane	TX	5110	10107207
1,1,2-Trichloroethane	TX	5165	10107207
1,1-Dichloroethane	TX	4630	10107207
1,1-Dichloroethylene	TX	4640	10107207
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10107207
1,2-Dichlorobenzene	TX	4610	10107207
1,2-Dichloroethane (Ethylene dichloride)	TX	4635	10107207
1,2-Dichloropropane	TX	4655	10107207
1,3-Dichlorobenzene	TX	4615	10107207
1,4-Dichlorobenzene	TX	4620	10107207
2-Butanone (Methyl ethyl ketone, MEK)	TX	4410	10107207
2-Chloroethyl vinyl ether	TX	4500	10107207
Acetone (2-Propanone)	TX	4315	10107207

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704211-11-6**
Expiration Date:	**4/30/2012**
Issue Date:	**5/1/2011**

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Non-Potable Water*

Acrolein (Propenal)	TX	4325	10107207
Acrylonitrile	TX	4340	10107207
Benzene	TX	4375	10107207
Bromodichloromethane	TX	4395	10107207
Bromoform	TX	4400	10107207
Carbon tetrachloride	TX	4455	10107207
Chlorobenzene	TX	4475	10107207
Chlorodibromomethane	TX	4575	10107207
Chloroethane (Ethyl chloride)	TX	4485	10107207
Chloroform	TX	4505	10107207
cis-1,2-Dichloroethylene	TX	4645	10107207
cis-1,3-Dichloropropene	TX	4680	10107207
Ethylbenzene	TX	4765	10107207
m+p-xylene	TX	5240	10107207
Methyl bromide (Bromomethane)	TX	4950	10107207
Methyl chloride (Chloromethane)	TX	4960	10107207
Methyl tert-butyl ether (MTBE)	TX	5000	10107207
Methylene chloride (Dichloromethane)	TX	4975	10107207
Naphthalene	TX	5005	10107207
o-Xylene	TX	5250	10107207
Tetrachloroethylene (Perchloroethylene)	TX	5115	10107207
Toluene	TX	5140	10107207
Total trihalomethanes	TX	5205	10107207
trans-1,2-Dichloroethylene	TX	4700	10107207
trans-1,3-Dichloropropylene	TX	4685	10107207
Trichloroethene (Trichloroethylene)	TX	5170	10107207
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	TX	5175	10107207
Vinyl chloride	TX	5235	10107207
Xylene (total)	TX	5260	10107207

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non-Potable Water***

Method EPA 625

Analyte	AB	Analyte ID	Method ID
1,2,4,5-Tetrachlorobenzene	TX	6715	10107401
1,2,4-Trichlorobenzene	TX	5155	10107401
1,2-Dichlorobenzene	TX	4610	10107401
1,2-Diphenylhydrazine	TX	6220	10107401
1,3-Dichlorobenzene	TX	4615	10107401
1,4-Dichlorobenzene	TX	4620	10107401
2,3,4,6-Tetrachlorophenol	TX	6735	10107401
2,4,5-Trichlorophenol	TX	6835	10107401
2,4,6-Trichlorophenol	TX	6840	10107401
2,4-Dichlorophenol	TX	6000	10107401
2,4-Dimethylphenol	TX	6130	10107401
2,4-Dinitrophenol	TX	6175	10107401
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10107401
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10107401
2-Chloronaphthalene	TX	5795	10107401
2-Chlorophenol	TX	5800	10107401
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	TX	6360	10107401
2-Methylphenol (o-Cresol)	TX	6400	10107401
2-Nitrophenol	TX	6490	10107401
3,3'-Dichlorobenzidine	TX	5945	10107401
4,4'-DDD	TX	7355	10107401
4,4'-DDE	TX	7360	10107401
4,4'-DDT	TX	7365	10107401
4-Bromophenyl phenyl ether (BDE-3)	TX	5660	10107401
4-Chloro-3-methylphenol	TX	5700	10107401
4-Chlorophenyl phenylether	TX	5825	10107401
4-Methylphenol (p-Cresol)	TX	6410	10107401
4-Nitrophenol	TX	6500	10107401

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Non-Potable Water*

Acenaphthene	TX	5500	10107401
Acenaphthylene	TX	5505	10107401
Aldrin	TX	7025	10107401
alpha-BHC (alpha-Hexachlorocyclohexane)	TX	7110	10107401
alpha-Chlordane	TX	7240	10107401
Anthracene	TX	5555	10107401
Aroclor-1016 (PCB-1016)	TX	8880	10107401
Aroclor-1221 (PCB-1221)	TX	8885	10107401
Aroclor-1232 (PCB-1232)	TX	8890	10107401
Aroclor-1242 (PCB-1242)	TX	8895	10107401
Aroclor-1248 (PCB-1248)	TX	8900	10107401
Aroclor-1254 (PCB-1254)	TX	8905	10107401
Aroclor-1260 (PCB-1260)	TX	8910	10107401
Benzidine	TX	5595	10107401
Benzo(a)anthracene	TX	5575	10107401
Benzo(a)pyrene	TX	5580	10107401
Benzo(b)fluoranthene	TX	5585	10107401
Benzo(g,h,i)perylene	TX	5590	10107401
Benzo(k)fluoranthene	TX	5600	10107401
beta-BHC (beta-Hexachlorocyclohexane)	TX	7115	10107401
bis(2-Chloroethoxy)methane	TX	5760	10107401
bis(2-Chloroethyl) ether	TX	5765	10107401
bis(2-Chloroisopropyl) ether	TX	5780	10107401
bis(2-Ethylhexyl) phthalate (DEHP)	TX	6255	10107401
Butyl benzyl phthalate	TX	5670	10107401
Chrysene	TX	5855	10107401
delta-BHC (delta-Hexachlorocyclohexane)	TX	7105	10107401
Dibenz(a,h) anthracene	TX	5895	10107401
Dieldrin	TX	7470	10107401
Diethyl phthalate	TX	6070	10107401

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704211-11-6**
Expiration Date:	**4/30/2012**
Issue Date:	**5/1/2011**

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Non-Potable Water*

Dimethyl phthalate	TX	6135	10107401
Di-n-butyl phthalate	TX	5925	10107401
Di-n-octyl phthalate	TX	6200	10107401
Endosulfan I	TX	7510	10107401
Endosulfan II	TX	7515	10107401
Endosulfan sulfate	TX	7520	10107401
Endrin	TX	7540	10107401
Endrin aldehyde	TX	7530	10107401
Fluoranthene	TX	6265	10107401
Fluorene	TX	6270	10107401
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	TX	7120	10107401
gamma-Chlordane	TX	7245	10107401
Heptachlor	TX	7685	10107401
Heptachlor epoxide	TX	7690	10107401
Hexachlorobenzene	TX	6275	10107401
Hexachlorobutadiene	TX	4835	10107401
Hexachlorocyclopentadiene	TX	6285	10107401
Hexachloroethane	TX	4840	10107401
Indeno(1,2,3-cd) pyrene	TX	6315	10107401
Isophorone	TX	6320	10107401
Naphthalene	TX	5005	10107401
Nitrobenzene	TX	5015	10107401
n-Nitrosodiethylamine	TX	6525	10107401
n-Nitrosodimethylamine	TX	6530	10107401
n-Nitrosodi-n-butylamine	TX	5025	10107401
n-Nitrosodi-n-propylamine	TX	6545	10107401
n-Nitrosodiphenylamine	TX	6535	10107401
Pentachlorobenzene	TX	6590	10107401
Pentachlorophenol	TX	6605	10107401
Phenanthrene	TX	6615	10107401

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Non-Potable Water*

Phenol	TX	6625	10107401
Pyrene	TX	6665	10107401
Pyridine	TX	5095	10107401
Toxaphene (Chlorinated camphene)	TX	8250	10107401

Method EPA 7196

Analyte	AB	Analyte ID	Method ID
Chromium VI	TX	1045	10162400

Method EPA 7470

Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10165807

Method EPA 8011

Analyte	AB	Analyte ID	Method ID
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10173009

Method EPA 8015

Analyte	AB	Analyte ID	Method ID
Diesel range organics (DRO)	TX	9369	10173203
Ethylene glycol	TX	4785	10173203
Gasoline range organics (GRO)	TX	9408	10173203
Propylene Glycol	TX	6657	10173203

Method EPA 8021

Analyte	AB	Analyte ID	Method ID
Benzene	TX	4375	10174808
Ethylbenzene	TX	4765	10174808
m+p-xylene	TX	5240	10174808
Methyl tert-butyl ether (MTBE)	TX	5000	10174808
o-Xylene	TX	5250	10174808
Toluene	TX	5140	10174808
Xylene (total)	TX	5260	10174808

Method EPA 8082

Analyte	AB	Analyte ID	Method ID
Aroclor-1016 (PCB-1016)	TX	8880	10179007

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non-Potable Water***

Aroclor-1221 (PCB-1221)	TX	8885	10179007
Aroclor-1232 (PCB-1232)	TX	8890	10179007
Aroclor-1242 (PCB-1242)	TX	8895	10179007
Aroclor-1248 (PCB-1248)	TX	8900	10179007
Aroclor-1254 (PCB-1254)	TX	8905	10179007
Aroclor-1260 (PCB-1260)	TX	8910	10179007
PCBs (total)	TX	8870	10179007

Method EPA 8260

Analyte	AB	Analyte ID	Method ID
1,1,1,2-Tetrachloroethane	TX	5105	10184802
1,1,1-Trichloroethane	TX	5160	10184802
1,1,2,2-Tetrachloroethane	TX	5110	10184802
1,1,2-Trichloroethane	TX	5165	10184802
1,1-Dichloroethane	TX	4630	10184802
1,1-Dichloroethylene	TX	4640	10184802
1,1-Dichloropropene	TX	4670	10184802
1,2,3-Trichlorobenzene	TX	5150	10184802
1,2,3-Trichloropropane	TX	5180	10184802
1,2,4-Trichlorobenzene	TX	5155	10184802
1,2,4-Trimethylbenzene	TX	5210	10184802
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10184802
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10184802
1,2-Dichlorobenzene	TX	4610	10184802
1,2-Dichloroethane (Ethylene dichloride)	TX	4635	10184802
1,2-Dichloropropane	TX	4655	10184802
1,3,5-Trimethylbenzene	TX	5215	10184802
1,3-Dichlorobenzene	TX	4615	10184802
1,3-Dichloropropane	TX	4660	10184802
1,4-Dichlorobenzene	TX	4620	10184802
1-Chlorohexane	TX	4510	10184802

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Non-Potable Water*

2,2-Dichloropropane	TX	4665	10184802
2-Butanone (Methyl ethyl ketone, MEK)	TX	4410	10184802
2-Chloroethyl vinyl ether	TX	4500	10184802
2-Chlorotoluene	TX	4535	10184802
2-Hexanone (MBK)	TX	4860	10184802
4-Chlorotoluene	TX	4540	10184802
4-Isopropyltoluene (p-Cymene)	TX	4915	10184802
4-Methyl-2-pentanone (MIBK)	TX	4995	10184802
Acetone (2-Propanone)	TX	4315	10184802
Acrolein (Propenal)	TX	4325	10184802
Acrylonitrile	TX	4340	10184802
Benzene	TX	4375	10184802
Bromobenzene	TX	4385	10184802
Bromochloromethane	TX	4390	10184802
Bromodichloromethane	TX	4395	10184802
Bromoform	TX	4400	10184802
Carbon disulfide	TX	4450	10184802
Carbon tetrachloride	TX	4455	10184802
Chlorobenzene	TX	4475	10184802
Chlorodibromomethane	TX	4575	10184802
Chloroethane (Ethyl chloride)	TX	4485	10184802
Chloroform	TX	4505	10184802
cis-1,2-Dichloroethylene	TX	4645	10184802
cis-1,3-Dichloropropene	TX	4680	10184802
Dibromomethane (Methylene bromide)	TX	4595	10184802
Dichlorodifluoromethane (Freon-12)	TX	4625	10184802
Ethylbenzene	TX	4765	10184802
Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)	TX	4770	10184802
Hexachlorobutadiene	TX	4835	10184802
Iodomethane (Methyl iodide)	TX	4870	10184802

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704211-11-6**
Expiration Date:	**4/30/2012**
Issue Date:	**5/1/2011**

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Non-Potable Water*

Isopropyl ether	TX	4905	10184802
Isopropylbenzene (Cumene)	TX	4900	10184802
m+p-xylene	TX	5240	10184802
Methyl acetate	TX	4940	10184802
Methyl bromide (Bromomethane)	TX	4950	10184802
Methyl chloride (Chloromethane)	TX	4960	10184802
Methyl tert-butyl ether (MTBE)	TX	5000	10184802
Methylcyclohexane	TX	4965	10184802
Methylene chloride (Dichloromethane)	TX	4975	10184802
Naphthalene	TX	5005	10184802
n-Butylbenzene	TX	4435	10184802
n-Propylbenzene	TX	5090	10184802
o-Xylene	TX	5250	10184802
sec-Butylbenzene	TX	4440	10184802
Styrene	TX	5100	10184802
T-amylmethylether (TAME)	TX	4370	10184802
tert-Butyl alcohol	TX	4420	10184802
tert-Butylbenzene	TX	4445	10184802
Tetrachloroethylene (Perchloroethylene)	TX	5115	10184802
Toluene	TX	5140	10184802
Total trihalomethanes	TX	5205	10184802
trans-1,2-Dichloroethylene	TX	4700	10184802
trans-1,3-Dichloropropylene	TX	4685	10184802
trans-1,4-Dichloro-2-butene	TX	4605	10184802
Trichloroethene (Trichloroethylene)	TX	5170	10184802
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	TX	5175	10184802
Trichlorotrifluoroethane	TX	5185	10184802
Vinyl acetate	TX	5225	10184802
Vinyl chloride	TX	5235	10184802
Xylene (total)	TX	5260	10184802

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704211-11-6
Expiration Date: 4/30/2012
Issue Date: 5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non-Potable Water***

Method EPA 8270

Analyte	AB	Analyte ID	Method ID
1,2,4,5-Tetrachlorobenzene	TX	6715	10185805
1,2,4-Trichlorobenzene	TX	5155	10185805
1,2-Dichlorobenzene	TX	4610	10185805
1,2-Diphenylhydrazine	TX	6220	10185805
1,3-Dichlorobenzene	TX	4615	10185805
1,4-Dichlorobenzene	TX	4620	10185805
1-Naphthylamine	TX	6425	10185805
2,3,4,6-Tetrachlorophenol	TX	6735	10185805
2,4,5-Trichlorophenol	TX	6835	10185805
2,4,6-Trichlorophenol	TX	6840	10185805
2,4-Dichlorophenol	TX	6000	10185805
2,4-Dimethylphenol	TX	6130	10185805
2,4-Dinitrophenol	TX	6175	10185805
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10185805
2,6-Dichlorophenol	TX	6005	10185805
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10185805
2-Chloronaphthalene	TX	5795	10185805
2-Chlorophenol	TX	5800	10185805
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	TX	6360	10185805
2-Methylnaphthalene	TX	6385	10185805
2-Methylphenol (o-Cresol)	TX	6400	10185805
2-Naphthylamine	TX	6430	10185805
2-Nitroaniline	TX	6460	10185805
2-Nitrophenol	TX	6490	10185805
2-Picoline (2-Methylpyridine)	TX	5050	10185805
3,3'-Dichlorobenzidine	TX	5945	10185805
3-Methylcholanthrene	TX	6355	10185805
3-Nitroaniline	TX	6465	10185805

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Non-Potable Water*

4,4'-DDD	TX	7355	10185805
4,4'-DDE	TX	7360	10186002
4,4'-DDT	TX	7365	10185805
4-Aminobiphenyl	TX	5540	10185805
4-Bromophenyl phenyl ether (BDE-3)	TX	5660	10185805
4-Chloro-3-methylphenol	TX	5700	10185805
4-Chloroaniline	TX	5745	10185805
4-Chlorophenyl phenylether	TX	5825	10185805
4-Dimethyl aminoazobenzene	TX	6105	10185805
4-Methylphenol (p-Cresol)	TX	6410	10185805
4-Nitroaniline	TX	6470	10185805
4-Nitrophenol	TX	6500	10185805
7,12-Dimethylbenz(a) anthracene	TX	6115	10185805
a-a-Dimethylphenethylamine	TX	6125	10185805
Acenaphthene	TX	5500	10185805
Acenaphthylene	TX	5505	10185805
Acetophenone	TX	5510	10185805
Aldrin	TX	7025	10186002
alpha-BHC (alpha-Hexachlorocyclohexane)	TX	7110	10186002
alpha-Chlordane	TX	7240	10185601
Aniline	TX	5545	10185805
Anthracene	TX	5555	10185805
Aroclor-1016 (PCB-1016)	TX	8880	10186002
Aroclor-1221 (PCB-1221)	TX	8885	10185203
Aroclor-1232 (PCB-1232)	TX	8890	10185407
Aroclor-1242 (PCB-1242)	TX	8895	10185203
Aroclor-1248 (PCB-1248)	TX	8900	10186002
Aroclor-1254 (PCB-1254)	TX	8905	10185601
Aroclor-1260 (PCB-1260)	TX	8910	10185203
Atrazine	TX	7065	10185805

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Non-Potable Water*

Azinphos-methyl (Guthion)	TX	7075	10185805
Benzidine	TX	5595	10185805
Benzo(a)anthracene	TX	5575	10185805
Benzo(a)pyrene	TX	5580	10185805
Benzo(b)fluoranthene	TX	5585	10185805
Benzo(e)pyrene	TX	5605	10185805
Benzo(g,h,i)perylene	TX	5590	10185805
Benzo(k)fluoranthene	TX	5600	10185805
Benzoic acid	TX	5610	10185805
Benzyl alcohol	TX	5630	10185805
beta-BHC (beta-Hexachlorocyclohexane)	TX	7115	10185203
Biphenyl	TX	5640	10185805
bis(2-Chloroethoxy)methane	TX	5760	10185805
bis(2-Chloroethyl) ether	TX	5765	10185805
bis(2-Chloroisopropyl) ether	TX	5780	10185805
bis(2-Ethylhexyl) phthalate (DEHP)	TX	6255	10185805
Butyl benzyl phthalate	TX	5670	10185805
Caprolactam	TX	7180	10185805
Carbaryl (Sevin)	TX	7195	10185407
Carbazole	TX	5680	10185805
Carbophenothion	TX	7220	10185407
Chlordane (tech.)	TX	7250	10185203
Chlorfenvinphos	TX	7255	10185805
Chrysene	TX	5855	10185805
Coumaphos	TX	7315	10186002
Crotoxyphos	TX	7330	10185407
delta-BHC (delta-Hexachlorocyclohexane)	TX	7105	10185805
Demeton	TX	7390	10185407
Demeton-o	TX	7395	10185203
Demeton-s	TX	7385	10185601

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Non-Potable Water*

Dibenz(a,h) anthracene	TX	5895	10185805
Dibenzofuran	TX	5905	10185805
Dichlorovos (DDVP, Dichlorvos)	TX	8610	10186002
Dicrotophos	TX	7465	10185407
Dieldrin	TX	7470	10186002
Diethyl phthalate	TX	6070	10185805
Dimethoate	TX	7475	10185805
Dimethyl phthalate	TX	6135	10185805
Di-n-butyl phthalate	TX	5925	10185805
Di-n-octyl phthalate	TX	6200	10185805
Dioxathion	TX	7495	10185203
Diphenylamine	TX	6205	10185805
Disulfoton	TX	8625	10185601
Endosulfan I	TX	7510	10185805
Endosulfan II	TX	7515	10185203
Endosulfan sulfate	TX	7520	10185601
Endrin	TX	7540	10185203
Endrin aldehyde	TX	7530	10185805
Endrin ketone	TX	7535	10186002
EPN (Phosphonothioic acid, phenyl-, O-ethyl O-(p-nitrophenyl) ester)	TX	7550	10186002
Ethion	TX	7565	10185805
Ethyl methanesulfonate	TX	6260	10185805
Famphur	TX	7580	10185407
Fensulfothion	TX	7600	10185203
Fenthion	TX	7605	10186002
Fluoranthene	TX	6265	10185805
Fluorene	TX	6270	10185805
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	TX	7120	10185203
gamma-Chlordane	TX	7245	10185203
Heptachlor	TX	7685	10185601

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Non-Potable Water*

Heptachlor epoxide	TX	7690	10185805
Hexachlorobenzene	TX	6275	10185805
Hexachlorobutadiene	TX	4835	10185805
Hexachlorocyclopentadiene	TX	6285	10185805
Hexachloroethane	TX	4840	10185805
Hexachlorophene	TX	6290	10185805
Indeno(1,2,3-cd) pyrene	TX	6315	10185805
Isodrin	TX	7725	10185407
Isophorone	TX	6320	10185805
Leptophos	TX	7755	10186002
Malathion	TX	7770	10186002
Methoxychlor	TX	7810	10185601
Methyl methanesulfonate	TX	6375	10185805
Methyl parathion (Parathion, methyl)	TX	7825	10185203
Mevinphos	TX	7850	10186002
Monocrotophos	TX	7880	10185203
Naled	TX	7905	10185203
Naphthalene	TX	5005	10185805
Nitrobenzene	TX	5015	10185805
n-Nitrosodiethylamine	TX	6525	10185805
n-Nitrosodimethylamine	TX	6530	10185805
n-Nitrosodi-n-butylamine	TX	5025	10185805
n-Nitrosodi-n-propylamine	TX	6545	10185805
n-Nitrosodiphenylamine	TX	6535	10185805
n-Nitrosopiperidine	TX	6560	10185805
Parathion, ethyl	TX	7955	10185805
Pentachlorobenzene	TX	6590	10185805
Pentachloronitrobenzene	TX	6600	10185805
Pentachlorophenol	TX	6605	10185805
Phenacetin	TX	6610	10185805

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non-Potable Water***

Phenanthrene	TX	6615	10185805
Phenol	TX	6625	10185805
Phorate	TX	7985	10186002
Phosmet (Imidan)	TX	8000	10186002
Phosphamidon	TX	8005	10185805
Pronamide (Kerb)	TX	6650	10185805
Pyrene	TX	6665	10185805
Pyridine	TX	5095	10185805
Quinoline	TX	6670	10185805
Stirophos (Tetrachlorvinphos)	TX	8200	10186002
Sulfotepp	TX	8155	10186002
Terbufos	TX	8185	10185805
Tetraethyl pyrophosphate (TEPP)	TX	8210	10185407
Toxaphene (Chlorinated camphene)	TX	8250	10185203

Method EPA 8321

Analyte	AB	Analyte ID	Method ID
2,4,5-T	TX	8655	10188804
2,4-D	TX	8545	10188804
2,4-DB	TX	8560	10188804
Dalapon	TX	8555	10188804
Dicamba	TX	8595	10188804
Dichloroprop (Dichlorprop)	TX	8605	10188804
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	TX	8620	10188804
MCPA	TX	7775	10188804
MCPP	TX	7780	10188804
Silvex (2,4,5-TP)	TX	8650	10188804

Method EPA 8330

Analyte	AB	Analyte ID	Method ID
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10189807
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10189807
2,4,6-Trinitrotoluene (2,4,6-TNT)	TX	9651	10189807

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704211-11-6
Expiration Date: 4/30/2012
Issue Date: 5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non-Potable Water***

2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10189807
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10189807
2-Amino-4,6-dinitrotoluene (2-am-dnt)	TX	9303	10189807
2-Nitrotoluene	TX	9507	10189807
3-Nitrotoluene	TX	9510	10189807
4-Amino-2,6-dinitrotoluene (4-am-dnt)	TX	9306	10189807
4-Nitrotoluene	TX	9513	10189807
Nitrobenzene	TX	5015	10189807
Nitroglycerin	TX	6485	10189807
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	TX	9522	10189807
Pentaerythritoltetranitrate	TX	9558	10189807
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	TX	9432	10189807
Tetryl (methyl-2,4,6-trinitrophenylnitramine)	TX	9633	10189807

Method EPA 9014

Analyte	**AB**	**Analyte ID**	**Method ID**
Amenable cyanide	TX	1510	10193803
Total Cyanide	TX	1635	10193803

Method EPA 9040

Analyte	**AB**	**Analyte ID**	**Method ID**
pH	TX	1900	10197203

Method EPA 9056

Analyte	**AB**	**Analyte ID**	**Method ID**
Bromide	TX	1540	10199209
Chloride	TX	1575	10199209
Fluoride	TX	1730	10199209
Nitrate as N	TX	1810	10199209
Nitrate-nitrite	TX	1820	10199209
Nitrite as N	TX	1840	10199209
Sulfate	TX	2000	10199209

Method EPA 9060

Analyte	**AB**	**Analyte ID**	**Method ID**

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Non-Potable Water*

Total Organic Carbon (TOC)	TX	2040	10200201

Method RSK 175

Analyte	AB	Analyte ID	Method ID
Carbon dioxide	TX	3755	RSK 175
Ethane	TX	4747	RSK 175
Ethene	TX	4752	RSK 175
Methane	TX	4926	RSK 175

Method SM 2130 B

Analyte	AB	Analyte ID	Method ID
Turbidity	TX	2055	20002408

Method SM 2310 B (4a)

Analyte	AB	Analyte ID	Method ID
Acidity, as CaCO3	TX	1500	20002806

Method SM 2320 B

Analyte	AB	Analyte ID	Method ID
Alkalinity as CaCO3	TX	1505	20003003

Method SM 2340 B

Analyte	AB	Analyte ID	Method ID
Total hardness as CaCO3	TX	1755	20003401

Method SM 2510 B

Analyte	AB	Analyte ID	Method ID
Conductivity	TX	1610	20003809

Method SM 2540 C

Analyte	AB	Analyte ID	Method ID
Residue-filterable (TDS)	TX	1955	20004404

Method SM 2540 D

Analyte	AB	Analyte ID	Method ID
Residue-nonfilterable (TSS)	TX	1960	20004802

Method SM 3500-Cr D

Analyte	AB	Analyte ID	Method ID
Chromium	TX	1040	20009001

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704211-11-6**
Expiration Date:	**4/30/2012**
Issue Date:	**5/1/2011**

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non-Potable Water***

Method SM 4500-CN⁻ E

Analyte	AB	Analyte ID	Method ID
Total Cyanide	TX	1635	20021209

Method SM 4500-CN⁻ G

Analyte	AB	Analyte ID	Method ID
Amenable cyanide	TX	1510	20021607

Method SM 4500-H+ B

Analyte	AB	Analyte ID	Method ID
pH	TX	1900	20016404

Method SM 4500-NH3 F

Analyte	AB	Analyte ID	Method ID
Ammonia as N	TX	1515	20023001

Method SM 4500-P E

Analyte	AB	Analyte ID	Method ID
Orthophosphate as P	TX	1870	20025803
Phosphorus	TX	1910	20025803

Method SM 4500-S2⁻ D

Analyte	AB	Analyte ID	Method ID
Sulfide	TX	2005	20125400

Method SM 4500-SiO2 D

Analyte	AB	Analyte ID	Method ID
Silica-dissolved	TX	1995	20018206

Method SM 5310 C

Analyte	AB	Analyte ID	Method ID
Total Organic Carbon (TOC)	TX	2040	20028200

Method TCEQ 1005

Analyte	AB	Analyte ID	Method ID
Total Petroleum Hydrocarbons (TPH)	TX	2050	90019208

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704211-11-6**
Expiration Date:	**4/30/2012**
Issue Date:	**5/1/2011**

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Chemical Materials***

Method ASTM D2216

Analyte	AB	Analyte ID	Method ID
Moisture	TX	10337	ASTM D2216-05

Method EPA 1010

Analyte	AB	Analyte ID	Method ID
Ignitability	TX	1780	10116606

Method EPA 1311

Analyte	AB	Analyte ID	Method ID
TCLP	TX	849	10118806

Method EPA 1312

Analyte	AB	Analyte ID	Method ID
SPLP	TX	850	10119003

Method EPA 200.8

Analyte	AB	Analyte ID	Method ID
Aluminum	TX	1000	10014605
Antimony	TX	1005	10014605
Arsenic	TX	1010	10014605
Barium	TX	1015	10014605
Beryllium	TX	1020	10014605
Cadmium	TX	1030	10014605
Calcium	TX	1035	10014605
Chromium	TX	1040	10014605
Cobalt	TX	1050	10014605
Copper	TX	1055	10014605
Iron	TX	1070	10014605
Lead	TX	1075	10014605
Magnesium	TX	1085	10014605
Manganese	TX	1090	10014605
Molybdenum	TX	1100	10014605
Nickel	TX	1105	10014605
Potassium	TX	1125	10014605

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Chemical Materials***

Selenium	TX	1140	10014605
Silver	TX	1150	10014605
Sodium	TX	1155	10014605
Strontium	TX	1160	10014605
Thallium	TX	1165	10014605
Tin	TX	1175	10014605
Titanium	TX	1180	10014605
Vanadium	TX	1185	10014605
Zinc	TX	1190	10014605

Method EPA 300.0

Analyte	AB	Analyte ID	Method ID
Bromide	TX	1540	10053006
Chloride	TX	1575	10053006
Fluoride	TX	1730	10053006
Nitrate as N	TX	1810	10053006
Nitrate-nitrite	TX	1820	10053006
Nitrite as N	TX	1840	10053006
Sulfate	TX	2000	10053006

Method EPA 310.1

Analyte	AB	Analyte ID	Method ID
Alkalinity as CaCO3	TX	1505	10054805

Method EPA 350.3

Analyte	AB	Analyte ID	Method ID
Ammonia as N	TX	1515	10064401

Method EPA 365.2

Analyte	AB	Analyte ID	Method ID
Orthophosphate as P	TX	1870	10070403
Phosphorus	TX	1910	10070403

Method EPA 6020

Analyte	AB	Analyte ID	Method ID
Aluminum	TX	1000	10156204

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704211-11-6
Expiration Date: 4/30/2012
Issue Date: 5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Chemical Materials***

Antimony	TX	1005	10156204
Arsenic	TX	1010	10156204
Barium	TX	1015	10156204
Beryllium	TX	1020	10156204
Boron	TX	1025	10156204
Cadmium	TX	1030	10156204
Calcium	TX	1035	10156204
Chromium	TX	1040	10156204
Cobalt	TX	1050	10156204
Copper	TX	1055	10156204
Iron	TX	1070	10156204
Lead	TX	1075	10156204
Lithium	TX	1080	10156204
Magnesium	TX	1085	10156204
Manganese	TX	1090	10156204
Molybdenum	TX	1100	10156204
Nickel	TX	1105	10156204
Potassium	TX	1125	10156204
Selenium	TX	1140	10156204
Silver	TX	1150	10156204
Sodium	TX	1155	10156204
Strontium	TX	1160	10156204
Thallium	TX	1165	10156204
Tin	TX	1175	10156204
Titanium	TX	1180	10156204
Vanadium	TX	1185	10156204
Zinc	TX	1190	10156204

Method EPA 7196

Analyte	**AB**	**Analyte ID**	**Method ID**
Chromium VI	TX	1045	10162400

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704211-11-6**
Expiration Date:	**4/30/2012**
Issue Date:	**5/1/2011**

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Chemical Materials***

Method EPA 7470

Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10165807

Method EPA 7471

Analyte	AB	Analyte ID	Method ID
Mercury	TX	1095	10166208

Method EPA 8015

Analyte	AB	Analyte ID	Method ID
Diesel range organics (DRO)	TX	9369	10173203
Ethylene glycol	TX	4785	10173203
Gasoline range organics (GRO)	TX	9408	10173203
Propylene Glycol	TX	6657	10173203

Method EPA 8021

Analyte	AB	Analyte ID	Method ID
Benzene	TX	4375	10174808
Ethylbenzene	TX	4765	10174808
m+p-xylene	TX	5240	10174808
Methyl tert-butyl ether (MTBE)	TX	5000	10174808
o-Xylene	TX	5250	10174808
Toluene	TX	5140	10174808
Xylene (total)	TX	5260	10174808

Method EPA 8082

Analyte	AB	Analyte ID	Method ID
Aroclor-1016 (PCB-1016)	TX	8880	10179007
Aroclor-1221 (PCB-1221)	TX	8885	10179007
Aroclor-1232 (PCB-1232)	TX	8890	10179007
Aroclor-1242 (PCB-1242)	TX	8895	10179007
Aroclor-1248 (PCB-1248)	TX	8900	10179007
Aroclor-1254 (PCB-1254)	TX	8905	10179007
Aroclor-1260 (PCB-1260)	TX	8910	10179007
PCBs (total)	TX	8870	10179007

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Chemical Materials***

Method EPA 8260

Analyte	AB	Analyte ID	Method ID
1,1,1,2-Tetrachloroethane	TX	5105	10184802
1,1,1-Trichloroethane	TX	5160	10184802
1,1,2,2-Tetrachloroethane	TX	5110	10184802
1,1,2-Trichloroethane	TX	5165	10184802
1,1-Dichloroethane	TX	4630	10184802
1,1-Dichloroethylene	TX	4640	10184802
1,1-Dichloropropene	TX	4670	10184802
1,2,3-Trichlorobenzene	TX	5150	10184802
1,2,3-Trichloropropane	TX	5180	10184802
1,2,4-Trichlorobenzene	TX	5155	10184802
1,2,4-Trimethylbenzene	TX	5210	10184802
1,2-Dibromo-3-chloropropane (DBCP)	TX	4570	10184802
1,2-Dibromoethane (EDB, Ethylene dibromide)	TX	4585	10184802
1,2-Dichlorobenzene	TX	4610	10184802
1,2-Dichloroethane (Ethylene dichloride)	TX	4635	10184802
1,2-Dichloropropane	TX	4655	10184802
1,3,5-Trimethylbenzene	TX	5215	10184802
1,3-Dichlorobenzene	TX	4615	10184802
1,3-Dichloropropane	TX	4660	10184802
1,4-Dichlorobenzene	TX	4620	10184802
1-Chlorohexane	TX	4510	10184802
2,2-Dichloropropane	TX	4665	10184802
2-Butanone (Methyl ethyl ketone, MEK)	TX	4410	10184802
2-Chloroethyl vinyl ether	TX	4500	10184802
2-Chlorotoluene	TX	4535	10184802
2-Hexanone (MBK)	TX	4860	10184802
4-Chlorotoluene	TX	4540	10184802
4-Isopropyltoluene (p-Cymene)	TX	4915	10184802

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704211-11-6**
Expiration Date:	**4/30/2012**
Issue Date:	**5/1/2011**

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Solid & Chemical Materials*

4-Methyl-2-pentanone (MIBK)	TX	4995	10184802
Acetone (2-Propanone)	TX	4315	10184802
Acrolein (Propenal)	TX	4325	10184802
Acrylonitrile	TX	4340	10184802
Benzene	TX	4375	10184802
Bromobenzene	TX	4385	10184802
Bromochloromethane	TX	4390	10184802
Bromodichloromethane	TX	4395	10184802
Bromoform	TX	4400	10184802
Carbon disulfide	TX	4450	10184802
Carbon tetrachloride	TX	4455	10184802
Chlorobenzene	TX	4475	10184802
Chlorodibromomethane	TX	4575	10184802
Chloroethane (Ethyl chloride)	TX	4485	10184802
Chloroform	TX	4505	10184802
cis-1,2-Dichloroethylene	TX	4645	10184802
cis-1,3-Dichloropropene	TX	4680	10184802
Dibromomethane (Methylene bromide)	TX	4595	10184802
Dichlorodifluoromethane (Freon-12)	TX	4625	10184802
Ethylbenzene	TX	4765	10184802
Hexachlorobutadiene	TX	4835	10184802
Iodomethane (Methyl iodide)	TX	4870	10184802
Isopropyl alcohol (2-Propanol, Isopropanol)	TX	4895	10184802
Isopropylbenzene (Cumene)	TX	4900	10184802
m+p-xylene	TX	5240	10184802
Methyl acetate	TX	4940	10184802
Methyl bromide (Bromomethane)	TX	4950	10184802
Methyl chloride (Chloromethane)	TX	4960	10184802
Methyl tert-butyl ether (MTBE)	TX	5000	10184802
Methylcyclohexane	TX	4965	10184802

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Chemical Materials***

Methylene chloride (Dichloromethane)	TX	4975	10184802
Naphthalene	TX	5005	10184802
n-Butylbenzene	TX	4435	10184802
n-Propylbenzene	TX	5090	10184802
o-Xylene	TX	5250	10184802
sec-Butylbenzene	TX	4440	10184802
Styrene	TX	5100	10184802
tert-Butylbenzene	TX	4445	10184802
Tetrachloroethylene (Perchloroethylene)	TX	5115	10184802
Toluene	TX	5140	10184802
trans-1,2-Dichloroethylene	TX	4700	10184802
trans-1,3-Dichloropropylene	TX	4685	10184802
trans-1,4-Dichloro-2-butene	TX	4605	10184802
Trichloroethene (Trichloroethylene)	TX	5170	10184802
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	TX	5175	10184802
Trichlorotrifluoroethane	TX	5185	10184802
Vinyl acetate	TX	5225	10184802
Vinyl chloride	TX	5235	10184802
Xylene (total)	TX	5260	10184802

Method EPA 8270

Analyte	AB	Analyte ID	Method ID
1,2,4,5-Tetrachlorobenzene	TX	6715	10185805
1,2,4-Trichlorobenzene	TX	5155	10185805
1,2-Dichlorobenzene	TX	4610	10185805
1,2-Diphenylhydrazine	TX	6220	10185805
1,3-Dichlorobenzene	TX	4615	10185805
1,4-Dichlorobenzene	TX	4620	10185805
1-Naphthylamine	TX	6425	10185805
2,3,4,6-Tetrachlorophenol	TX	6735	10185805
2,4,5-Trichlorophenol	TX	6835	10185805

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Solid & Chemical Materials*

2,4,6-Trichlorophenol	TX	6840	10185805
2,4-Dichlorophenol	TX	6000	10185805
2,4-Dimethylphenol	TX	6130	10185805
2,4-Dinitrophenol	TX	6175	10185805
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10185805
2,6-Dichlorophenol	TX	6005	10185805
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10185805
2-Chloronaphthalene	TX	5795	10185805
2-Chlorophenol	TX	5800	10185805
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	TX	6360	10185805
2-Methylnaphthalene	TX	6385	10185805
2-Methylphenol (o-Cresol)	TX	6400	10185805
2-Naphthylamine	TX	6430	10185805
2-Nitroaniline	TX	6460	10185805
2-Nitrophenol	TX	6490	10185805
2-Picoline (2-Methylpyridine)	TX	5050	10185805
3,3'-Dichlorobenzidine	TX	5945	10185805
3-Methylcholanthrene	TX	6355	10185805
3-Nitroaniline	TX	6465	10185805
4,4'-DDD	TX	7355	10185203
4,4'-DDE	TX	7360	10186002
4,4'-DDT	TX	7365	10185407
4-Aminobiphenyl	TX	5540	10185805
4-Bromophenyl phenyl ether (BDE-3)	TX	5660	10185805
4-Chloro-3-methylphenol	TX	5700	10185805
4-Chloroaniline	TX	5745	10185805
4-Chlorophenyl phenylether	TX	5825	10185805
4-Dimethyl aminoazobenzene	TX	6105	10185805
4-Methylphenol (p-Cresol)	TX	6410	10185805
4-Nitroaniline	TX	6470	10185805

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Solid & Chemical Materials*

4-Nitrophenol	TX	6500	10185805
7,12-Dimethylbenz(a) anthracene	TX	6115	10185805
a-a-Dimethylphenethylamine	TX	6125	10185805
Acenaphthene	TX	5500	10185805
Acenaphthylene	TX	5505	10185805
Acetophenone	TX	5510	10185805
Aldrin	TX	7025	10186002
alpha-BHC (alpha-Hexachlorocyclohexane)	TX	7110	10185407
alpha-Chlordane	TX	7240	10185805
Aniline	TX	5545	10185805
Anthracene	TX	5555	10185805
Aroclor-1016 (PCB-1016)	TX	8880	10186002
Aroclor-1221 (PCB-1221)	TX	8885	10185805
Aroclor-1232 (PCB-1232)	TX	8890	10185407
Aroclor-1242 (PCB-1242)	TX	8895	10185407
Aroclor-1248 (PCB-1248)	TX	8900	10185805
Aroclor-1254 (PCB-1254)	TX	8905	10185805
Aroclor-1260 (PCB-1260)	TX	8910	10185407
Atrazine	TX	7065	10185805
Azinphos-methyl (Guthion)	TX	7075	10185203
Benzidine	TX	5595	10185805
Benzo(a)anthracene	TX	5575	10185805
Benzo(a)pyrene	TX	5580	10185805
Benzo(b)fluoranthene	TX	5585	10185805
Benzo(e)pyrene	TX	5605	10185805
Benzo(g,h,i)perylene	TX	5590	10185805
Benzo(k)fluoranthene	TX	5600	10185805
Benzoic acid	TX	5610	10185805
Benzyl alcohol	TX	5630	10185805
beta-BHC (beta-Hexachlorocyclohexane)	TX	7115	10185601

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Solid & Chemical Materials*

Biphenyl	TX	5640	10185805
bis(2-Chloroethoxy)methane	TX	5760	10185805
bis(2-Chloroethyl) ether	TX	5765	10185805
bis(2-Chloroisopropyl) ether	TX	5780	10185805
bis(2-Ethylhexyl) phthalate (DEHP)	TX	6255	10185805
Butyl benzyl phthalate	TX	5670	10185805
Caprolactam	TX	7180	10185805
Carbaryl (Sevin)	TX	7195	10185601
Carbazole	TX	5680	10185805
Carbophenothion	TX	7220	10185805
Chlordane (tech.)	TX	7250	10185805
Chlorfenvinphos	TX	7255	10185203
Chrysene	TX	5855	10185805
Coumaphos	TX	7315	10185805
Crotoxyphos	TX	7330	10185203
delta-BHC (delta-Hexachlorocyclohexane)	TX	7105	10186002
Demeton	TX	7390	10185805
Demeton-o	TX	7395	10185805
Demeton-s	TX	7385	10185601
Dibenz(a,h) anthracene	TX	5895	10185805
Dibenzofuran	TX	5905	10185805
Dichlorovos (DDVP, Dichlorvos)	TX	8610	10185805
Dicrotophos	TX	7465	10185805
Dieldrin	TX	7470	10185407
Diethyl phthalate	TX	6070	10185805
Dimethoate	TX	7475	10185805
Dimethyl phthalate	TX	6135	10185805
Di-n-butyl phthalate	TX	5925	10185805
Di-n-octyl phthalate	TX	6200	10185805
Dioxathion	TX	7495	10185601

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704211-11-6**
Expiration Date:	**4/30/2012**
Issue Date:	**5/1/2011**

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Solid & Chemical Materials*

Diphenylamine	TX	6205	10185805
Disulfoton	TX	8625	10185407
Endosulfan I	TX	7510	10185601
Endosulfan II	TX	7515	10185805
Endosulfan sulfate	TX	7520	10186002
Endrin	TX	7540	10185601
Endrin aldehyde	TX	7530	10186002
Endrin ketone	TX	7535	10186002
EPN (Phosphonothioic acid, phenyl-, O-ethyl O-(p-nitrophenyl) ester)	TX	7550	10186002
Ethion	TX	7565	10185203
Ethyl methanesulfonate	TX	6260	10185805
Famphur	TX	7580	10186002
Fensulfothion	TX	7600	10185805
Fenthion	TX	7605	10186002
Fluoranthene	TX	6265	10185805
Fluorene	TX	6270	10185805
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	TX	7120	10185407
gamma-Chlordane	TX	7245	10185601
Heptachlor	TX	7685	10185601
Heptachlor epoxide	TX	7690	10185203
Hexachlorobenzene	TX	6275	10185805
Hexachlorobutadiene	TX	4835	10185805
Hexachlorocyclopentadiene	TX	6285	10185805
Hexachloroethane	TX	4840	10185805
Hexachlorophene	TX	6290	10185601
Indeno(1,2,3-cd) pyrene	TX	6315	10185805
Isodrin	TX	7725	10185203
Isophorone	TX	6320	10185805
Leptophos	TX	7755	10185407
Malathion	TX	7770	10185601

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704211-11-6**
Expiration Date:	**4/30/2012**
Issue Date:	**5/1/2011**

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: *Solid & Chemical Materials*

Methoxychlor	TX	7810	10185203
Methyl methanesulfonate	TX	6375	10185805
Methyl parathion (Parathion, methyl)	TX	7825	10185203
Mevinphos	TX	7850	10185805
Monocrotophos	TX	7880	10185805
Naled	TX	7905	10185805
Naphthalene	TX	5005	10185805
Nitrobenzene	TX	5015	10185805
n-Nitrosodiethylamine	TX	6525	10185805
n-Nitrosodimethylamine	TX	6530	10185805
n-Nitrosodi-n-butylamine	TX	5025	10185805
n-Nitrosodi-n-propylamine	TX	6545	10185805
n-Nitrosodiphenylamine	TX	6535	10185805
n-Nitrosopiperidine	TX	6560	10185805
Parathion, ethyl	TX	7955	10185805
Pentachlorobenzene	TX	6590	10185805
Pentachloronitrobenzene	TX	6600	10185805
Pentachlorophenol	TX	6605	10185805
Phenacetin	TX	6610	10185805
Phenanthrene	TX	6615	10185805
Phenol	TX	6625	10185805
Phorate	TX	7985	10185407
Phosmet (Imidan)	TX	8000	10185203
Phosphamidon	TX	8005	10186002
Pronamide (Kerb)	TX	6650	10185805
Pyrene	TX	6665	10185805
Pyridine	TX	5095	10185805
Quinoline	TX	6670	10185805
Stirophos (Tetrachlorvinphos)	TX	8200	10186002
Sulfotepp	TX	8155	10185203

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Chemical Materials***

Terbufos	TX	8185	10185805
Tetraethyl pyrophosphate (TEPP)	TX	8210	10185407
Toxaphene (Chlorinated camphene)	TX	8250	10185203

Method EPA 8321

Analyte	AB	Analyte ID	Method ID
2,4,5-T	TX	8655	10188804
2,4-D	TX	8545	10188804
2,4-DB	TX	8560	10188804
Dalapon	TX	8555	10188804
Dicamba	TX	8595	10188804
Dichloroprop (Dichlorprop)	TX	8605	10188804
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	TX	8620	10188804
MCPA	TX	7775	10188804
MCPP	TX	7780	10188804
Silvex (2,4,5-TP)	TX	8650	10188804

Method EPA 8330

Analyte	AB	Analyte ID	Method ID
1,3,5-Trinitrobenzene (1,3,5-TNB)	TX	6885	10189807
1,3-Dinitrobenzene (1,3-DNB)	TX	6160	10189807
2,4,6-Trinitrotoluene (2,4,6-TNT)	TX	9651	10189807
2,4-Dinitrotoluene (2,4-DNT)	TX	6185	10189807
2,6-Dinitrotoluene (2,6-DNT)	TX	6190	10189807
2-Amino-4,6-dinitrotoluene (2-am-dnt)	TX	9303	10189807
2-Nitrotoluene	TX	9507	10189807
3-Nitrotoluene	TX	9510	10189807
4-Amino-2,6-dinitrotoluene (4-am-dnt)	TX	9306	10189807
4-Nitrotoluene	TX	9513	10189807
Nitrobenzene	TX	5015	10189807
Nitroglycerin	TX	6485	10189807
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	TX	9522	10189807
Pentaerythritoltetranitrate	TX	9558	10189807

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	T104704211-11-6
Expiration Date:	4/30/2012
Issue Date:	5/1/2011

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Chemical Materials***

RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	TX	9432	10189807
Tetryl (methyl-2,4,6-trinitrophenylnitramine)	TX	9633	10189807

Method EPA 9014

Analyte	AB	Analyte ID	Method ID
Total Cyanide	TX	1635	10193803

Method EPA 9040

Analyte	AB	Analyte ID	Method ID
Corrosivity	TX	1615	10197203
pH	TX	1900	10197203

Method EPA 9045

Analyte	AB	Analyte ID	Method ID
pH	TX	1900	10198400

Method EPA 9056

Analyte	AB	Analyte ID	Method ID
Bromide	TX	1540	10199209
Chloride	TX	1575	10199209
Fluoride	TX	1730	10199209
Nitrate as N	TX	1810	10199209
Nitrate-nitrite	TX	1820	10199209
Nitrite as N	TX	1840	10199209
Sulfate	TX	2000	10199209

Method SM 2320 B

Analyte	AB	Analyte ID	Method ID
Alkalinity as CaCO3	TX	1505	20003003

Method SM 2510 B

Analyte	AB	Analyte ID	Method ID
Conductivity	TX	1610	20003809

Method SSA/ASA Part 3:14

Analyte	AB	Analyte ID	Method ID
Conductivity	TX	1610	SSA/ASA Pt 3:14

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704211-11-6**
Expiration Date:	**4/30/2012**
Issue Date:	**5/1/2011**

DHL Analytical, Inc.

2300 Double Creek Drive
Round Rock, TX 78664-3801

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Chemical Materials***

Method TCEQ 1005

Analyte	AB	Analyte ID	Method ID
Total Petroleum Hydrocarbons (TPH)	TX	2050	90019208

Appendix F

EX-SITU SAMPLE COLLECTION, PREPARATION AND XRF MEASUREMENT

Bulk Sample Aliquot Collection

1. Select 10 Sample Points within the Decision Unit (as described in the FSP).
2. Remove grass and other ground-cover from the Sample Point.
3. Collect an approximate 60 ml soil plug (3 inch diameter by 1 inch deep) from the 0-1 inch interval using a suitable cylindrical coring device. Discard any soil collected below 1 inch in depth.
4. Collect 10 such soil plugs from 10 designated Sample Points within the Decision Unit. The bulk Soil Sample mass should be greater than 0.5 kg to assure enough sample volume.
5. Combine the 10 soil plugs into the bulk sample in a suitable non-metallic dedicated and disposable mixing container.

Bulk Sample Mixing

6. Remove large non-soil materials (rock, sticks, leaves…) from the bulk sample.
7. Disaggregate and mix the material using a stirring and mixing motion with a suitable non-metallic dedicated tool.
8. Sieve the bulk sample though a No. 10 (2mm) stainless steel sieve.
9. Discard the un-sieved portion of the bulk sample.
10. Thoroughly mix the sieved portion of the bulk sample for 2 minutes.
11. Collect the bulk sample into a large labeled sample bag.

Cone and Quarter Splitting

12. Pour and pile the bulk sample onto a plastic lined cutting board to form a conical shape.
13. Flatten the coned pile into a circular-shaped uniform thickness of approximately ½ inch or less.
14. Split the bulk sample into pie-shaped quarters using a straight-edged device to drag and separate each quadrant.
15. Combine OPPOSITE quadrants into the mixing container.
16. Replace the other opposite quadrants into the original bulk sample bag.
17. Thoroughly mix the remaining bulk sample again.
18. Repeat steps 12-14 above.
19. Combine and mix ADJACENT quadrants.
20. Complete this coning and quartering procedure until approximately 16 ounces of sample remains for laboratory and/or XRF analysis.
21. For Study Units North of Gale Street, split the prepared sample into 2 halves and place each half into a properly labeled sample jar or bag (XRF samples only).

LABORATORY SAMPLES (MERCURY SAMPLES)

22. Pack and prepare samples for shipping to the laboratory.

EX-SITU XRF COMPOSITE SAMPLES (ALL STUDY UNITS)

23. Store and preserve samples in an iced and sealed cooler for delivery to the DBS&A Austin Office at the end of the field week.

Appendix G

1. Portable X-Ray Fluorescence Screening for Metals

This Standard Operating Procedure (SOP) establishes protocols for the collection of x-ray fluorescence (XRF) data at discrete in-situ locations as well as from composite ex-situ soil sample locations. This SOP has been prepared exclusively for use at the Dona Park Neighborhood Site (the Site) in Corpus Christi, Texas. This SOP addresses sample preparation and field methodologies to be employed during this sampling event. A total of 20 in-situ measurements and 1 composite sample will be collected in each study unit. The samples will be analyzed in the field using the NITON® XL3t Series analyzer. Lead, cadmium, and zinc are the contaminants of concern for the Site. The action levels for the Site are 500 milligrams per kilogram (mg/kg), 50 mg/kg, and 9,900 mg/kg for lead, cadmium, and zinc, respectively. The primary objective of this activity is to determine whether the XRF tool can be used to accurately measure concentrations of lead, cadmium, and zinc in soils. The purpose of this SOP is to standardize the XRF sampling procedures to ensure data quality, defensibility, and reproducibility.

All or parts of the SOPs and SOGs described in this section may be reproduced and used in DBS&A reports, proposals, and work plans with the verbal consent of the President, the Quality Assurance Manager, or a DBS&A Division Director.

1.1 Procedures

XRF analysis is based on the principle of atomic excitation. Elements in a soil sample are irradiated with a beam of X-rays. Inner-orbital electrons in the atom are photoejected and leave the atom in an excited state as a result of electron vacancy. Relaxation occurs when an outer orbital electron with higher energy fills the vacancy and emits X-rays possessing energy unique to each element in the sample.

Field measurement of metals in soils with an XRF may be influenced by soil moisture, with errors in reporting increasing with increasing soil moisture contents. Because of this, this SOP also details the procedures to employ to ensure that the data collected are defensible.

These protocols refer to and depend upon the implementation of related Daniel B. Stephens & Associates, Inc. protocols on decontamination; instrument calibration, maintenance and use; quality control; field documentation, sample integrity, and chain-of-custody procedures.

1.1.1 Apparatus and Materials

The following apparatus and materials are required for metals screening in soils.

1. NITON® XL3t Series analyzer.
2. Field Scout TDR 300 Soil Moisture Meter
3. A plastic trowel or spatula for smoothing and compacting soil
4. Soil jars or sealable plastic bags for collecting samples
5. Marking pens, field notebook

1.2 Soil Moisture Readings

Soil moisture readings will be collected at each Study Unit where field XRF measurements are made. Moisture readings will be collected using a Field Scout TDR 300 Soil Moisture Meter capable of producing a percent moisture range from 0 to saturation (saturation is typically around 50% volumetric water) and with meter accuracy of approximately ±3.0%.

Prior to collecting moisture readings, the soil moisture meter will be calibrated following the user's manual calibration process provided in Appendix 1 of this SOP. The meter should be wiped with a towel between tests to remove all excess dirt. Soil moisture measurements will be made at a minimum of two locations in each Study Unit. The soil moisture measurements will be recorded in the field log book.

1.3 Go/No-Go Determination

Optimal moisture percentages will be determined in the field during Phase I of the Pilot Study, which will be conducted to determine the optimal sampling depth determination. Field soil moisture readings will be collected and compared to the laboratory derived percent moisture. Once optimal moisture percentages are determined for the site, this optimal moisture plus or minus 5% will be set as a Go/No-Go indicator for soil sample collection.

1.4 XRF Operations

The NITON® XL3t Series analyzer will be used to measure metal concentrations reported in parts per million (ppm) for both the in-situ samples as well as the ex-situ composite soil samples. The XRF ex-situ composite samples will be homogenized, placed in XRF sample cups and five readings collected to achieve a mean sample result for each study unit.

The XRF unit will be factory prepared specifically for environmental soil analysis and will be factory calibrated prior to shipment. In the field, a calibration verification check and XRF precision check will be conducted daily using standards provided with the instrument as well as project-specific decision level and varying level concentrations standards. Table 1 provides a summary of the QC procedures and the applicable acceptance criteria when using the XRF.

Table 1. Summary of QC Procedures for Field XRF by Method SW-846 6200

QC Check Sample	Minimum Frequency	QC Acceptance Criteria*	Required Corrective Action if QC Acceptance Criteria not Met
Calibration verification check on decision level concentration standards.	Before each Study Unit and at the end of each day.	± 20% difference (%D) of concentration standard [%D=((Cs –Cm)/Cm) x 100] Cs = Concentration Standard Cm = Concentration Measured	1. Reanalyze the calibration verification check sample using an analysis time of 200 seconds. 2. If QA acceptance criteria remain unmet, perform internal system check (aka "standardless" calibration in accordance with Section 10.0 of SW846-6200) and reanalyze the batch of samples analyzed immediately prior to the unacceptable calibration verification check. 3. If QA acceptance criteria remain unmet, consult the instrument representative and adjust the y-intercept and slope of the instrument calibration curve to best fit the known concentration of target COC in the concentration standards, and reanalyze the batch of samples analyzed immediately prior to the unacceptable calibration verification check.
XRF precision check on concentration standards.**	At the beginning of each day, analyze the decision level concentration standard 7 times in replicate. Calculate the %RSD of the 7 replicates.	≤ 20% RSD [%RSD=(Std. Dev of 7 replicates/mean of 7 replicates) x 100]	1. Reanalyze the decision level concentration standard 7 times in replicate at an analysis time of 200 seconds. 2. Recalculate the %RSD.
Blank sample check.	Before each Study Unit and at the end of each day.	No target COC concentrations above the established detection limit.	1. Check measurement window and blank sample window for soils and clean appropriately. 2. If QA acceptance criteria remain unmet, "zero out" the instrument by following the manufacturer's instructions.

Notes:

* If the QC Acceptance Criteria are not met, the corrective actions given in Section 9.0 of SW846-6200 will be followed.

**The precision check should be performed on decision level concentration standards with varying concentration ranges to assess the effect of concentration on method precision. This check will be performed using standards provided with the instrument as well as project-specific decision level and varying level concentrations standards.

1.4.1 In-Situ Discrete Sampling

Twenty (20) in-situ soil sample locations will be identified in each study unit prior to collecting XRF readings. Each study unit sample location will be uniquely identified. XRF soil sample collection will be in a gridded pattern. The optimal screening depth will be determined prior to XRF sampling and will be consistent for all in-situ soil sample locations.

The sampling procedure will be programmed into the XRF prior to mobilizing to the field. This procedure will assure that the filters used and the sample collection time will be optimal for lead, cadmium, and zinc analysis and that the required detection limits for lead, cadmium, and zinc are achieved at each location. It is estimated that 4 to 5 minutes will be required at each soil sample location. The in-situ measurement is taken by simply placing the analyzer probe on a prepared, flat area of soil.

The XRF soil sampling procedure for in-situ sampling is as follows:

1. The optimal sampling depth will be determined prior to XRF field sampling activities, and the field team will remove soils down to the optimal sampling depth.

2. Each sample location will be clearly marked and the Study Unit soil sample location documented.

3. In the event that a global positioning system (GPS) is linked to the XRF, the XRF will be programmed to automatically collect latitude and longitude points while the samples are being analyzed.

4. Remove any debris, such as leaves, twigs, grass, and stones, from the measurement surface.

5. Loosen the soil to a depth of 1.5 to 2.5 centimeters (cm) (0.5 inch (in) to 1 in) over an area of at least 10 cm (4 inch) diameter, and stir the loosened soil to achieve some homogenization with a dedicated trowel or stir wand.

6. Tamp the mixed and loosened soil to a relatively flat, smooth surface

7. Set the XRF on the prepared surface location using the extend-a-pole accessory.

8. Measure the metal concentrations in the soils with the NITON® XL3t Series analyzer following the NITON SOP.

9. Record the date, time, sample location and results in ppm in the field logbook.

1.4.2 Ex-Situ Composite Sampling

The ex-situ composite samples will be formed by combining soil from several sample locations (estimated 20 soil sample locations per study unit). Equal volume aliquots will be collected from the in-situ soil sampling locations where the in-situ XRF readings were collected.

1. Equal aliquots collected from the study unit sampling locations will be placed in a suitable non-metal mixing container.

2. Prior to analyzing the sample, identify and discard materials in the sample which are not relevant for characterizing the site. Examples of extraneous material in soil samples include pieces of glass, twigs, leaves, rocks, etc.

3. Homogenize the soil sample until uniform distribution is achieved per cone and quarter splitting sample preparation instructions in the field sampling plan (FSP). A consistent homogenization method should be determined during the first discrete sampling event at the site and used throughout the XRF sampling activities.

4. An aliquot of the homogenized soil will be placed in an XRF sample cup that is provided by the XRF manufacturer.

5. Following thorough homogenization, five (5) XRF readings will be taken on the cupped sample. The mean of the five measurements will be the ex-situ composite XRF mean of the study unit.

6. At the completion of XRF readings on the cupped sample, the sample will be moved to the appropriate sampling container for submittal to laboratory for comparative analysis.

1.5 Field Documentation

The following data, at a minimum, shall be recorded in a field book, log, or form (or a combination thereof):

1. Date, time, and location

2. Name(s) of field operator

3. Equipment

4. QC Check sample documentation

5. Sample identification and collection start time

6. Site conditions that could affect the integrity of the sample

Attachments

Appendix 1: NITON® XL3t Series analyzer User's Manual

Appendix H

Daniel B. Stephens & Associates, Inc.

DBS&A XRF-In Office Analysis Sample Tracking Log

All dates below must be initialed by the person in custody of the sample.

Sample ID	Date Sampled	Date Received from Field	Logged in By (initials)	Date Sample Prep	Date Analyzed	Date Prepped for Laboratory Analysis	Date Sample Delivered to DHL (See Lab COC)