2008 DEEP SOIL BACKGROUND REPORT

BMI COMMON AREAS (EASTSIDE)
CLARK COUNTY, NEVADA

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I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession and to the best of my knowledge comply with all applicable federal, state and local statutes, regulations and ordinances. I hereby certify that all laboratory analytical data was generated by a laboratory certified by the NDEP for each constituent and media presented herein.

October 20, 2009

Jill A. Quillin, C.E.M. (No. EM-1707, Exp. 6/21/2010) Date
ERM Program Geologist

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ABBREVIATION AND ACRONYM LIST

ANOVA	one-way analysis of variance
bgs	below ground surface
BMI	Basic Management, Inc.
BRC	Basic Remediation Company
DBSA	Daniel B. Stevens and Associates
DOE	U.S. Department of Energy
DQI	data quality indicator
DQO	data quality objective
DVSR	Data Validation Summary Report
ERM	ERM-West, Inc.
FOD	frequency of detection
FSSOP	Field Sampling and Standard Operating Procedures
H_o	null hypothesis
H_a	alternative hypothesis
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MDL	method detection limit
mg/kg	milligrams per kilogram
MS/MSD	matrix spike/matrix spike duplicate
MDA	minimum detectable activity
NBMG	Nevada Bureau of Mines and Geology
NDEP	Nevada Division of Environmental Protection
NRCS	Natural Resources Conservation Service
NRS	Nevada Revised Statute
OCP	organochloride pesticide
pCi/g	pico Curies per gram
PID	photoionization detector
PARCC	precision, accuracy, representativeness, comparability, and completeness (data quality indicators)
Qal	Quaternary alluvium
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
QC	quality control
RPD	relative percent difference

ABBREVIATION AND ACRONYM LIST

SQL	sample quantitation limit
SVOCs	semi-volatile organic compounds
SSURGO	Soil Survey Geographic
SOP	standard operating procedure
UMCf	Upper Muddy Creek formation
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
VOCs	volatile organic compounds

1.0 INTRODUCTION

On behalf of Basic Remediation Company (BRC), ERM-West, Inc. (ERM) has prepared this Deep Soil Background Report applicable to the Basic Management, Inc. (BMI) Complex and Common Areas in Clark County, Nevada. The deep soil background data were collected in accordance with the *Revised Work Plan for Determination of Deep Quaternary Alluvium and Upper Muddy Creek Formation Background Soil Chemistry and Upgradient Alluvial Aquifer Conditions – BMI Common Areas and Complex Vicinity* (Daniel B Stevens & Associates [DBSA] 2007), and approved by the Nevada Division of Environmental Protection (NDEP) on June 12, 2007 (hereinafter, "Work Plan").

This revision of the report, Revision 3, incorporates (1) the redline/strikeout version of the text received from NDEP on September 16, 2009, and text revisions based on subsequent discussions between BRC and NDEP; (2) comments received from the NDEP, dated May 11, 2009, on Revision 1 of the report, dated March 2009; and (3) comments received from the NDEP, dated December 28, 2008, on Revision 0 of the report, dated October 2008; as well as comment resolutions between BRC and NDEP on the *2008 Supplemental Shallow Soil Background Report* (BRC and ERM 2009a). The NDEP comments and BRC's response to these comments are included in Appendix A. Also included in Appendix A is a redline/strikeout version of the text showing the revisions from the June 2009 version of the report. An electronic version of the entire report, as well as original format files (MS Word and MS Excel) of all text and tables are included in Appendix B; as is the 2008 Deep Soil Background dataset.[1]

The general scope of work included the collection of soil samples from background areas upgradient of the BMI Common Areas and Complex industrial areas and analysis of these samples for Site-related metals and radionuclides for determining background concentrations. In addition, selected samples were analyzed for general chemistry/soil parameters, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and organochloride pesticides (OCPs). The report entitled *Deep Background Investigation Report* (GES 2007), an electronic copy of which is provided in Appendix B, describes the drilling and sampling procedures, including detailed boring logs for each drilling location. Deep soil background sample locations

[1] The data presented in Appendix B includes all data collected during the 2008 Deep Soil Background Investigation, including chemical data other than metals and radionuclides. Here and elsewhere in the report, the term "background dataset" refers to the metals and radionuclide data (excluding the other chemical data collected during the deep background investigation), which will be used in comparisons to metals and radionuclide Site data as part of the Site closure process.

are shown on Figure 1. This report provides a summary of the scope of work and data associated with the Deep Background Investigation, after which the statistical analyses employed and the associated results are presented.

1.1 OBJECTIVES AND PURPOSE

The primary purpose of this investigation was to collect and analyze data for metals and radionuclides in background deep soils that are comparable to Site soils in geologic units and depths not covered by the existing *Background Shallow Soil Summary Report* (BRC/TIMET 2007) and *2008 Supplemental Shallow Soil Background Report* (BRC and ERM 2009a) datasets, which address shallower (0 to 10 feet below ground surface [bgs]) stratigraphic intervals. To support this data collection effort, soils collected from the background borings were analyzed for VOCs, SVOCs, and OCPs to evaluate potential soil impacts at the background drilling locations. The underlying assumption was that if potential chemical impacts were observed at a given boring location, the designation of that boring as representing background conditions would be suspect. In addition, general chemistry/soil parameters were also collected to better characterize the nature of the deeper soils, because limited data are currently available. General descriptive summary statistics and comparative statistical analyses for each stratigraphic unit were calculated only for the constituents being evaluated as background (*i.e.*, metals and radionuclides).

This deep background study was primarily undertaken because 1) insufficient background chemical data exist to evaluate whether concentrations of certain Site-related chemicals in deeper Site samples statistically exceed concentrations of these chemicals in background soils, and 2) insufficient background chemical data exist for the Upper Muddy Creek formation (UMCf), which outcrops to the northeast of the Site. The UMCf is near the ground surface in certain areas of the Common Areas (*i.e.*, within the Western Hook sub-areas), but does not appear to outcrop within the Site. As presented in the two shallow soil background summary reports identified above (BRC/TIMET 2007; BRC and ERM 2009a), the existing datasets focused on shallow Quaternary alluvium (Qal) soils (*i.e.*, surface to 10 feet bgs) and did not include data for the UMCf. One of the specific points of this study was to determine whether arsenic concentrations are different in the UCMf than in the Qal; this is particularly important because arsenic is usually a risk driver at the Site.

The field activities were specifically designed to collect the following soil chemical data needed for Site-to-background comparisons:

- Data for various depth intervals, in both the Qal and UMCf units;
- Data for a representative range of soil map units applicable to the Site (*i.e.*, Natural Resources Conservation Service [NRCS] mapped soil units 117, 182, and 184);
- Data to form an adequate statistical sample to support future statistical comparisons of Site and background sample datasets; and
- Data to form an adequate statistical sample to compare data from different background geologic units within the deep background data and between the deep background, supplemental background and shallow background data.

1.2 SITE LOCATION AND GEOLOGIC SETTING

The Site is located in Clark County, Nevada, and is situated approximately two miles west of the River Mountains and one mile north of the McCullough Range (Figure 2). For reference, it is noted that the Upper Ponds occupy the southern portion of the BMI Common Areas, and the Lower Ponds occupy the northern part of the BMI Common Areas. The McCullough Range is the primary source of materials upslope of the BMI Complex, the Lower Ponds, and the western and central portions of the Upper Ponds. Both the River Mountains and the McCullough Range are primary sources of materials upslope of the eastern portion of the Upper Ponds. According to the Nevada Bureau of Mines and Geology (NBMG) *Las Vegas SE Folio Geologic Map (1977) and the Geologic Map of the Henderson Quadrangle, Nevada* (NBMG 1980), the River Mountains and McCullough Range consist of volcanic rocks: dacite in the River Mountains and andesite in the McCullough Range. The land surface slopes in a westerly to northwesterly direction from the River Mountains and in a northerly to northeasterly direction from the McCullough Range. Near the Site, the surface topography slopes in a northerly direction towards the Las Vegas Wash.

Soils in the Site vicinity have been identified and mapped by the NRCS in Soils Survey of Las Vegas Valley Area, Nevada (USDA, 1985; hereinafter referred to as "NRCS Soils Survey"). The soils map from the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (USDA 2009) shows that the soil type classification for the Upper and Lower Ponds area proper is map unit 600, "slickens," a non-native soil type (artificial fill). This term is presumed to reflect the non-native material observed in those Ponds that were used for waste disposal. The soil type classification for the BMI Complex is map unit 615, "urban land." Native soils underlying the slickens and urban land are assumed to be consistent with the surrounding map units (*i.e.*, primarily map unit 184, and, to a lesser extent, map units 112, 117, 182, 187 and 326). In Figure 3, the sampling locations associated with this deep background soil investigation are superimposed over a digitized soils map reproduced from the NRCS SSURGO database, which represents the most recent available information pertaining to the mapped, naturally-occurring soils in the Site vicinity.

2.0 SUMMARY OF THE INVESTIGATION

This section identifies the sampling locations, presents the sampling and analytical methods, and summarizes the results of data validation.

2.1 SAMPLING LOCATIONS

As described in the Work Plan, a total of 33 potential sampling locations were originally identified within map units 117, 182, and 184. These potential sampling locations were selected because they exhibited the following characteristics:

- They are off-Site locations within the same soil map units as soils located immediately adjacent to the Site, and in relatively close proximity to the Common Areas and BMI Complex; however, they are upgradient and sufficiently distant from the Site such that impacts from Site or other industrial operations are not likely.

- Because the focus of the investigation is on deeper soils, the locations of these potential deeper background locations should not be affected by wind relationships such as might affect a shallow surface sampling program. Nonetheless, assuming a predominant wind direction from the south and southwest, the potential locations are upwind or crosswind of the Site.

- The sampling locations are upgradient of the Site and are thus unlikely to have been affected by overland transport of potentially contaminated sediments in surface water.

The *Background Shallow Soil Summary Report* (BRC/TIMET 2007) and *2008 Supplemental Shallow Soil Background Report* (BRC and ERM 2009a) support the assumption that deep native soils collected from within map units 117, 182, and 184 should reflect background conditions at the Site. As specified in the Work Plan, based on then-current accessibility, site hazards, and land use compatibility, of the 33 candidate drilling locations, seven locations within each soil unit were selected for drilling (*i.e.*, a total of 21 locations[2]).

[2] Each of the original potential drilling locations identified in the Work Plan are depicted in Figure 1, with color coding to differentiate the locations that were ultimately drilled from those that were omitted. Because the boring-specific nomenclature assigned in the Work Plan was retained, the associated dataset has gaps in the boring locations numbering system reflecting the omitted borings.

Based on geologic mapping data (NBMG 1980), ERM classified each sampling location as representing Qal sediments derived from either 1) the McCullough Range, 2) the River Mountains, or 3) mixed River and McCullough sources,[3] as follows, and the resultant data was accordingly segregated:

McCullough Range Source

- DBSA-01
- DBSA-02
- DBSA-03
- DBSA-04
- DBSA-08
- DBSA-09
- DBSA-10
- DBSA-11
- DBSA-13
- DBSA-14
- DBSA-15

River Mountain Source

- DBSA-23
- DBSA-26
- DBSA-27
- DBSA-29
- DBSA-30[4]
- DBSA-32
- DBSA-33

Mixed Source

- DBSA-17
- DBSA-20
- DBSA-21

The underlying UMCf was assumed to be the same unit across the study area, and all data collected from the UMCf were compiled into a single dataset.

Soil samples were collected at 10-foot intervals at 21 sampling locations, from surface soil (0 to 0.5 feet bgs), to a maximum of 160 feet bgs. Of these samples, as discussed in the following section, a subset was submitted for laboratory analysis. As noted in the *Deep Background Investigation Report* (GES 2007), no odors or stains indicating impacts to the soils in the deep background borings were observed. Likewise, field screening for VOCs using photoionization detectors (PIDs; 10.6 eV and 11.7 eV) revealed no elevated VOC measurements (see boring logs

[3] Map Unit #117, which contains sampling locations DBSA-17, DBSA-20, and DBSA-21 as seen in Figure 3, is classified as modern wash deposits. Its location is coincident with 1) a sharp topographic break and 2) the apparent contact of the alluvium from the River Mountains with that of the McCullough Ranges, which suggests that it could be derived from reworking of both underlying sediments. Discussions on the field investigation and boring locations are provided in the 2007 GES report (Appendix B).

[4] Original interpretation of the boring log for DBSA-30 indicated that the UMCf contact was identified based on the presence of clay at 148 feet bgs—accordingly, the 130 and 140 ft bgs samples were assigned to Qal/River. However, further scrutiny of the boring log reveals that soils overlying the clay UMCf are clayey sands with distinct clay beds, and may represent transitional UMCf. Based on this and the observed similarity in metal concentrations in the 130 ft bgs, 140 ft bgs, 150 ft bgs, and 160 ft bgs samples, data associated with the 130 ft bgs and 140 ft bgs samples were re-assigned to the UMCf dataset.

in Appendix C, which have been replicated from the *Deep Background Investigation Report* [GES 2007]).

2.2 SUMMARY OF SAMPLING PROCEDURES AND ANALYSES

Soil samples were collected from a single boring at each location, drilled using either a hollow-stem auger or sonic drill rig. The first five borings drilled (DBSA-1, -2, -3, -27, and -32) were advanced using hollow-stem auger drilling techniques. When the depth to the UMCf contact was determined to be greater than 100 feet bgs in portions of the Site, the project team revised the drilling approach to include the use of rotary sonic drilling, which could readily achieve greater depths. Samples collected from each boring using either drilling technique are considered independent samples, each representing a sample interval of 2.5 feet.

At the locations where hollow stem auger drilling was used, samples were obtained using a split-spoon sampler fitted with 2.5-inch by 6-inch stainless steel sleeves. Five sleeves were collected for each sampling interval, except where duplicate or matrix spike/matrix spike duplicate (MS/MSD) samples were needed, and were submitted directly to the laboratory without compositing. The sonic drill rig used a 6-inch diameter, 5-foot long core-sampler, which was advanced in 5-foot runs. The resulting “cores” were divided into two 2.5-foot sections, each of which was composited (separately) within a clean stainless steel bowl; a representative portion of each composited 2.5-foot sample was then placed into glass sample jars provided by the laboratory. In most cases, the jars containing the shallower 2.5-foot section of a given run were the only samples analyzed for that run; however, at intervals where duplicate samples were analyzed, the deeper samples from that interval were submitted for duplicate analysis.

Sampling and sample handling procedures were consistent with the standard operating procedures (SOP) developed for the BMI Common Areas as provided in the Field Sampling and Standard Operating Procedures (FSSOP; BRC, ERM and MWH 2008). Subsurface soil samples were collected from each 10-foot depth interval bgs. At locations where the UMCf contact was observed, an effort was made to collect soil samples from 10 and 20 feet below that contact. A subset of the samples (173 samples,[5] Table 1) was subjected to laboratory analysis for Site-

[5] Note: Samples were inadvertently collected from the first soil boring, DBSA-1, at 0, 5, and 10 feet bgs. Since the purpose of the deep soil background study was to collect data for metals and radionuclides in deep background soils (that is, depths greater than 10 feet bgs), metals and radionuclide data for these shallow soil samples were removed from the deep background dataset and are not included in any of the statistical discussions, plots, or analyses in this report.

related metals and radionuclides. Data for OCPs, VOCs, and SVOCs were also collected to evaluate whether the background soil locations are impacted by other anthropogenic sources.

Twenty-five (25) field duplicate samples were collected and analyzed for metals and radionuclides during the deep soil background investigation. Because these samples are considered field duplicates, and not split samples, each is considered an independent sample for the purposes of this report. This approach is consistent with NDEP's November 14, 2008, guidance *Statistical Analysis Recommendations for Field Duplicates and Field Splits* (NDEP 2008a), which states that NDEP's preferred approach to managing duplicate data is to include field duplicates as independent samples, unless the field duplicates show lower variance than site samples, which is not the case for this dataset. Therefore, there were a total of 173 soil samples collected and analyzed for metals and radionuclides as part of this investigation.

The soil samples were submitted for analysis to TestAmerica in St. Louis, Missouri. Analyses were conducted at four TestAmerica laboratory locations: St. Louis, Missouri (most analyses); Burlington, Vermont (physical parameters); Irvine, California (Chromium [VI]) and Richland, Washington (radionuclides). At the time of analysis, all laboratories were NDEP-certified laboratories for the analyses conducted. Sample analyses consisted of a full suite of metals, eight radionuclides (radium-226, radium-228, thorium-228, thorium-230, thorium-232, uranium-233/234, uranium-235/236, and uranium-238), VOCs (5' and 10' bgs samples only), SVOCs (selected 5' and 10' bgs samples only), OCPs (selected surface soil samples only), and general soil characteristics.

Table 1 presents a sample-specific summary of the sampling and analysis program; a more detailed sample analysis summary, including the sample-specific laboratory information, the Lab Sample ID and Sample Delivery Group, sampling date and time is provided in Appendix D. The individual analytes, analytical methods, sample quantitation limits (SQLs; for metals and organics), and minimum detectable activities (MDAs; for radionuclides) are consistent with the methods specified in the Work Plan. These analytes and methods are consistent with the BRC Site-related chemicals list and analytical program previously established in the BRC Quality Assurance Project Plan (QAPP; BRC and ERM 2009b). All radionuclide analyses underwent full dissolution preparatory methods. All preparatory methods and analyses are consistent with the 2005 BRC/TIMET and 2008 Supplemental background datasets.

The detection frequency for metals and radionuclides evaluated during this deep soil background study is presented in Table 2. Detection frequencies observed for these analytes during the shallow background studies are also provided on that table for comparison. As seen in Table 2, most of the metals and radionuclides that are the subject of the deep soil background investigation were detected routinely in the deep soil samples. Exceptions are:

- Boron
- Chromium (VI)
- Mercury
- Niobium
- Platinum
- Selenium
- Thallium
- Tungsten

These eight constituents were detected in fewer than forty percent of the samples in which they were analyzed during the deep soil background investigation. This observation is generally consistent with the shallow soil background investigation findings, in which these same compounds (with the exception of mercury) were also not detected routinely. Certain constituents were detected at noticeably higher frequencies in the deep background samples than in those from the shallow background investigations (*e.g.*, antimony, cadmium, chromium (VI), silver, and tungsten). In addition, mercury, selenium and thallium were detected at noticeably lower frequencies in the 2008 deep samples than in the shallow background studies. However, as discussed in Section 3.5, for many of these metals (*i.e.*, antimony, cadmium, chromium (VI), selenium, and silver) variations in detection frequencies are suspected as having been affected by variations in SQLs, and may not reflect trends in actual concentrations.

2.3 DATA VALIDATION SUMMARY

All of the data were subjected to a Level 3 review. In addition to the Level 3 review, 20 percent of all data collected during the course of the investigation were subjected to full Level 4 data validation. Level 3 and 4 reviews are provided in the *Data Validation Summary Report (DVSR)— Deep Background Soil Investigation – August-October 2007 (Dataset 34c) – BMI Common Areas (Eastside), Clark County, Nevada* (BRC and ERM 2008;[6] approved by NDEP in June 25, 2008), which is provided electronically in Appendix B. Stable chemistry sample results (metals) and organic data for deep soil background samples were validated in accordance with the following U.S. Environmental Protection Agency (USEPA) guidance documents: *U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2004); and *USEPA Contract Laboratory Program National Functional Guidelines for*

[6] Note: in addition to the deep soil background data that are the subject of this report, the DVSR also includes other data not addressed in this report, such as incidental grab groundwater samples collected during the deep background drilling.

Organic Data Review (USEPA 1999),[7] respectively. USEPA has not standardized the validation of radionuclide data. Radionuclide results for deep soil background samples were validated in accordance with SOP-40 (BRC, ERM and MWH 2008) and the project QAPP (BRC and ERM 2009b).

Based on data validation and review, data qualifiers were placed in the electronic deep soil background database to classify whether the data were acceptable, acceptable with qualification, or rejected. Where applicable, an indication of result bias is presented. In addition, for every data validation qualifier, a secondary comment code was entered to indicate the reason for qualification. The DVSR (BRC and ERM 2008) provides the definitions for the data validation qualifiers and comment codes used in the deep soil background database. Validation qualifiers and definitions are based on those used by USEPA in the current validation guidelines (USEPA 1999 and USEPA 2004) and summarized in the SOP-40 (BRC, ERM, and MWH 2008).

Results that are qualified as estimated may generally be usable for the purposes of establishing background and for comparison to Site-specific sample data. Based on the evaluation of the dataset, approximately 98 percent of the data obtained during the field investigation are valid (that is, not rejected) and acceptable for their intended use.

2.4 DATA USABILITY EVALUATION

The analytical data were reviewed for applicability and usability following procedures in the *Guidance for Data Usability in Risk Assessment (Part A)* (USEPA 1992) and *Supplemental Guidance for Assessing Data Usability for Environmental Investigations at the BMI Complex and Common Area in Henderson, Nevada* (NDEP 2008b). A quality assurance/quality control (QA/QC) review of the analytical results was conducted during the sampling events. According to both NDEP's and USEPA's Data Usability Guidance, there are six principal evaluation criteria by which data are judged for usability. The six criteria are:

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[7] Revised validation procedures have been specified in NDEP's guidance document Revisions to Data Validation of Organic Data based on June 2008 National Functional Guidelines for Superfund Organic Methods Data Review – USEPA-540-R-08-01 (NDEP 2009a). Because these data were collected and validated prior to March 2009, these revised procedures were not employed. The primary changes relative to the 1999 USEPA guidance and SOP-40 (BRC, ERM and MWH 2008) are associated with the manner in which blanks are evaluated and where data are rejected due to very low internal standards. A review of the data indicates that for this dataset three VOC qualifiers would not have been applied under the new validation guidelines. In particular, dichloromethane in three soil samples (DBSA-27-Q-5, DBSA-3-Q-5, and DBSA-3-Q-10) would not have been qualified as non-detect; however, detections of dichloromethane are not likely to change the findings regarding the usability of the background metals and radionuclide data.

- availability of information associated with site data;
- documentation;
- data sources;
- analytical methods and detection limits;
- data review; and
- data quality indicators (DQIs), including precision, accuracy, representativeness, comparability, and completeness.

In addition to the six principal evaluation criteria, NDEP's Data Usability Guidance includes a step for data analysis. A summary of these six criteria for determining data usability is provided below. Data usability evaluation tables are provided electronically in Appendix E.

Criterion I – Availability of Information Associated with Deep Soil Background Data

The usability analysis of the deep soil background data requires the availability of sufficient data for review. The required information is available from documentation associated with the data collection efforts. Data have been validated per the NDEP-approved DVSR (BRC and ERM 2008). The following lists the information sources and the availability of such information for the data usability process:

- Background description and objectives provided in the NDEP-approved Work Plan (DBSA 2007) and in Section 1.
- A Site map with sample locations is provided in Figure 1.
- Sampling design and procedures were provided in the NDEP-approved Work Plan (DBSA 2007) and discussed in Sections 2.1 and 2.2.
- Analytical methods and detection limits are provided in the Work Plan.
- A complete dataset is provided in Appendix B.[8]

[8] The data presented in Appendix B includes all data collected during the 2008 Deep Soil Background Investigation, including chemical data other than metals and radionuclides.

- Field conditions and physical parameter data as applicable to the background dataset are provided in Appendix B.

- The laboratory provides a narrative with each analytical data package outlining any problems encountered in the laboratory, control limit exceedance, and rationale for any deviations from protocol. These narratives are included as part of the DVSR (BRC and ERM 2008).

- QC results are provided by the laboratory, including blanks, replicates, and spikes. The laboratory QC results are included as part of the DVSR (BRC and ERM 2008).

- Data flags used by the laboratory were defined adequately

- Electronic files containing the raw data made available by the laboratory are included as part of the DVSR (BRC and ERM 2008).

<u>Criterion II – Documentation Review</u>

The objective of the documentation review is to confirm that the analytical results provided are associated with a specific sample location and collection procedure, using available documentation. For the purposes of this data usability analysis, the chain-of-custody forms prepared in the field were reviewed and compared to the analytical data results provided by the laboratory to ensure completeness of the dataset as discussed in the DVSR (BRC and ERM 2008). Based on the documentation review, all samples analyzed by the laboratory correspond to their respective geographic locations as discussed in Section 2 and shown in Figure 1. The samples were collected in accordance with the NDEP-approved Work Plan (DBSA 2007) and SOPs developed for the BMI Common Areas as provided in the FSSOP (BRC, ERM and MWH 2008). Field procedures included documentation of sample times, dates and locations, and other sample-specific information (*e.g.*, sample depth). Information from field forms generated during sample collection activities was imported into the project database.

The analytical data were reported in a format that provides adequate information for evaluation, including appropriate quality control measures and acceptance criteria. Each laboratory report describes the analytical method used, provides results and detection limits on a sample-by-sample basis, and provides the results of appropriate quality control samples (*e.g.*, laboratory control spike samples, sample surrogates and internal standards [organic analyses only], and MS samples). All laboratory reports provided the documentation required by USEPA's Contract Laboratory Program (USEPA 1999 and 2004) which includes chain of custody records, calibration data, QC results for blanks, duplicates, and spike samples from the field and laboratory, and all supporting raw data generated during sample analysis. Reported sample analysis results were imported into the project database.

Criterion III –Data Sources

The review of data sources is performed to determine whether the analytical techniques used in the site characterization process are appropriate. The data collection activities were primarily developed to characterize a broad spectrum of background metals and radionuclides. The State of Nevada is in the process of certifying the laboratories used to generate the analytical data. As such, standards of practice in these laboratories follow the quality program developed by the Nevada Revised Statutes (NRS) and are within the guidelines of the analytical methodologies established by the USEPA.

Given previous issues with analysis of radionuclides at the BMI Complex (NDEP 2009b), note that all radionuclide analyses underwent full dissolution preparatory methods. These preparatory methods and analyses are consistent with those used for the 2005 BRC/TIMET background data and the 2008 Supplemental background data.

Based on the review of the available information, the data sources for chemical and physical parameter measurements are adequate for use.

Criterion IV – Analytical Methods and Detection Limits

In addition to the appropriateness of the analytical techniques evaluated as part of Criterion III, it is necessary to evaluate whether the detection limits are low enough to allow adequate characterization of the data. At a minimum, this data usability criterion can be met through the determination that routine USEPA reference analytical methods were used in analyzing the samples. The Work Plan identifies the USEPA methods that were used in conducting the laboratory analysis of soil samples. Each of the identified USEPA methods is considered the most appropriate method for the respective constituent class and each was approved by NDEP as part of the Work Plan (DBSA 2007).

Laboratory SQLs for metals were based on those outlined in the reference method, the Work Plan, and the project QAPP (BRC and ERM 2009b). In accordance with respective laboratory SOPs, the analytical processes included instrument calibration, laboratory method blanks, and other verification standards used to ensure quality control during the analyses of collected samples.

Even though the same analytical methods were used for the samples collected as part of this background study and the prior background sampling events, the SQLs for several metals vary between those events. Datasets with multiple sample-specific detection limits are not uncommon in analytical chemistry data. This has minimal effect on datasets for analytes with high frequencies of detection. However, it is of concern for datasets with numerous non-detections, for which variable SQLs can result in difficulties in differentiating whether datasets are actually different or merely an artifact of detection limits. As evidence of this potential problem, as discussed in Sections 2.2 and 3.5, in a few instances (*i.e.*, for antimony, cadmium, chromium (VI), selenium, silver, thallium, and tungsten) the variations in SQLs for the background data have potentially caused differences in frequency of detection (FOD).

Therefore, it should be recognized that having differences in SQLs for a given analyte may compromise statistical analyses in this report and future background comparisons. As discussed in Section 2.2, eight constituents were detected in fewer than fifty percent of the samples--differences in detection limits are anticipated to have the greatest effect on calculations of descriptive statistics and statistical analyses for these constituents. For datasets with relatively low frequencies of detection and variable SQLs, particularly when SQLs for non-detects are among the largest reported values in the datasets, then conclusions from the statistical test results should be treated with caution, because the assumptions underlying the statistical tests, such as background comparison tests, might not be adequately satisfied. In these cases, greater emphasis should be given to the summary statistics (*e.g.*, mean, median, maximum detect, maximum non-detect, frequency of detection) and plots of the data.

Radionuclides represent a different situation than metals. Radionuclide detection frequencies are considered using the minimum detectable activity (MDA) as the reported value below which measured results are considered "non-detections." As discussed in Section 3.1.3, when radionuclides are not detected at activities greater than the MDA, the laboratory reports the measured activity, including those lower than the MDA. Therefore, all reported results for radionuclides are used in the statistical evaluations, regardless of where they fall relative to the MDA. The MDA and radionuclide detection frequencies relative to the MDA have no effect on statistical comparisons of the radionuclide data.

Criterion V – Data Review

The data review portion of the data usability process focuses primarily of the quality of the analytical data received from the laboratory. However for this study, the data review also included evaluation of the organics data to identify any evidence of impacts that might indicate that these locations are not suitable for consideration as background. Both elements are discussed below.

Data Quality Review. Soil sample data were subject to data validation. The DVSR was prepared as a separate deliverable (BRC and ERM 2008). The analytical data were validated according to the internal procedures using the principles of USEPA National Functional Guidelines (USEPA 1999 and 2004) and were designed to ensure completeness and adequacy of the dataset. Any analytical errors and/or limitations in the data have been addressed and an explanation for data qualification provided in the respective data tables. The results of ERM's data review for these issues are presented in the DVSR (BRC and ERM 2008) and are summarized as qualifiers in the data tables in Appendix E.

For some analytical results, quality criteria were not met and various data qualifiers were added to indicate limitations and/or bias in the data. The definitions for the data qualifiers, or data validation flags, used during validation are those defined in SOP-40 (BRC, ERM and MWH 2008) and the project QAPP (BRC and ERM 2009b). Sample results are rejected based on findings of serious deficiencies in the ability to properly collect or analyze the sample and meet QC criteria. Only rejected data are considered unusable for decision-making purposes. A small subset of organic chemical data collected during the 2008 deep soil background investigation were rejected (approximately two percent). Non-detect VOC data in two samples were rejected due to high temperatures of the storage coolers. In addition, 12 mercury results, 13 total cyanide results, one chloride result and one chlorine result were rejected due to very low MS recoveries. Sample results qualified as estimated indicate an elevated uncertainty in the value. A bias flag may have been applied to indicate a direction of the bias. Estimated analytical results are included in the deep soil background dataset.

Evaluation for Evidence of Impacts/Background Unsuitability. In addition, under this criterion, the OCP, SVOC and VOC data were evaluated to identify any evidence of impacts that might indicate that these locations are not suitable for consideration as background. The following analyses were conducted for this purpose:

- Surface soil samples collected from five locations (DBSA-01, DBSA-26, DBSA-27, BDSA-32, and DBSA-33) were analyzed for OCPs. As summarized in Table 3, OCPs were only detected in one sample (DBSA-01). These detections (2,4-DDE, 4,4-DDD, 4,4-DDE, 4,4-DDT, and beta-BHC) were relatively low; the maximum reported detection was 0.016 mg/kg of 4,4-DDE.

- Subsurface samples collected from 5 and 10 feet bgs from locations DBSA-01 and DBSA-02 were analyzed for SVOCs. As summarized in Table 3, no SVOCs were reported as detections in these four samples.

- Subsurface samples collected from 5 and 10 feet bgs from all 21 background sampling locations were analyzed for VOCs. As summarized in Table 3, the following VOCs were reported as detections[9]: 1,2,4-trimethylbenzene, acetone, dichloromethane, and toluene. These detections, which are relatively low, are as follows:

Constituent	Locations where Detected	Maximum Detection (mg/kg)
1,2,4-Trimethylbenzene	DBSA-01 (5 ft bgs) DBSA-04 (5 and 10 ft bgs) DBSA-11 (10 ft bgs) DBSA-13 (5 and 10 ft bgs) DBSA-23 (10 ft bgs) DBSA-27 (10 ft bgs) DBSA-32 (5 and 10 ft bgs)	0.00075 mg/kg (DBSA-11)
Acetone	DBSA-01 (5 ft bgs) DBSA-02 (10 ft bgs) DBSA-03 (10 ft bgs) DBSA-04 (5 ft bgs) DBSA-11 (5 and 10 ft bgs) DBSA-14 (5 and 10 ft bgs) DBSA-27 (5 and 10 ft bgs) DBSA-33 (5 and 10 ft bgs)	0.036 mg/kg (DBSA-04)

[9] It should be noted that the non-detect VOC results for DBSA-01 (5 ft and 10 ft bgs depths) were rejected due to cooler temperature exceedances, as noted above.

Constituent	Locations where Detected	Maximum Detection (mg/kg)
Dichloromethane	DBSA-01 (5 ft bgs) DBSA-02 (5 ft bgs)	0.0049 mg/kg (DBSA-01)
Toluene	DBSA-27 (10 ft bgs) DBSA-29 (10 ft bgs)	0.00027 mg/kg (DBSA-27)

Analytical results for VOC, SVOC, and OCP analyses performed on samples collected from shallow soil intervals at the 21 presumed background soil locations were used to assess whether the sampling locations had been impacted by other anthropogenic sources. Given (1) the relatively low reported organic chemical detections, (2) the fact that they are associated with soil intervals appreciably shallower than those assessed for background metals and radionuclide data, and (3) the lack of historical uses associated with the sampling locations, there do not appear to have been significant impacts from other anthropogenic sources and there is no evidence suggesting that the use of the metals and radionuclide data from this investigation for determining background conditions would not be appropriate.

Criterion VI – Data Quality Indicators

DQIs are used to verify that sampling and analytical systems used in support of project activities are in control and the quality of the data generated for this project is appropriate for making decisions affecting future activities. The DQIs address the field and analytical data quality aspects as they affect uncertainties in the data collected. The DQIs include precision, accuracy, representativeness, comparability, and completeness (PARCC). The project QAPP provides the definitions and specific criteria for assessing DQIs using field and laboratory QC samples and is the basis for determining the overall quality of the dataset. Data validation activities included the evaluation of PARCC parameters, and all data not meeting the established PARCC criteria were qualified during the validation process using the guidelines presented in the National Functional Guidelines (USEPA 1999 and 2004).

Precision is a measure of the degree of agreement between replicate measurements of the same source or sample. Precision is expressed by relative percent difference (RPD) between replicate measurements. Replicate measurements can be made on the same sample or on two samples from the same source. Precision is generally assessed using a subset of the measurements made. The precision of the data was evaluated using several laboratory QA/QC procedures such as laboratory duplicates, laboratory control sample (LCS) and laboratory control sample duplicate

(LCSD), and MS and MSD results. The review of the results of these procedures showed that field duplicate and laboratory duplicate imprecision does occur, but the imprecision is sporadic and not specific to any one analyte or sample, as demonstrated in the data usability tables where all of the qualified data are presented (Appendix E). Field duplicate imprecision affects one pair each of barium, bromide, bromine, chromium (VI), cobalt, fluoride, manganese, silicon, sodium, strontium, total kjeldahl nitrogen, and tungsten, two pairs each of lead, and palladium, and three pairs for nitrate (as N), sulfate, and total organic carbon. One result for uranium-238 was qualified based on laboratory duplicate imprecision. Therefore, there do not appear to be any widespread data usability issues associated with precision. Note that field duplicates are treated as independent samples in the statistical analysis of the deep background data. Review of the data indicated that the variability of the field duplicates was similar to the variability across background samples.

Accuracy measures the level of bias that an analytical method or measurement exhibits. To measure accuracy, a standard or reference material containing a known concentration is analyzed or measured and the result is compared to the known value. Several QC parameters are used to evaluate the accuracy of reported analytical results:

- Holding times and sample temperatures;
- LCS percent recovery;
- MS/MSD percent recovery;
- Spike sample recovery (inorganics)
- Surrogate spike recovery; and
- Blank sample results.

As mentioned in the Criterion V discussion, several data points were rejected based on accuracy issues due to sample temperature (VOCs only) and low MS recoveries for total cyanide, chlorine and chloride. The rejection of these data points is not anticipated to affect the quality of the metals and radionuclide deep background data. There is a potential that high temperatures contributed to loss of VOCs and an impacted area could have been missed. However, data requiring rejection due to sample temperature were limited to two samples (DBSA-1-Q-5 and DBSA-1-Q-10). There were a number of other VOC samples with usable data to provide that determination as discussed under Criterion V.

One sample (DBSA-1-Q-50) for chlorine and chloride was rejected due to low MS recoveries. Thirteen results for total cyanide (DBSA-27-Q-60, DBSA-27-Q-70, DBSA-27-Q-80, DBSA-27-Q-90, DBSA-T-100, DBSA-32-Q-20, DBSA-32-Q-30, DBSA-32-Q-40, DBSA-32-Q-50, DBSA-32-Q-60, DBSA-32-Q-70, DBSA-32-T-80, and DBSA-32-T-95) were rejected due to low MS recoveries. While eight percent of total cyanide results were rejected, its effect on the usability of the dataset is likely minimal due to the usability of other total cyanide results as well as the broad spectrum of chemical classes which underwent analysis. Detailed discussions of and tables with specific exceedances, with respect to precision and accuracy, are provided in the data usability tables (Appendix E) and in the NDEP-approved DVSR (BRC and ERM 2008) (Appendix B).

Representativeness is the degree to which data accurately and precisely represent a characteristic of the population at a sampling point or an environmental condition (USEPA 2002). There is no standard method or formula for evaluating representativeness, which is a qualitative term. Representativeness is achieved through selection of sampling locations that are appropriate relative to the objective of the specific sampling task, and by collection of an adequate number of samples from the relevant types of locations. The sample data collected are representative of background conditions for the lithologies identified. The deep background data were collected in accordance with the SOPs developed for the BMI Common Areas as provided in the FSSOP (BRC, ERM and MWH 2008). Therefore, the sampling protocols are representative of the protocols being used to collect the data to which the deep background data will be compared. There were preservation issues in regards to high temperatures of the storage coolers; however, this will have little to no effect on the quality of the metals and radionuclide data. The organic data was collected only to determine if there were anthropogenic sources and only two VOC samples were severely affected enough to require rejection. This is not likely to have affected the determination regarding anthropogenic sources.

Completeness is commonly expressed as a percentage of measurements that are valid and usable relative to the total number of measurements made. Analytical completeness is a measure of the number of overall accepted analytical results, including estimated values, compared to the total number of analytical results requested on samples submitted for analysis after review of the analytical data. A small subset of the data was eliminated due to data usability concerns. The percent completeness for the dataset is 98 percent.

Comparability is a qualitative characteristic expressing the confidence with which one dataset can be compared with another. The desire for comparability is the basis for specifying the analytical methods; these methods are consistent with those used in the 2005 BRC/TIMET shallow background soil and the 2008 supplemental shallow background soil datasets. The comparability goal is achieved through using standard techniques to collect and analyze representative samples and reporting analytical results in appropriate units. As mentioned before, the data were collected in accordance with the SOPs developed for the BMI Common Areas as provided in the FSSOP (BRC, ERM and MWH 2008) and samples were analyzed in accordance with the project QAPP (BRC and ERM 2009b). Therefore, the sampling techniques and analytical procedures for the deep background are comparable to other data collected for the BMI Common Areas. Despite this, as discussed in more detail in Sections 2.2 and 3.5, the 2008 deep background datasets have variable SQLs for certain metals. In the case of antimony, cadmium, chromium (VI), selenium, silver, thallium, and tungsten, all of which have relatively low frequencies of detection, the variable SQLs result in difficulties in differentiating whether the background datasets are actually different or merely an artifact of detection limits. Similar problems could arise during comparisons of background datasets to Site samples.

3.0 STATISTICAL METHODS

The exploratory data analysis and statistical evaluation of data for deep background soils generally followed industry-standard guidance documents (USEPA 2006a,b; Navy 1999, 2002) and standards agreed upon with NDEP, including the *Guidance on the Development of Summary Statistics Tables* (NDEP 2008c). These guidance documents discuss the use of statistical plots, calculation of summary statistics, treatment of non-detect data, and selection of statistical tests. In addition, the statistical approaches employed are consistent with those used in prior background data evaluations performed for the BMI Common Areas and vicinity (BRC/TIMET 2007; BRC and ERM 2009a). The following sections discuss data preparation, statistical plots, summary statistics and statistical tests, and the types of comparisons conducted.

3.1 DATA PREPARATION

3.1.1 Spatial Independence Assumptions

There are 21 soil boring locations that were sampled for the deep soil background dataset, for a total of 173 samples from various depth intervals,[10] including field duplicates. The 21 soil boring locations/173 samples are treated as spatially independent in this background soil study. The concentrations of each analyte at each sample location and depth is dependent on the origin of the sediment and the composition of the parent material (with the exception of anthropogenic deposition of analytes such as lead).

Naturally occurring variability is associated with the deposition of sediments, and these variations may never be fully characterized and result in unexplainable data clusters. The naturally occurring variability may be impacted by sediment transport, leaching, weathering, and other geochemical processes within the alluvium; therefore, when statistical tests are performed, it is expected that some spatial correlation may be seen, but the impact of this on the background evaluation is assumed to be negligible. All background data were treated as independent in the statistical tests and calculations performed for this study. Treating the data points as independent is more conservative since the larger number of samples will result in narrower confidence intervals when comparing the background data to Site data. Note also that the sample results

[10] This tally includes only those samples that are associated with intervals deeper than 10 feet bgs, and were analyzed for metals and/or radionuclides. Some sample locations/depths were analyzed for hexavalent chromium only; in addition, not all sample locations/depths were analyzed for radionuclides. For this reason the totals from the text and Table 1 do not match the metal/radionuclide-specific total sample numbers in Table 2.

from the 25 field duplicates were also treated as independent. There is no obvious indication in the data that the variance between duplicate results is very different than the variance between other sample results.

3.1.2 Data Filtering Rules

As discussed in Section 2.3, results generated during the deep soil background investigation were validated. In order to prepare the metals and radionuclide datasets for statistical evaluation, the following results were removed from the dataset:

- All laboratory QC samples;
- All rejected (R-qualified) data; and
- Non-metals/non-radionuclides (*e.g.*, organic analyses, percent moisture).

Split samples, which are typically not included in datasets subjected to statistical analysis, were not collected during the deep soil background investigation; field duplicates were collected separately from their original sample and are thus considered independent samples that can appropriately be included in the statistical analyses.

3.1.3 Treatment of Data Qualified as Non-Detections

When radionuclides were not detected at activities greater than the MDA, the laboratory reported the measured activity. Treatment of radionuclide data qualified as non-detections followed U.S. Department of Energy (DOE) guidance (DOE 1997), which states that, for radionuclide activity data:

> "All of the actual values, including those that are negative, should be included in the statistical analysis. Practices such as assigning a zero, a detect limit value, or some in-between value to the below-detectable data point, or discarding those data points can severely bias the resulting parameter estimates and should be avoided."

Therefore, for radionuclides, the actual reported activities (in pico Curies per gram [pCi/g]) were used without censoring to calculate all descriptive statistics (Tables 4 through 14), prepare plots (*e.g.*, boxplots), and conduct statistical analyses presented in this report.

For metals, a value of one-half the SQL was used as a replacement value for non-detected data for parametric and nonparametric analysis of variance (ANOVA, Kruskal-Wallis tests), and calculation of parametric and nonparametric correlation coefficients. The summary statistics (Tables 4 through 14) and plots (boxplots, individual value plots, and probability plots in Appendix F) incorporate the full SQL for non-detects.

It should be noted that the method detection limit (MDL) is established by the laboratories and represents the minimum concentration of a substance that can be measured and reported with 99 percent probability that the analyte concentration is greater than zero. MDLs are established using matrices with little or no interfering species using reagent matrices and are considered the lowest possible reporting limit. Often, the MDL is represented as the instrument detection limit.

The SQL is defined as the MDL adjusted to reflect sample-specific actions, such as dilution or use of smaller aliquot sizes, and takes into account sample characteristics, sample preparation, and analytical adjustments. It represents the sample-specific detection limit and all non-detected results are reported to this level. Because the SQL is a sample-specific detection limit, for the dataset as a whole there may be instances where the maximum non-detect value may be higher than the lowest detected concentration, the median SQL for a chemical in a dataset is greater than the median detected concentration, or median SQL for non-detects are different across different datasets. It is recognized that these limitations may compromise statistical analyses in this report and potential future background comparisons.

3.2 STATISTICAL PLOTS

Statistical plots are used in exploratory data analysis to show characteristics and relationships of the data, to evaluate fit to a normal distribution, to identify anomalous data points or outliers, and to provide a general overview of the data. Probability plots, boxplots, and individual value plots were constructed as part of the data evaluation for this investigation. Preliminary evaluation of the data included an assessment of data characteristics through graphical and quantitative analysis. The deep soil background data were summarized overall and by stratigraphic classification (*i.e.*, Qal/McCullough source, Qal/River source, Qal/Mixed source, and UMCf), with data plotted for the various groupings. The graphical analysis of the deep soil background analytical data is described in the following sections, and Appendix F contains the following statistical plots for the datasets, grouping data for each dataset by chemical:

- A series of boxplots for the 2008 deep soil dataset, along with the 2005 BRC/TIMET and 2008 Supplemental shallow soil datasets;
- A series of probability plots for the 2008 deep soil dataset;

- A series of individual value plots for the 2008 deep soil dataset; and
- A series of boxplots for the Qal/McCullough, Qal/Mixed, and Qal/River units for each of the depths evaluated (0 ft bgs, 10 ft bgs, and deep samples).

Probability Plots. The distribution plots for each chemical include a probability plot that shows how well the dataset for the chemical fits a normal or lognormal distribution. Probability plots are also useful to visually identify outliers and to evaluate the possible presence of multiple populations within a dataset. For this study, probability plots are also useful for comparing datasets for the various lithologies evaluated. Potential multiple populations may be identified by inflection points on the probability plot when initially exploring the data. However, inflection points are not defined statistically, have been found to be unreliable, and should be used with considerable caution (DON 2002).

The probability plots are graphs of values, ordered from lowest to highest and plotted against a standard normal or lognormal distribution function. The vertical axis is scaled in units of concentration (or activity, in the case of radionuclides), and the horizontal axis is scaled in units of the normal/lognormal distribution function. The vertical scale is plotted as a linear scale (concentration versus normal/lognormal quantile) and populations of data that plot approximately as a straight line in a linear scale are referred to as normally distributed (or lognormally distributed).

Boxplots. Boxplots provide a method for comparing data groupings or datasets side by side. The boxplots simultaneously display the full range of data, as well as key summary statistics, such as the median, 25th and 75th percentiles, and minimum and maximum values. A boxplot is a box (a rectangle) with lines. The length of the box is the interquartile range; therefore, the box represents the middle 50 percent of the data. The top and bottom of the box are the 25th and 75th percentiles of the distribution. The width of the box is arbitrary. The line in the middle of the box depicts the median value (the 50th percentile) of the population. The upper (lower) whisker extends to the highest (lowest) data value within the upper (lower) limit. Where the upper (lower) limit = third (first) quantile + (-) 1.5 * [third quantile-first quantile]. These plots show the symmetry of the dataset, the range of data, and a measure of central tendency (median). Symbols used for the data points distinguish between detections (filled circle) and non-detect (open circle) results.

As noted in the previous section, probability and boxplots were used for identifying anomalous data points (outliers) and data clusters in the deep soil background dataset. All anomalous data points and clusters were investigated further. As indicated above, outliers shown on the boxplots are indicated with a * symbol.

The plots in Appendix F are presented to provide a comprehensive overview of the deep soil background dataset for soils and to compare the different stratigraphic units. The plots also compare the deep background dataset to the 2005 and 2008 shallow soil background datasets.

Scatterplots. A scatterplot uses a Cartesian coordinate system to display values for two variables for a set of data. The data are displayed as a collection of points, each having the value of one variable determining the position on the horizontal axis and the value of the other variable determining the position on the vertical axis.

Scatterplots were constructed for those constituent pairs with significant correlation coefficients (Appendix H). Scatterplots were visually examined and best professional judgment was used to ascertain whether high concentration outliers occur "near" the least-square linear trend line. Where high-concentration outliers occur "near" the trend line, one may infer that these concentrations are consistent with background concentrations.

3.3 DESCRIPTIVE SUMMARY STATISTICS

Descriptive summary statistics for metals and radionuclides were calculated for the deep soil background dataset (Table 4 for all deep units combined, and Tables 5 through 8 for deep units Qal/McCullough, Qal/River, Qal/Mixed, and UMCf, respectively). The descriptive summary statistics calculated for each analyte include the sample size, number of detections, the minimum and maximum concentration, the median, the mean, and the 25th and 75th percentiles (quantiles); separately for both censored and detected data. Note that frequency of detection is calculated for radionuclides in terms of the proportion of sample results that are greater than the sample specific MDA. However, for all other radionuclide data summaries and statistical analyses the uncensored data are used (see Section 2.4).

For comparison purposes, Tables 9 through 14 present descriptive summary statistics for the Qal/River data collected during the 2008 Supplemental shallow soil investigation,[11] and the Qal/McCullough and Qal/Mixed data collected during the 2005 shallow soil investigation, respectively.

3.4 IDENTIFICATION AND TREATMENT OF OUTLIERS

The data collected for this study are intended to represent background conditions for the deeper soils of the BMI Common Areas. Several lines of evidence are used to verify that these data are representative of these background conditions. For example, background soil samples were collected from known/suspected unimpacted areas upgradient of the Site industrial areas, and the organic chemical data did not provide compelling evidence suggesting that data were inappropriate for characterizing background conditions (Criterion V of Section 2.4). A further line of evidence involves an evaluation of outliers in this background dataset. Statistical outliers are data points that are extremely large or small relative to the rest of the data, and may not, therefore, be representative of the population sampled (USEPA 2000a).

For this investigation, boxplots[12], individual value plots, and probability plots were used to identify statistical outliers that would undergo further examination (see Appendix F). If an outlier was identified, the next step was to confirm that the datum was not a result of a transcription or other verifiable error. If confirmed not to be an error, correlation analyses were conducted and used to identify those constituent pairs that should be visually examined in scatterplots to ascertain whether high-concentration outliers were consistent with the background dataset (see Section 3.7.4).[13]

Based on the overall findings of the outlier analysis, statistical outliers represented only a small proportion of the entire dataset[14] and no consistent pattern was observed among outliers. This

[11] Qal/River data from the 2005 BRC/TIMET background dataset were not used in this report. The 2005 BRC/TIMET Qal/River data are considered more representative of the southern part of the River Mountains; while the site is closer to the northern part of the River Mountains range. The Qal/River data from the 2008 Supplemental shallow soil background investigation are considered more representative of northern part of the River Mountains and therefore more applicable for use for the Site. Additional discussion on this issue is provided in the *2008 Supplemental Shallow Soil Background Report* (BRC and ERM 2009a).

[12] Statistical outliers within the 2008 deep dataset were defined as those points corresponding to detected metal concentrations or radionuclide activities (*i.e.*, ignoring non-detection report limit artifacts) that were greater than 1.5 times the interquartile range for the (i) combined depth plots and (ii) individual depth plots, and are shown as an asterisk (*) on the boxplots (see Section 3.2).

[13] Scatterplots and correlation analyses were performed with the statistical outliers included in the dataset.

[14] It is not unusual for a dataset of this size to have some outliers.

supports the premise that these data are representative of naturally occurring background conditions. Given the lack of scientifically defensible reasons to consider these statistical outliers to be incongruous with background conditions (*i.e.*, "true" outliers), these data were considered representative of background and retained in the deep background soil dataset.

3.5 FREQUENCY OF DETECTION

As noted in Section 2.2, antimony, cadmium, chromium (VI), tungsten, and silver were detected at noticeably higher frequencies in the deep background samples than in those from the shallow background investigations, and mercury, selenium and thallium were detected at noticeably lower frequencies in the 2008 deep samples than in the shallow background studies. The statistical summaries in Tables 4 through 14 were evaluated to assess the likely influence of SQLs on these observed detection frequencies. This evaluation determined that variations in SQLs are likely to have had effects on detection frequencies for certain constituents (*i.e.*, antimony, cadmium, selenium, and silver), as summarized below.

Antimony	**2008 Deep Data**	**2008 Supplemental Shallow Data**	**2005 Shallow Data**
Number of Samples	163	33	120
Percent Detection[15]	95.1%	39.4%	40.8%
Mean SQLs for Non-Detects (mg/kg)	0.105	0.126	0.0394 to 0.33
Mean Detected Concentration (mg/kg)	0.148 to 0.222	0.318 to 0.378	0.19 to 0.287
Assessment of SQL Effects on FOD	The 2005 and 2008 shallow soil FOD for antimony are comparable, at less than half the FOD of the 2008 deep data. For the 2008 shallow data, the mean SQLs are lower than the mean detections, and it is assumed that SQLs are not affecting the FOD. However, the upper range of mean SQLs for the 2005 shallow data is higher than the ranges of mean detections, and SQLs are suspected as being potential contributors to the lower FOD for that event.		

[15] For all summary tables in this section, the number of samples and value for Percent Detection entries reflect the full dataset for each event, as taken from Table 2. The range of values provided for the mean SQL and mean detection were derived from Tables 5 through 8 (2008 Deep Data), Tables 9 and 10 (2008 Supplemental Shallow Data), and Tables 11 through 14 (2005 Shallow Data). In cases where there was no variation between the mean values a single value is provided herein.

Cadmium

	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Number of Samples	163	33	120
Percent Detection	85.3%	63.6%	13.3%
Mean SQLs for Non-Detects (mg/kg)	0.01	0.04	0.129
Mean Detected Concentration (mg/kg)	0.0871 to 0.109	0.108 to 0.144	0.11 to 0.133
Assessment of SQL Effects on FOD	The cadmium detections are comparable across the sampling events, primarily estimated results. The mean non-detect SQLs for the 2005 data are substantially higher than for the other events, and are higher than the majority of the detections during the three events. Based on this, it is likely that the higher SQLs of the 2005 event are one cause of differences in FODs between the 2008 and 2005 sampling events.		

Chromium (VI)

	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Number of Samples	158	33	104
Percent Detection	24.1%	0%	0%
Mean SQLs for Non-Detects (mg/kg)	0.16 to 0.21	0.41 to 0.56	0.25 to 0.32
Mean Detected Concentration (mg/kg)	0.19 to 0.41	- -	- -
Assessment of SQL Effects on FOD	The deep soil detections are primarily estimated results. The SQLs for the 2008 deep data are lower than those associated with the 2008 shallow and 2005 event. The upper range of detections in the 2008 deep data are higher than the 2005 SQLs, however, many of the reported detections for the 2008 deep data are lower than the SQLs for the 2005 data, and the 2008 deep detections are generally lower than the SQLs for the 2008 shallow data. Based on this, it is possible that the higher SQLs of the shallow events are one cause of differences in FODs between the deep and shallow sampling events. However, because many of the detections in the 2008 deep data are higher than SQLs for the 2005 shallow data (and therefore should have been detected if present), lithologic differences may also contribute to the differences in FOD between the 2005 shallow and 2008 deep data.		

Mercury

	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Number of Samples	151	33	120
Percent Detection	36.4%	0%	77.5%
Mean SQLs for Non-Detects (mg/kg)	0.00668	0.00668	0.0072
Mean Detected Concentration (mg/kg)	0.00832 to 0.0126	- -	0.0145 to 0.0247

Mercury

	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Assessment of SQL Effects on FOD	The 2005 mercury detections are higher than those associated with the 2008 event. Both the 2005 and 2008 detections are primarily estimated results. The non-detect SQLs for all three events are comparable, and are an order of magnitude lower than most of the reported detections. Therefore, it does not appear that variations in SQLs are the causes of variations in the FODs, and the FOD variations are more likely due to lithologic differences.		

Selenium

	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Number of Samples	163	33	120
Percent Detection	0%	0%	43.3%
Mean SQLs for Non-Detects (mg/kg)	0.32 to 0.323	0.32	0.158
Mean Detected Concentration (mg/kg)	- -	- -	0.13 to 0.34
Assessment of SQL Effects on FOD	The 2008 selenium SQLs for non-detections are higher than those associated with the 2005 event, and are higher than the 2005 detections. Therefore, it is likely that the higher SQLs of the 2008 events are one cause of differences in FODs between the 2008 and 2005 sampling events.		

Silver

	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Number of Samples	163	33	120
Percent Detection	100%	42.4%	13.3%
Mean SQLs for Non-Detects (mg/kg)	- -	0.11	0.261
Mean Detected Concentration (mg/kg)	0.135 to 0.251	0.0743 to 0.126	0.056 to 0.0613
Assessment of SQL Effects on FOD	The 2005 SQLs for non-detects are higher than the majority of the detections during the other two events. Therefore, it is likely that the higher SQLs of the 2005 event are one cause of differences in FODs between the 2008 and 2005 sampling events. However, the 2008 shallow soil SQLs are adequately low such that detections in the ranges observed in the deep soil samples would be reported. Based on this, differences in the lithologic units (shallow vs. deep) also appear to account in part for the FOD differences.		

Thallium

	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Number of Samples	163	33	120
Percent Detection	2.5%	18.2%	35%

Thallium

	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Mean SQLs for Non-Detects (mg/kg)	0.2 to 0.202	0.3	0.543
Mean Detected Concentration (mg/kg)	0.228	0.758	0.853 to 1.33
Assessment of SQL Effects on FOD	The 2005 dataset has a higher FOD than the 2008 datasets, despite the fact that the 2005 SQLs are higher than those associated with the 2008 events. The 2005 detections are higher than the range of the 2008 SQLs. Therefore, it is likely that the differences in SQLs are one cause of differences in FODs between the 2008 and 2005 sampling events.		

Tungsten

	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Number of Samples	163	33	104
Percent Detection	33.1%	6.1%	0%
Mean SQLs for Non-Detects (mg/kg)	0.2 to 0.203	0.5	0.0175
Mean Detected Concentration (mg/kg)	0.38 to 0.454	0.96 to 1.0	- -
Assessment of SQL Effects on FOD	The 2005 SQLs for non-detects are an order of magnitude lower than those for the 2008 data, which had a much higher FOD. The 2008 detections are higher than the 2005 SQLs. Therefore, it is likely that the differences in SQLs are one cause of differences in FODs between the 2008 and 2005 sampling events.		

As noted above in Section 3.4, review of the statistical plots identified several outliers in the dataset. As discussed in Section 3.4, several outliers were associated with constituents with large percentages of non-detections (*i.e.*, boron, chromium (VI), mercury, niobium, platinum, selenium, thallium, and tungsten). With the exception of these samples, there were no other samples that exhibited consistent outliers (high or low biased) in the datasets, and there is no consistent pattern to the data that would suggest that the data are not indicative of naturally occurring background conditions.

3.6 STATISTICAL METHODS

The main statistical problem is to determine if the background data are from more than one background population based on statistical comparisons of data from (1) different geological settings, including 2008 Deep Soil investigation, 2008 Supplemental Shallow investigation and 2005 BRC/TIMET investigation sample locations; and (2) sampling depth intervals (0 to 0.5 feet, 9 to 11 feet and Deep soils [$\geq$ 20 ft bgs]). To answer these questions, several groups of data were compared using statistical tests and statistical plots (Section 3.2). These included comparison of the following datasets:

- Comparison of the 2008 deep soil dataset among stratigraphic units (Qal/McCullough, Qal/River, Qal/Mixed, and UMCf);
- The Qal/McCullough unit datasets - deep data from the 2008 Deep Soil Background investigation, and surface soil and 10 ft bgs data from the 2005 BRC/TIMET dataset;
- The Qal/River unit datasets - deep data from the 2008 Deep Soil Background investigation, and surface soil and 10 ft bgs data from the 2008 Supplemental Shallow dataset; and
- The Qal/Mixed unit datasets - deep data from the 2008 Deep Soil Background investigation, and surface soil and 10 ft bgs data from the 2005 BRC/TIMET dataset.

In addition, prior to conducting these analyses, comparison of the data associated with the Qal units (McCullough, River, and Mixed) was performed to determine whether data categorized as Mixed was statistically different from the other two units. If no significant differences were observed between the Qal/Mixed data and one or both of the other Qal units, the Qal/Mixed data would have been moved into one of the other Qal datasets as appropriate. However, as discussed below, the Qal/Mixed data were found to exhibit significant differences from the other two Qal units; thus it was retained as a separate Qal unit.

3.6.1 Hypothesis Testing

A common application of statistics is to test a scientific hypothesis. A statistical test examines a set of sample data and, based on the underlying distribution of the data, leads to a decision whether to (i) accept[16] the hypothesis or (ii) reject the hypothesis in favor of accepting an alternative complementary one (Sokal and Rohlf 1981). Accordingly, statistical hypotheses are framed in terms of a null hypothesis (H_o) and an alternative hypothesis (H_a).

In this study, ANOVA/Kruskal-Wallis tests were used to evaluate the null hypothesis that mean/median concentrations are the same among several background populations for a specific

[16] Note that according to classical statistics, the null hypothesis is never proven, as the absence of evidence against the null hypothesis does not establish it. In other words, strictly speaking, one may either "reject" or "fail to reject" the null hypothesis. However, for this study and as commonly used in practice, the term "accept" is used instead of "fail to reject" the null hypothesis (Sokal and Rohlf 1981).

constituent; conversely, the rejection of the null hypothesis results in the acceptance of the alternative hypothesis that the mean/median concentrations are different.

Correlation tests were used to characterize the relationship (or lack thereof) between concentrations of two constituents. The null hypothesis is that there is no correlation between two constituents (*i.e.*, no inter-element correlation); conversely, should this null hypothesis be rejected, one would accept the alternative hypothesis and infer that there exists a relationship (positive or negative) in concentrations between the two constituents.[17]

3.6.2 Statistical Tests

Statistical analyses were conducted to infer whether background datasets are comparable and whether there exist relationships between concentrations of some of the metals. A key characteristic of statistical analyses is whether a parametric or nonparametric statistical test is used. Parametric statistical tests used in this evaluation of deep background concentrations assume the following:

- Samples are independent and drawn randomly from the population.
- Data are normally distributed for each population.

Nonparametric methods/tests are not dependent on a specific distribution (*e.g.*, normal distribution) (Gilbert 1987; Sokal and Rohlf 1981; Zar 1984).[18] These methods do not require estimates of the population variance or mean. Nonparametric statistical tests assume that samples are independent and drawn randomly from the population.

Methods used to evaluate and compare the data groups for this deep background dataset are summarized below. The parametric and nonparametric multiple population comparisons and correlation analyses were performed using SPSS v. 15.[19] Given this study examined potential differences among deep background datasets, two-tailed tests were performed. Consistent with previous studies of background concentrations at BRC (*e.g.*, (BRC/TIMET 2007)), a level of significance (α) equal to 0.05 was used to evaluate the tests (BRC/TIMET 2007).[20]

[17] See Section 3.6.2.4 (Correlation Analysis).
[18] Accordingly, nonparametric tests are also known as distribution-free tests.
[19] The substitution of one-half of the SQL was used for non-detects for Kruskal-Wallis (Section 3.6.2.1) and Kendall tau (Section 3.6.2.4) analyses.
[20] Where appropriate, a confidence level (1-α) of 95 percent confidence was used.

3.6.2.1 Multiple Independent Sample Tests[21]

One-Way Analysis of Variance (ANOVA). The parametric one-way ANOVA tests the hypothesis that multiple (*k*) population means are equal (Sokal and Rohlf 1981; Gilbert 1987; Zar 1984). Where one-way ANOVAs indicated the existence of significant differences among soil strata, the Tukey Honestly Significant Difference (HSD) test (Tukey 1953) was used to conduct pair-wise *post-hoc* comparisons.[22]

Kruskal-Wallis Test. The Kruskal-Wallis test is a nonparametric analog for the one-way ANOVA that is based on ranks and is used to test the equality of medians among multiple (*k*) populations. The underlying distributions of datasets being tested are assumed to have approximately the same shape. The Kruskal-Wallis tests the null hypothesis that several populations have the same continuous distribution. If the null hypothesis is rejected, one may infer that measurements tend to be higher in one or more of the populations. Fundamentally, this test is analogous to a parametric one-way ANOVA with the exception that the measured/observed values are replaced by their ranks. Accordingly, it is an extension of the Wilcoxon-Mann-Whitney test for three or more groups. Where Kruskal-Wallis tests indicated the existence of significant differences among soil strata, examinations of boxplots were used to evaluate pair-wise *post-hoc* comparisons.[23]

3.6.2.2 Adjustment for Use of Multiple Tests

An adjustment may be applied when multiple hypotheses of no effect are tested. Note that by random chance alone, approximately 1 out of every 20 hypothesis tests on the same dataset is expected to be statistically significant at a level of 0.05 if the tests are independent (α = 0.05; Sokal and Rohlf 1981). Accordingly, an adjustment may be applied to safeguard against falsely giving the appearance of statistically significant results when a single hypothesis is tested using multiple statistical tests.

In this background study, adjustment for the use of multiple tests was performed for the two applications listed below. Note that the conservatism of using the family-wise significance level for individual tests was recognized and marginally significant results were identified.

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[21] Results of both the parametric ANOVA and the nonparametric Kruskal-Wallis tests are provided.
[22] Note that only *post-hoc* (= *a posteriori*) comparisons were conducted.
[23] One-half the SQL was substituted for non-detected concentrations.

Differences Among Background Populations Based on Tests For Multiple Constituents. Differences among lithologies or depth intervals were evaluated based on the findings of ANOVA/Kruskal-Wallis tests for each of 46 metals and radionuclides. As noted earlier, due to random chance alone, 1 out of every 20 hypothesis test on the same data is expected to be statistically significant at a significance level of 0.05 ($\alpha = 0.05$). For ANOVA/Kruskal-Wallis tests, a qualitative adjustment was applied when evaluating whether lithologies or depth intervals were different based on comparisons for multiple constituents. For this study, a nominal family-wise significance level of 0.05 was desired; thus, lithologies and depth intervals were considered different when more than five percent of all the ANOVA/Kruskal-Wallis tests were found to be significantly different.

Multiple Post-Hoc Pairwise Comparisons. When ANOVA identified a statistically significant difference among lithologies or among depth intervals, the Tukey's HSD was used to identify which pairs of lithologies or which pairs of depth intervals were different. Tukey's HSD uses the Studentized range statistic to make all pairwise comparisons between groups and adjusts the investigation-wise error rate to the error rate for the collection of all pairwise comparisons (SPSS 2006).

3.6.2.3 Examination of Constituents with Less than 50 Percent Frequency of Detection.

When frequency of detections is less than 50 percent, even the nonparametric tests have little power to detect differences in central values (Smeti *et al*. 2007). For those constituents where the frequency of detection was less than 50 percent, multiple independent sample tests were not conducted. The following approach was conducted:

1. For individual constituent datasets in which SQLs are similar, a Z-test for two proportions was conducted[24] to identify similarities in datasets based on the proportion of detected concentrations.

2. For individual constituent datasets in which SQLs are similar, where the proportion of detected concentrations is found to be similar and the number of detected concentrations is greater than four (4), multiple independent sample tests were conducted on detected data only.

[24] In this investigation, the Z-test for two proportions (http://www.dimensionresearch.com/resources/calculators/ztest.html) was used to test the null hypothesis that the proportion of detected concentrations is the same among two datasets. If the null hypothesis is rejected, one may accept the alternative hypothesis and infer that the two populations are different with respect to the proportion of detected data.

3.6.2.4 Correlation Analysis

Correlations or "measures of association" are of interest because they offer another line of evidence to confirm that data are consistent with a background dataset. Inter-element correlation analyses were conducted for exploratory purposes and used to identify those constituent pairs that should be further examined (*i.e.*, visual examination of scatterplots) to ascertain whether high-concentration outliers were congruous with the background dataset.

Pearson's Product-Moment Correlation Coefficient. The Pearson product-moment correlation coefficient (r) is a parametric measure of the correlation between two variables (Sokal and Rohlf 1981; Gilbert 1987; Zar 1984). Pearson's correlation reflects the degree of linear relationship between two variables and ranges from +1 to -1. A correlation of +1 means that there is a perfect positive linear relationship between variables. A correlation of -1 means that there is a perfect negative linear relationship between variables. A correlation of 0 means there is no linear relationship between the two variables. The statistical significance of the correlations was also tested.[25]

Kendall Tau Correlation Coefficient. The Kendall tau rank correlation coefficient (or Kendall tau coefficient) is a non-parametric statistic used to measure the degree of correspondence between the ranks of two populations. As with the Pearson's correlation coefficient, Kendall tau ranges from +1 to -1. A value of +1 means that there is 100 percent positive association between the two variables—*i.e.*, rankings for both variables are identical. A value of -1 means that there is 100 percent negative association between the two variables—*i.e.*, the ranking of one variable is the reverse of the other variable. A value of zero indicates the absence of an association between the two variables—*i.e.*, rankings are independent. The statistical significance of the correlations was also tested.[26]

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[25] For sample size (n), the significance of the Pearson product-moment correlation coefficient (r) is tested using a *t*-test with n–2 degrees of freedom (Sokal and Rohlf 1981):

$$t_s = r \times [(n-2)/(1-r^2)]^{1/2} \qquad \text{…compare with } t_{\alpha[n-2]}$$

[26] For sample sizes observed in this investigation (n > 40), a normal approximation is used to test the significance of Kendal's tau (τ) (Sokal and Rohlf 1981):

$$t_s = \frac{\tau}{[2(2n+5)/9n(n-1)]^{1/2}} \qquad \text{…compare with } t_{\alpha[\infty]}$$

3.7 RESULTS OF STATISTICAL ANALYSES

Key objectives of this investigation are to evaluate whether (1) the 2008 deep soil background dataset is statistically similar to or different across the various lithologies at the Site, and (2) the lithology-specific deep soil background datasets are statistically similar to or different from their counterparts in the 2005 BRC/TIMET background data and the 2008 supplemental shallow soil background data. The results of the following statistical analyses are provided with the intention of supporting a weight-of-evidence evaluation as part of this investigation.

3.7.1 Comparison of All Deep Soil Units (2008 Data)

In this section, the findings of statistical comparisons of the three Qal datasets are presented, followed by a summary of comparison findings between the Qal datasets and the UMCf dataset.

3.7.1.1 Comparison of Separate Qal Datasets

The Qal/McCullough, Qal/River, and Qal/Mixed datasets from the 2008 Deep Soil Background investigation were evaluated to determine if the Qal/Mixed dataset should be combined into one or the other datasets for future consideration, including the potential use of the background data (or subsets thereof) for future comparison to Site samples. The results of the statistical analyses are included in Table G-1 of Appendix G. Probability plots, boxplots, and individual value plots were used to semi-quantitatively compare the three datasets. These plots are included in Appendix F.

Overall, statistical comparisons indicated that significant differences existed for 34 of the 46 constituents among the three constituent populations: Qal/McCullough, Qal/River, and Qal/Mixed (Table G-1 of Appendix G). The five elements for which no significant differences may be inferred are as follows:

- Aluminum
- Cadmium
- Calcium
- Palladium
- Silver

Statistical tests were not conducted for metals that had fewer than four detections in one or more of the unit-specific datasets. Accordingly, statistical tests were not performed for boron, chromium (VI), niobium, platinum, selenium, thallium, and tungsten and it was not possible to determine whether significant differences were associated with the Qal/McCullough, Qal/River, and Qal/Mixed datasets for these metals.

As seen in Table G-1, the datasets for the remaining 34 elements (metals and radionuclides) had significant differences noted between the 2008 Qal/McCullough, Qal/River, and/or Qal/Mixed datasets for deep background soils. More significant differences were noted between the Qal/McCullough and Qal/River datasets (29 elements) than between the Qal/Mixed and Qal/River datasets (18 elements with significant differences) or the Qal/Mixed and Qal/McCullough datasets (22 elements with significant differences). This is consistent with the geological interpretation that the Qal/Mixed unit is derived from a mixed source with contributions from both the Qal/McCullough and Qal/River units.

In general, for radionuclides, more significant differences in activities may be inferred between the Qal/McCullough and the other two units than between the Qal/Mixed and Qal/River units; the radionuclide detections tended to be higher in the McCullough unit than in the other two units (Table G-1). Neither the Qal/River nor Qal/McCullough datasets had consistently higher metal detections, and Qal/Mixed metal datasets were usually 1) statistically indistinguishable from one or the other units; or 2) mid-range values between the two. Limited exceptions to this rule were observed: barium and chromium detections were higher in the Qal/Mixed dataset than in either the Qal/McCullough or Qal/River datasets, and silicon and sodium detections were lower in the Qal/Mixed dataset than in either the Qal/McCullough or Qal/River datasets.

Based on *post-hoc* comparison tests (Table G-1), the following metals were considered to be present at significantly higher concentrations in the Qal/McCullough dataset than the Qal/River dataset:

- Beryllium
- Cobalt
- Copper
- Iron
- Magnesium
- Manganese
- Molybdenum
- Nickel
- Phosphorus
- Titanium
- Uranium
- Vanadium
- Zirconium

Similarly, the following metals were considered to be present at significantly higher concentrations in the Qal/River dataset than the Qal/McCullough dataset (Table G-1):

- Antimony
- Arsenic
- Barium
- Lead
- Lithium
- Potassium
- Sodium
- Zinc

Given that considerably more than five percent of all the ANOVA/Kruskal-Wallis tests were found to be significantly different, the three deep units were considered to be different. Given significant differences observed among Qal/McCullough, Qal/River, and Qal/Mixed units, data for each of these three units should be retained and used independently for future statistical evaluations to determine if there exists elevated Site concentrations of metals or radionuclides as compared to background. Specific unit- and depth-appropriate use of these data is discussed in Chapter 4 and will be discussed in a subsequent background summary report.

3.7.1.2 Comparison of Qal and UMCf Datasets

As discussed above, significant differences in constituent concentrations may be inferred among the three Qal populations (Table G-1). In addition, the analysis determined that no significant differences may be inferred between the UMCf and Qal units for the following metals:

- Aluminum
- Cadmium
- Calcium
- Palladium
- Silver

Statistical tests were not conducted for metals with fewer than four detections in one or more of the unit-specific datasets. Accordingly, statistical tests were not performed for boron, chromium (VI), niobium, platinum, selenium, thallium, and tungsten and it was not possible to determine whether significant differences were associated with the deep unit datasets for these metals.

The datasets for the remaining 34 elements had significant differences noted between the 2008 datasets for deep background soils (Table G-1). More significant differences were noted between the UMCf and Qal/McCullough datasets (28 elements with significant differences) than between the UMCf and Qal/Mixed datasets (12 elements with significant differences) or the UMCf and Qal/River datasets (17 elements with significant differences).

For radionuclides, there were more significant differences between the UMCf and Qal/McCullough than between the UMCf and the Qal/Mixed and/or Qal/River units; the radionuclide detections were higher in the Qal/McCullough unit than in the UMCf (Table G-1). In contrast, the UMCf metal datasets were usually 1) statistically indistinguishable from one or more of the other units; or 2) mid-range values between the three. Limited exceptions to this rule were observed: lithium and magnesium detections were higher in the UMCf dataset than in the other three deep datasets.

3.7.2 Comparison of Qal/McCullough Unit by Depth (2005 and 2008 Data)

The Qal/McCullough datasets from the 2008 Deep Soil Background and 2005 Shallow Soil Background investigations were evaluated to determine if there were significant differences between them. The specific datasets selected were surface data (2005 investigation), 10 ft bgs data (2005 investigation) and all Qal/McCullough data from depths 20 ft bgs or greater collected during the 2008 Deep Soil background investigation. The results of the statistical analyses are included in Table G-2 of Appendix G. Probability plots, boxplots and individual value plots of the 2008 datasets are included in Appendix F; the boxplots include the 2005 datasets for comparison.

Overall, a number of significant differences in constituent concentrations among the three populations may be inferred from the ANOVAs/Kruskal-Wallis tests. Arsenic, barium, lithium, and molybdenum were the only elements for which no significant differences may be inferred.

No statistical tests were performed for the following metals that had fewer than four detections in one or more of the unit-specific datasets:

- Cadmium
- Chromium (VI)
- Niobium
- Platinum
- Selenium
- Silver
- Thallium
- Tungsten

Because these metals were not subjected to statistical comparisons, it was not possible to determine whether significant differences were associated with the various Qal/McCullough depth intervals for these metals.

The datasets for the remaining 34 elements had significant differences noted between the shallow and deep Qal/McCullough datasets (Table G-2). More significant differences were noted between the surface and deep datasets (29 elements with significant differences) than between the surface and 10 ft bgs datasets (22 elements with significant differences) or the deep and 10 ft bgs datasets (21 elements with significant differences). Metal and radionuclide trends were inconsistent between the units; none of the datasets had consistently higher metal detections, but surface or deep results were more commonly identified as being statistically higher than the other datasets. The 10 ft bgs datasets were usually 1) statistically indistinguishable from one or the other units; or 2) mid-range values between the two. Limited exceptions to this rule were observed: calcium detections were higher in the 10 ft bgs dataset than in either the surface or deep datasets, and five elements (chromium, iron, lead, tin, and thorium-228) were lower in the 10 ft bgs dataset than in either the surface or deep datasets.

Based on *post-hoc* comparison tests, the following 13 elements were considered to be present at significantly higher concentrations in the surface soil dataset than the other two datasets (Table G-2 of Appendix G):

- Aluminum
- Barium
- Boron
- Copper
- Lead
- Manganese
- Nickel
- Phosphorus
- Potassium
- Silicon
- Zinc
- Thorium-232
- Uranium-233/234

The following eight elements were observed to be present at significantly higher concentrations in the deep soil dataset than the other two datasets (Table G-2 of Appendix G):

- Molybdenum
- Sodium
- Titanium
- Uranium
- Vanadium
- Radium-226
- Thorium-230

Given that considerably more than five percent of all the ANOVA/Kruskal-Wallis tests were found to be significantly different, depth intervals within Qal/McCullough unit were considered to be different. Given significant differences observed among depths within the Qal/McCullough unit, data for each of these three background depth intervals (0 ft bgs, 10 ft bgs, and 20+ ft bgs) should be retained and used independently for future statistical evaluations to determine if there exists elevated concentrations of metals or radionuclides as compared to background. Specific unit- and depth-appropriate use of these data is discussed in Chapter 4 and will be discussed in a subsequent background summary report.

3.7.3 Comparison of Qal/River Units by Depth (2008 Data)

The Qal/River datasets from the 2008 Deep Soil Background and 2008 Shallow Soil Supplemental Background investigations were evaluated to determine if there were significant differences between them. The specific datasets selected were surface data (Supplemental investigation), 10 ft bgs data (Supplemental investigation) and all Qal/River data from depths 20 ft bgs or greater collected during the 2008 Deep Soil background investigation. The results of the statistical analyses are included in Table G-3 of Appendix G. Probability plots, boxplots, and individual value plots of the 2008 datasets are included in Appendix F; the boxplots include the 2005 datasets for comparison.

Overall, fewer significant differences in constituent concentrations among the three populations may be inferred from statistical tests as compared to population comparisons described in the previous sub-sections. No significant differences in concentrations may be inferred from statistical tests for the following constituents (Table G-3 of Appendix G):

- Antimony
- Barium
- Beryllium
- Cadmium
- Chromium
- Iron
- Lead
- Magnesium
- Nickel
- Phosphorus
- Silver
- Vanadium
- Zinc
- Radium-228

No statistical tests were performed for the following metals that had fewer than four detections in one or more of the unit-specific datasets:

- Chromium (VI)
- Lithium
- Mercury
- Niobium
- Platinum
- Selenium
- Thallium
- Tungsten

Accordingly, it was not possible to determine whether significant differences were associated with the various Qal/River depth intervals for these metals.

The datasets for the remaining 24 elements had significant differences noted between the datasets for shallow and deep background Qal/River soils (Table G-3 of Appendix G). More significant differences were noted between the deep and shallow datasets than between the surface and 10 ft bgs datasets. As seen in Table G-3, eighteen elements had significant differences in the comparisons between Deep and Surface datasets and/or Deep and Subsurface datasets. Thirteen elements had significant differences in the comparisons between Deep and Surface datasets, and fifteen elements (many the same as in the former comparison) had significant differences in the comparisons between Deep and Subsurface datasets.

Metal and radionuclide trends were inconsistent between the units; none of the datasets had consistently higher metal detections, but surface or 10 ft bgs results were more commonly identified as being statistically higher than the deep dataset (Table G-3 of Appendix G). Titanium was the only element found at statistically higher concentrations in the deep dataset than in the surface and 10 ft bgs datasets.

The following metals were observed to be present at significantly higher concentrations in the surface soil dataset than the other datasets:

- Aluminum
- Cobalt
- Copper
- Manganese
- Potassium
- Silicon

The following metals were observed to be present at significantly higher concentrations in the 10 ft bgs dataset than the other two datasets:

- Calcium
- Palladium
- Sodium
- Strontium
- Uranium
- Radium-226
- Thorium-230
- Uranium-233/234
- Uranium-238

Given that considerably more than five percent of all the ANOVA/Kruskal-Wallis tests were found to be significantly different, depth intervals within Qal/River unit were considered to be different. Given significant differences observed among depths within the Qal/River unit, data for each of these three background depth intervals (0 ft bgs, 10 ft bgs, and 20+ ft bgs) should be retained and used independently for future statistical evaluations to determine if there exists elevated concentrations of metals or radionuclides as compared to background. Specific unit- and depth-appropriate use of these data is discussed in Chapter 4 and will be discussed in a subsequent background summary report.

3.7.4 Comparison of Qal/Mixed Units by Depth (2005 and 2008 Data)

The Qal/Mixed datasets from the 2008 Deep Soil Background and 2005 Shallow Soil Background investigations were evaluated to determine if there were significant differences between them. The specific datasets selected were surface data (2005 investigation), 10 ft bgs data (2005 investigation) and all Qal/Mixed data from depths 20 ft bgs or greater collected during the 2008 Deep Soil background investigation. The results of the statistical analyses are included in Table G-4 of Appendix G. Probability plots, boxplots, and individual value plots of the 2008 datasets are included in Appendix F; the boxplots include the 2005 datasets for comparison.

As seen in the descriptive summary statistics tables (Tables 13 and 14 for the shallow Qal/Mixed datasets), the surface dataset contained results for fewer than four samples for several of the elements being evaluated, and the 10 ft bgs dataset contained results for fewer than four samples for all of the elements. Therefore, because statistical comparisons would be of limited value, these datasets were not subjected to multiple-sample statistical comparisons and it was not possible to determine whether significant differences were associated with the various Qal/Mixed depth intervals for these metals.

Given that considerably more than five percent of all the ANOVA/Kruskal-Wallis tests were found to be significantly different, depth intervals within Qal/Mixed unit were considered to be different. Given significant differences observed among depths within the Qal/Mixed unit, data for each of these two background depth intervals (0 ft bgs and 20+ ft bgs) should be retained and used independently for future statistical evaluations to determine if there exists elevated concentrations of metals or radionuclides as compared to background. Specific unit- and depth-appropriate use of these data is discussed in Chapter 4 and will be discussed in a subsequent background summary report. Specific unit- and depth-appropriate use of these data will be discussed in a subsequent background summary report.

3.7.5 Constituents with Less Than 50 Percent Frequency of Detection

When FODs are less than 50 percent, even the nonparametric tests have little power to detect differences in central values (Smeti *et al*. 2007). Tests of proportions were performed for infrequently detected constituents (*i.e.*, constituents with FODs less than 50 percent) to identify potential similarities among datasets. For constituents with frequency of detects less than 50 percent and similar detection limits, a binomial proportions test was conducted to determine if frequency of detects between background datasets were comparable. Where frequency of detects were found to be similar, subsequent comparisons using detected-only data may be considered for infrequently detected constituents to identify potential similarities among background datasets.[27]

For comparisons among Qal/McCullough, Qal/River, Qal/Mixed, and UMCf, infrequently detected constituents are presented in Table G-5 of Appendix G and summarized as follows:

Constituent	Sample Size* (n > 4)	Similar SQLs**	Z-Test for Two Proportions	Additional Analysis Candidate
Boron	Yes	Yes	Similar FOD	Yes
Chromium (VI)	No	Yes	Dissimilar FOD	No
Niobium	No	Yes	Similar FOD	No
Platinum	No	Yes	Similar FOD	No
Selenium	No	Yes	—	No

[27] Only when datasets have comparable detection limits can this analysis be performed as a line of evidence to infer differences between datasets; otherwise, the test will only reflect differences in detection limits.

Constituent	Sample Size* (n > 4)	Similar SQLs**	Z-Test for Two Proportions	Additional Analysis Candidate
Thallium	No	Yes	—	No
Tungsten	Yes	Yes	Dissimilar FOD	No

* for three or more lithological units
** SQLs are considered similar when range is less than 10-fold[28]

For comparisons among 2008 Deep McCullough, 2005 Surface McCullough, and 2005 10-ft McCullough, infrequently detected constituents are presented in Table G-6 of Appendix G and summarized as follows:

Constituent	Sample Size* (n > 4)	Similar SQLs**	Z-Test for Two Proportions	Additional Analysis Candidate
Antimony	Yes	No	Dissimilar FOD	No
Boron	Yes	Yes	Dissimilar FOD	No
Chromium (VI)	No	Yes	Dissimilar FOD	No
Niobium	No	Yes	Similar FOD	No
Platinum	No	Yes	Similar FOD	No
Selenium	Yes	No	Dissimilar FOD	No
Silver	No	No	Similar FOD	No
Thallium	Yes	No	Dissimilar FOD	No
Tungsten	No	No	Dissimilar FOD	No

* for two or more Qal/McCullough groups
** SQLs are considered similar when range is less than 10-fold

For comparisons among 2008 Deep River, 2008 Supplemental Surface River, and 2008 Supplemental 10-ft River, infrequently detected constituents are presented in Table G-7 of Appendix G and summarized as follows:

Constituent	Sample Size* (n > 4)	Similar SQLs**	Z-Test for Two Proportions	Additional Analysis Candidate
Antimony	Yes	Yes	Dissimilar FOD	No
Boron	Yes	Yes	Dissimilar FOD	No

[28] SQLs were usually different by more than an order of magnitude. Therefore an actual cut-off established does not affect the data analysis.

Constituent	Sample Size* (n > 4)	Similar SQLs**	Z-Test for Two Proportions	Additional Analysis Candidate
Cadmium	Yes	No	Similar FOD	No
Chromium (VI)	No	Yes	Dissimilar FOD	No
Lithium	Yes	Yes	Dissimilar FOD	No
Mercury	No	Yes	Similar FOD	No
Niobium	No	Yes	Similar FOD	No
Platinum	No	Yes	Similar FOD	No
Selenium	No	Yes	—	No
Thallium	No	No	Dissimilar FOD	No
Tin	Yes	Yes	Similar FOD	Yes
Tungsten	No	Yes	Similar FOD	No
Zirconium	Yes	Yes	Dissimilar FOD	No

* for two or more Qal/River groups
** SQLs are considered similar when range is less than 10-fold

No further analyses were conducted for infrequently detected constituents because one of the following conditions existed:

- Sample size was less than four for the majority of the datasets under consideration
- SQLs were dissimilar
- Z-test for proportions found that FODs were dissimilar

The exception to the above conditions included boron (QAL McCullough vs. other lithologies) and tin (QAL River surface vs. other depths). No further analyses (*i.e.*, multiple sample comparisons) were conducted for these two constituents because these subsequent analyses were not considered likely to provide results that would affect overall decision-making.

Note that for constituents with FODs less than 50 percent (and SQLs meeting analytical DQOs), one may conclude that these constituents are present in background soils. Moreover, it is both reasonable and defensible that characterizations of similarities/dissimilarities among background datasets be largely ascertained based on the more robust statistical analyses of constituents with greater FODs. Accordingly, given that only one or two constituents were identified as candidates for potential additional analysis, it was presumed that these few constituents would be unlikely to alter conclusions of differences among datasets that were based on constituents with more robust

FODs (*i.e.*, FODs greater than 50 percent for all groups) and no further analyses were performed on detected-only concentrations.

3.7.6 Inter-Element Correlation Analysis and Scatterplots

In addition to statistical comparisons and plots, the deep background data were evaluated with respect to inter-element correlations. Correlations or "measures of association" are of interest because they were considered to offer another line of evidence to confirm that data are consistent with a background dataset. Correlation analyses were conducted and used to identify those constituent pairs that should be visually examined in scatterplots to ascertain whether high-concentration outliers should be considered within the background dataset. Both parametric (Pearson's product-moment) and nonparametric (Kendall tau) correlation coefficients are presented in correlation matrices (Tables H-1 through H-8 of Appendix H). Note that statistically significant correlation coefficients (at a significance level of 0.05)[29] are indicated by bold font and are color-coded for parametric and nonparametric coefficients in each table. Scatterplots for constituents with significant correlation coefficients and high-concentration outliers are also presented in Appendix H.

Statistically significant associations were observed for several elements. Certain inter-element relationships are expected on the basis of geochemical behavior and expected mineralogical associations. For example, alkaline metals (such as lithium, sodium, and potassium) and alkaline-earth metals (such as barium, calcium, and magnesium) can be expected to behave similarly in solution and may therefore be expected to show an association in certain environmental media. Other metals are found in association in common minerals and show correlations in soils containing these minerals (such as feldspars; metal oxides such as hematite, goethite and pyrolusite; and carbonate minerals such as calcite). These associations are useful in distinguishing soils derived from different source materials and in distinguishing site-related contamination from natural background (BRC/TIMET 2007).

Correlation among activities for radionuclides within the decay chain (parents and daughters) is anticipated, unless there are differences in geochemical behavior and mechanisms to separate the species (BRC/TIMET 2007). Statistically significant associations among radionuclides in the uranium-238 decay chain were observed for Qal/McCullough, Qal/River, and UMCf

[29] An adjustment for multiple comparisons was not applied to the correlation analyses because these analyses were used to identify constituents requiring further analysis and not for distinguishing between datasets using multiple tests.

(Appendix H). However, statistically significant associations among thorium-232 decay chain radionuclides were not observed.[30] Both the thorium-232 and uranium-238 chains were determined to be in approximate secular equilibrium following equivalence testing outlined in NDEP's *Guidance for Evaluating Secular Equilibrium at the BMI Complex and Common Areas February* (NDEP 2009c). There continues to be an issue for the thorium-232 chain, in which it is common for BRC site and background data to observe approximate secular equilibrium, but a lack of correlation between isotopes in the decay chain. To date, the issue is unresolved. The results of the equivalence testing for secular equilibrium are as follows:

<table>
<tr><th rowspan="2">Chain</th><th colspan="2">Equivalence Test</th><th>Secular</th><th colspan="4">Mean Proportion</th></tr>
<tr><th>Delta</th><th>p-value</th><th>Equilibrium?</th><th>Ra-226</th><th>Th-230</th><th>U-233/234</th><th>U-238</th></tr>
<tr><td>U-238</td><td>0.1</td><td>0.00</td><td>Yes</td><td>0.2430</td><td>0.2562</td><td>0.2569</td><td>0.2438</td></tr>
<tr><td colspan="4"></td><td>Ra-228</td><td>Th-228</td><td>Th-232</td><td rowspan="2"></td></tr>
<tr><td>Th-232</td><td>0.1</td><td>0.00</td><td>Yes</td><td>0.3117</td><td>0.3586</td><td>0.3297</td></tr>
</table>

Finally, a visual side-by-side presentation of correlation matrices for Qal/McCullough, Qal/River, Qal/Mixed, and UMCf is provided in Appendix H. This side-by-side presentation is intended to provide an overall visualization of significant inter-element correlations and may be used as an additional, though subjective, qualitative line-of-evidence for distinguishing among lithological units. A visual examination of the side-by-side presentation of correlation matrices suggests that the UMCf has a pattern of significant correlations that appears to be different than those for Qal/McCullough, Qal/River, and Qal/Mixed.

Scatterplots were generated to support the correlation analysis conducted to further justify that the supplemental data collected are representative of background conditions. Statistically significant associations and high-concentration outliers were identified for several elements in each lithological unit (Appendix H):

Qal/McCullough

- Aluminum
- Arsenic
- Barium
- Copper
- Lithium
- Nickel
- Palladium
- Silver
- Strontium

[30] Further investigation produced no explanation for the lack of correlation among thorium-232 decay chain radionuclides.

Qal/River

- Barium
- Chromium
- Lead
- Potassium

UMCf

- Arsenic
- Lithium
- Magnesium
- Nickel
- Uranium

However, visual examinations of scatterplots for these constituents found no consistent or conspicuous deviations from least-square trend lines but were observed for high concentration outliers. Accordingly, there was no compelling evidence obtained from examinations of scatterplots to suggest that data are not consistent with a background dataset.

The association of aluminum with trace metals was also evaluated. Trace metals such as chromium, cobalt, copper, nickel, and vanadium may occur as impurities in the common alumino-silicate family of minerals known as feldspars. Clays and other secondary aluminum minerals in soils may host sorption sites for trace metals, thereby associating these metals. In general, these associations are evident.

Scatterplots were also constructed for radionuclides within the thorium-232 and uranium-238 decay chains and are included in Appendix H. Often, species within the decay chains (parents and daughters) show correlations unless there are great differences in geochemical behavior and sufficient mechanisms to separate the species. In general, most of the radionuclides in the uranium-238 decay chain (radium-226, thorium-230, and uranium-233/234) did show significant associations. Radionuclides in the thorium-232 decay chain (radium-228 and thorium-228) did not show significant associations, confirming the correlation results discussed above.

4.0 SUMMARY AND CONCLUSIONS

The purpose of the deep soil background study was to collect data for metals, radionuclides, and general chemistry/soil parameters in deep background soils that are representative of soils in geologic units and depths not covered by the existing shallow soil background datasets (BRC/TIMET 2007; BRC and ERM 2009a). The key objectives of this study were to determine whether (1) the deep soil background dataset is statistically similar to or different across the various lithologies at the Site, and (2) the lithology-specific deep soil background datasets are statistically similar to or different from their counterparts in the 2005 BRC/TIMET background data and the 2008 supplemental shallow soil background data. One of the specific points of this study was to determine whether arsenic concentrations are different in the various units; this is particularly important because arsenic is usually a risk driver at the Site.

Soil sampling was conducted from August to October 2008. Samples were collected from 21 soil boring locations that represent the specific lithologies targeted by this deep soil background sampling study and that extend the representative range of soils found in the vicinity of the Site. A total of 148 field and 25 duplicate soil samples were collected from the 21 borings for analysis. Validation for the data collected during the 2008 deep background investigation included 20 percent full validation and 100 percent partial validation. Results qualified as estimated based on the data validation are usable for the purposes of establishing background concentrations and for comparison to Site-specific sample data. A small subset of soil sample results were rejected (approximately two percent). With 98 percent of the dataset validated as usable, the overall data collection objectives for the study were met.

Deep background samples were collected in areas presumed to be unimpacted by Site-related activities based on published documentation and Site inspections. In addition, analytical results for VOC, SVOC, and OCP analyses performed on samples collected from shallow soil intervals at the 21 presumed background soil locations were used to assess whether the sampling locations had been impacted by other anthropogenic sources. Given (1) the relatively low reported organic chemical detections, (2) the fact that they are associated with soil intervals appreciably shallower than those assessed for background metals and radionuclide data, and (3) the lack of historical uses associated with the sampling locations, there do not appear to have been significant impacts from other anthropogenic sources and there is no evidence suggesting that the use of the metals and radionuclide data from this investigation for determining background conditions would not be appropriate. Several sporadic outliers were found in the dataset, which is not unusual for a dataset of this size. However, a review of these sporadic outliers confirmed that they were not the result of reporting errors. A combined examination of correlation coefficients and scatterplots found no conspicuous anomalies, further supporting that this dataset is appropriate for use as a representative deep background soil dataset. All told, these lines of evidence support the contention that the dataset reflects background conditions for Site soils.

The statistical analyses performed as part of this study determined that a number of statistically significant differences exist between subsets of the 2008 Deep background dataset, suggesting that these subsets may be retained separately for comparison to applicable, geologically-similar portions of the BMI Common Areas as part of the closure process. The differences between the datasets are summarized as follows:

- ***Comparison of Deep Qal Units***. More significant differences were noted between the Qal/McCullough and Qal/River datasets than between the Qal/Mixed and Qal/River datasets or the Qal/Mixed and Qal/McCullough datasets. This is consistent with the geological interpretation that the Qal/Mixed unit is derived from a mixed source with contributions from both the Qal/McCullough and Qal/River units. In general, the radionuclide detections tended to be higher in the McCullough unit than in the other two units. In contrast, trends were inconsistent between the units for metals. Neither the Qal/River nor Qal/McCullough datasets had consistently higher metal detections, and Qal/Mixed metal datasets were usually 1) statistically indistinguishable from one or the other units; or 2) mid-range values between the two. Limited exceptions to this rule were observed: barium and chromium detections were higher in the Qal/Mixed dataset than in either the Qal/McCullough or Qal/River datasets, and silicon and sodium detections were lower in the Qal/Mixed dataset than in either the Qal/McCullough or Qal/River datasets. Arsenic concentrations in the Qal/Mixed or Qal/River were inferred as being statistically higher than those in the Qal/McCullough.

- ***Comparison of Deep Qal to UMCf Units***. More significant differences were noted between the UMCf and Qal/McCullough datasets than between the UMCf and Qal/Mixed datasets or the UMCf and Qal/River datasets. For radionuclides, the radionuclide detections were higher in the Qal/McCullough unit than in the UMCf. In contrast, the UMCf metal datasets were usually 1) statistically indistinguishable from one or more of the other units; or 2) mid-range values between the three. Limited exceptions to this rule were observed: lithium and magnesium detections were higher in the UMCf dataset than in the other three deep datasets. It is also notable that arsenic concentrations in the UMCf were generally higher than in the Qal, with the exception of arsenic concentrations in the Qal/River. Arsenic concentrations in the UMCf were inferred as being statistically higher than those in the Qal/McCullough, but the UMCf arsenic concentrations were statistically indistinguishable from those in the Qal/Mixed and Qal/River.

- ***Comparison of Qal/McCullough Depth Intervals***. More significant differences were noted between the surface and deep datasets than between the surface and 10 ft bgs datasets or the deep and 10 ft bgs datasets. Metal and radionuclide trends were inconsistent between the units; none of the datasets had consistently higher metal detections, but surface or deep results were more commonly identified as being statistically higher than the other datasets. The 10 ft bgs datasets were usually 1) statistically indistinguishable from one or the other units; or 2) mid-range values between the two. Limited exceptions to this rule were observed: calcium detections were higher in the 10 ft bgs dataset than in either the surface or deep datasets, and five elements (chromium, iron, lead, tin, and thorium-228) were lower in the 10 ft bgs dataset than in either the surface or deep datasets. Arsenic concentrations were statistically indistinguishable between the three Qal/McCullough depth intervals considered.

- ***Comparison of Qal/River Depth Intervals.*** More significant differences were noted between the deep and shallow datasets than between the surface and 10 ft bgs datasets. Metal and radionuclide trends were inconsistent between the units; none of the datasets had consistently higher metal detections, but surface or 10 ft bgs results were more commonly identified as being statistically higher than the deep dataset. Titanium was the only element found at statistically higher concentrations in the deep dataset than in the surface and 10 ft bgs datasets. Arsenic concentrations were statistically indistinguishable between the three Qal/River depth intervals considered.

- ***Comparison of Qal/Mixed Depth Intervals***. The Qal/Mixed surface dataset were comprised of fewer than four samples for several of the constituents being evaluated. Similarly, the Qal/Mixed 10 ft bgs dataset were comprised of fewer than four samples for all of the constituents. Given the low sample size, statistical analyses were not performed and it was not possible to determine whether significant differences were associated with the various Qal/Mixed depth intervals for these constituents.

The goals of the deep soil background study were met, and a valid background dataset has been generated. Given the distinct differences between the populations associated with soils derived from different geologic units, it is therefore appropriate to perform comparisons of background to Site data using the subset of background data that most closely matches the geologic conditions in the relevant area of interest:

Portion of Site	Applicable Background Dataset
Eastern portion (*e.g.*, Mohawk, eastern part of 4B)	2008 Deep River subset
Northwestern portion (*e.g.*, Western Hook)[31]	2008 Deep McCullough subset
Central or remaining portion	2008 Deep McCullough and Mixed subsets

Combining the background dataset by depth and/or lithology for subsequent comparison with Site data will be influenced by potential exposures at varying depth intervals and the location of a particular receptor – in other words, based on data usability and conceptual site model considerations. As discussed above, for arsenic, statistical differences were inferred between the Qal/McCullough and the other three datasets evaluated (Qal/Mixed, Qal/River, and UMCf); however, no statistical differences were inferred when comparing arsenic results for different depth intervals of a given lithologic unit (*i.e.*, Qal/McCullough and Qal/River).

These findings suggest that these data are appropriate for supporting future assessments and decision-making with respect to deep soils at sites within the BMI Complex and Common Areas. Specific decisions regarding how best to use the background soils data for future Site-to-background comparisons will be made on a case-by-case basis in consultation with NDEP.

[31] Note that portions of surface and/or near surface soils in the northwestern portion of the Site may also be associated with the Upper Muddy Creek formation (UMCf).

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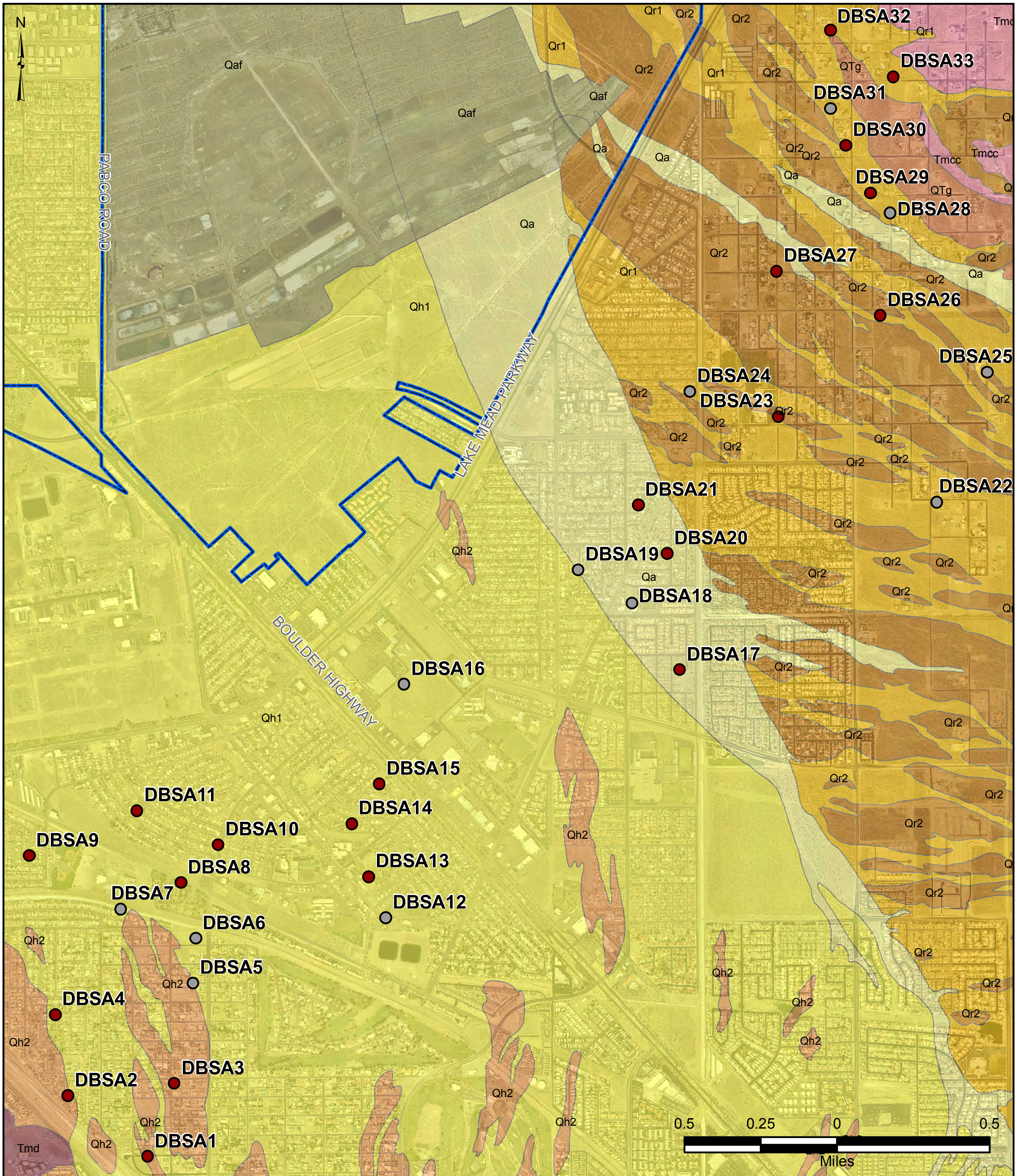
FIGURES



Site AOC3 Boundary

Deep Background Sample Location

- Boring Location
- Boring Location not Used

Lithology

Qa	Qr2
Qaf	QTg
Qh1	Tmcc
Qh2	Tmd
Qr1	

Fall 2006 Aerial Photo.

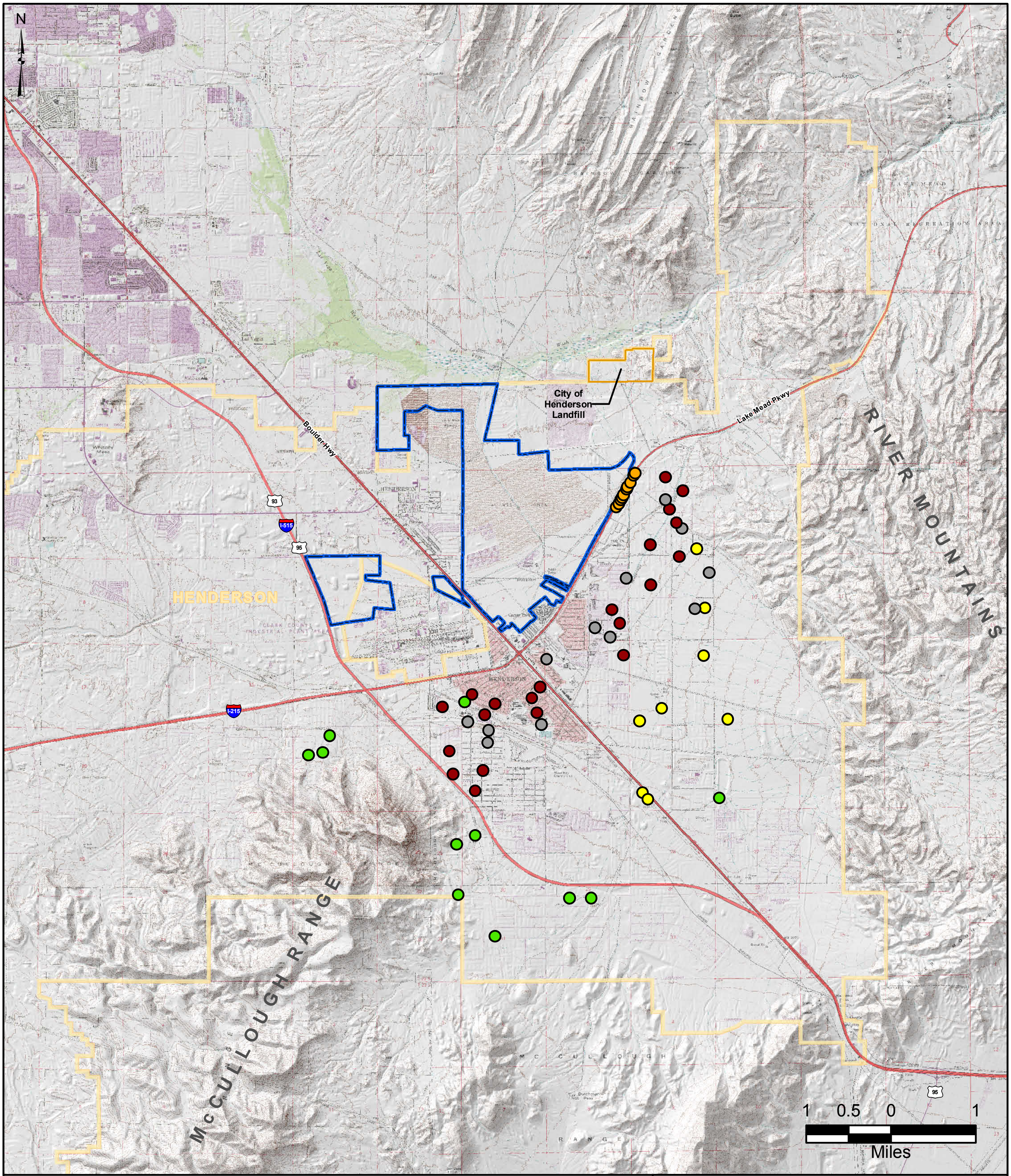
BMI Common Areas (Eastside)
Clark County, Nevada

FIGURE 1

2008 DEEP BACKGROUND SAMPLE LOCATIONS

Basic Remediation Company

Prepared by MKJ (ERM) | Date 06/18/09 | JOB No. 0064276 | FILE: GIS/BRC/DEEP-BACKGROUND_FIGURE1.MXD



Site AOC3 Boundary
City of Henderson Boundary
Supplemental Background Sample Location
BRC/TIMET Background Sample Location
ENVIRON Background Sample Location

Deep Background Sample Location
Boring Location
Boring Location not Used

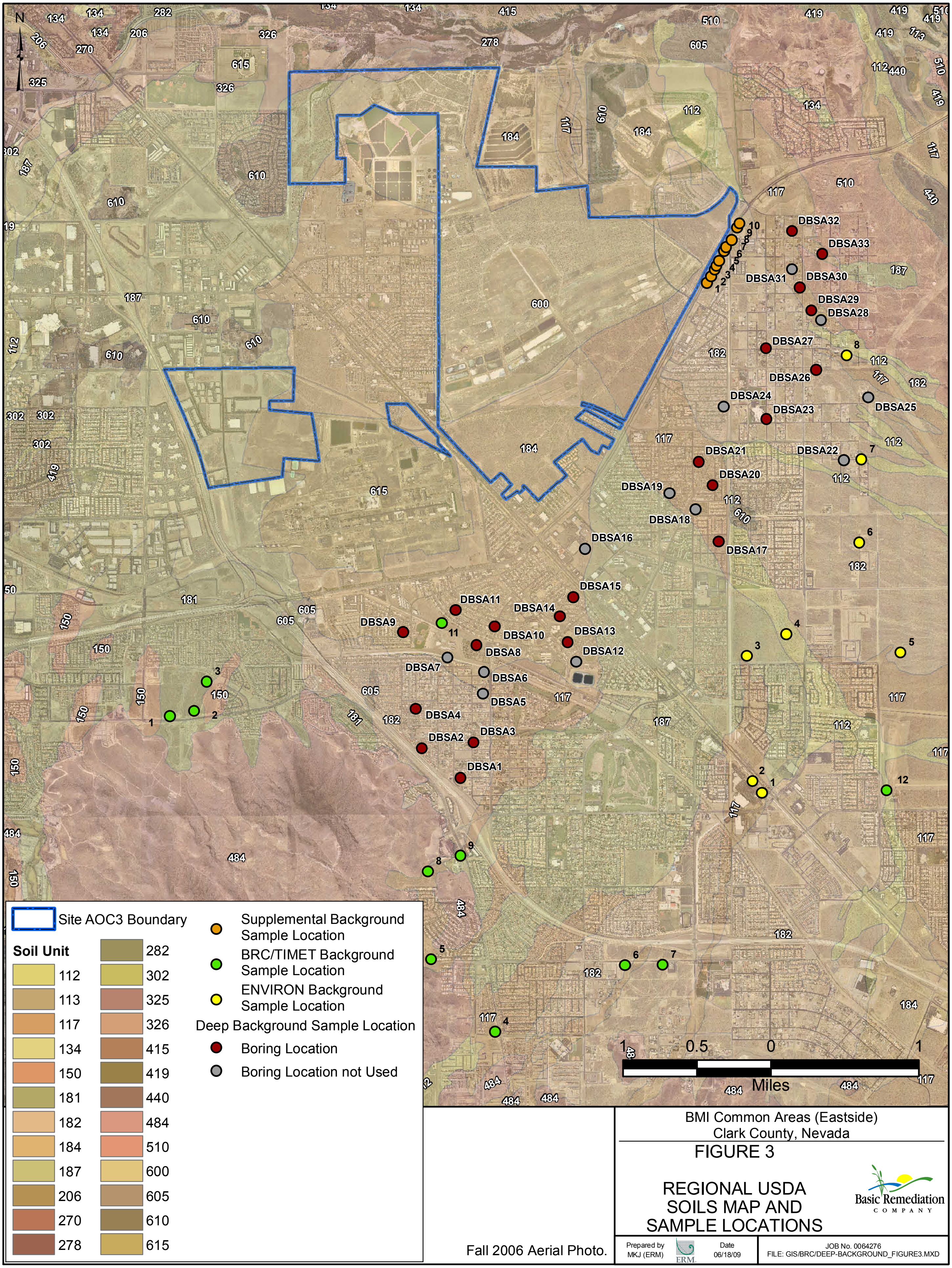
BMI Common Areas (Eastside)
Clark County, Nevada

FIGURE 2

REGIONAL TOPOGRAPHIC MAP AND SAMPLE LOCATIONS

Basic Remediation COMPANY

Prepared by MKJ (ERM)	ERM	Date 06/18/09	JOB No. 0064276 FILE: GIS/BRC/DEEP-BACKGROUND_FIGURE2.MXD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Site AOC3 Boundary
Soil Unit
112
113
117
134
150
181
182
184
187
206
270
278
282
302
325
326
415
419
440
484
510
600
605
610
615
Supplemental Background Sample Location
BRC/TIMET Background Sample Location
ENVIRON Background Sample Location
Deep Background Sample Location
Boring Location
Boring Location not Used
DBSA1
DBSA2
DBSA3
DBSA4
DBSA5
DBSA6
DBSA7
DBSA8
DBSA9
DBSA10
DBSA11
DBSA12
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DBSA32
DBSA33
1 0.5 0 1
Miles
Fall 2006 Aerial Photo.
BMI Common Areas (Eastside)
Clark County, Nevada
FIGURE 3
REGIONAL USDA SOILS MAP AND SAMPLE LOCATIONS
Basic Remediation COMPANY
Prepared by MKJ (ERM)
ERM
Date 06/18/09
JOB No. 0064276
FILE: GIS/BRC/DEEP-BACKGROUND_FIGURE3.MXD

TABLES

TABLE 1
PROJECT LIST OF ANALYTES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Sample ID	Sample Depth	Soil Unit (Qal or UMCf)	Sample Type	Metals	Radio-nuclides	VOCs	SVOCs	Organo-chlorine Pesticides	Soil Parameters
DBSA-01-Q	0	Qal/McCullough	N	X				X	X
	5	Qal/McCullough	N	X		X	X		X
	10	Qal/McCullough	N	X		X	X		X
	20	Qal/McCullough	N	X	X				X
	30	Qal/McCullough	N	X	X				X
	40	Qal/McCullough	N	X	X				X
	50	Qal/McCullough	N	X	X				X
	60	Qal/McCullough	N	X	X				X
	70	Qal/McCullough	N	X	X				X
	80	Qal/McCullough	N	X	X				X
	90	Qal/McCullough	N	X	X				X
DBSA-02-Q	5	Qal/McCullough	N			X	X		X
	10	Qal/McCullough	N			X	X		X
	20	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
	30	Qal/McCullough	N	X	X				X
	40	Qal/McCullough	N	X	X				X
	50	Qal/McCullough	N	X	X				X
	60	Qal/McCullough	N	X	X				X
	70	Qal/McCullough	N	X	X				X
	80	Qal/McCullough	N	X	X				X
DBSA-03-Q	5	Qal/McCullough	N			X			X
	10	Qal/McCullough	N			X			X
	20	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
	30	Qal/McCullough	N	X	X				X
	40	Qal/McCullough	N	X	X				X
	50	Qal/McCullough	N	X	X				X
	60	Qal/McCullough	N	X	X				X
	70	Qal/McCullough	N	X	X				X
	80	Qal/McCullough	N	X	X				X
DBSA-04-Q	5	Qal/McCullough	N			X			X
	10	Qal/McCullough	N			X			X
	20	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
	30	Qal/McCullough	N	X	X				X
	40	Qal/McCullough	N	X	X				X
	50	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
DBSA-08-Q	5	Qal/McCullough	N			X			X
	10	Qal/McCullough	N			X			X
	20	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
	30	Qal/McCullough	N	X	X				X
	40	Qal/McCullough	N	X	X				X
	50	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
DBSA-09-Q	5	Qal/McCullough	N			X			X
	10	Qal/McCullough	N			X			X
	20	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
	30	Qal/McCullough	N	X	X				X

TABLE 1
PROJECT LIST OF ANALYTES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 2 of 5)

Sample ID	Sample Depth	Soil Unit (Qal or UMCf)	Sample Type	Metals	Radio-nuclides	VOCs	SVOCs	Organo-chlorine Pesticides	Soil Parameters
DBSA-09-Q	40	Qal/McCullough	N	X	X				X
	50	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
DBSA-09-T	160	UMCf	N	X	X				X
DBSA-10-Q	5	Qal/McCullough	N			X			X
	10	Qal/McCullough	N			X			X
	20	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
	30	Qal/McCullough	N	X	X				X
	40	Qal/McCullough	N	X	X				X
	50	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
DBSA-11-Q	5	Qal/McCullough	N			X			X
	10	Qal/McCullough	N			X			X
	20	Qal/McCullough	N	X	X				X
	30	Qal/McCullough	N	X	X				X
	40	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
	50	Qal/McCullough	N	X	X				X
	60	Qal/McCullough	N	X	X				X
	120	Qal/McCullough	N	X	X				X
DBSA-11-T	150	UMCf	N	X	X				X
	160	UMCf	N	X	X				X
DBSA-13-Q	5	Qal/McCullough	N			X			X
	10	Qal/McCullough	N			X			X
	20	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
	30	Qal/McCullough	N	X	X				X
	40	Qal/McCullough	N	X	X				X
	50	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
	60	Qal/McCullough	N	X	X				X
	70	Qal/McCullough	N	X	X				X
	80	Qal/McCullough	N	X	X				X
DBSA-14-Q	5	Qal/McCullough	N			X			X
	10	Qal/McCullough	N			X			X
	20	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
	30	Qal/McCullough	N	X	X				X
	40	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
	50	Qal/McCullough	N	X					
		Qal/McCullough	FD	X	X				
	140	Qal/McCullough	N	X	X				X
	150	Qal/McCullough	N	X					
	160	Qal/McCullough	N	X					
		Qal/McCullough	FD	X					

TABLE 1
PROJECT LIST OF ANALYTES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Sample ID	Sample Depth	Soil Unit (Qal or UMCf)	Sample Type	Metals	Radio-nuclides	VOCs	SVOCs	Organo-chlorine Pesticides	Soil Parameters
DBSA-15-Q	5	Qal/McCullough	N			X			X
	10	Qal/McCullough	N			X			X
	20	Qal/McCullough	N	X	X				X
		Qal/McCullough	FD	X	X				X
	30	Qal/McCullough	N	X	X				X
	40	Qal/McCullough	N	X	X				X
	50	Qal/McCullough	N	X	X				X
	120	Qal/McCullough	N	X	X				X
	150	Qal/McCullough	N	X	X				X
	160	Qal/McCullough	N	X	X				X
DBSA-17-Q	5	Qal/Mixed	N			X			X
	10	Qal/Mixed	N			X			X
	20	Qal/Mixed	N	X	X				X
	30	Qal/Mixed	N	X	X				X
	40	Qal/Mixed	N	X	X				X
	50	Qal/Mixed	N	X	X				X
	60	Qal/Mixed	N	X	X				X
	70	Qal/Mixed	N	X	X				X
	80	Qal/Mixed	N	X	X				X
		Qal/Mixed	FD						
	90	Qal/Mixed	N	X	X				X
	100	Qal/Mixed	N	X	X				X
	110	Qal/Mixed	N	X	X				X
	120	Qal/Mixed	N	X	X				X
DBSA-17-T	130	UMCf	N	X	X				X
	140	UMCf	N	X	X				X
	150	UMCf	N	X	X				X
DBSA-20-Q	5	Qal/Mixed	N			X			X
	10	Qal/Mixed	N			X			X
	20	Qal/Mixed	N	X	X				X
	30	Qal/Mixed	N	X	X				X
	40	Qal/Mixed	N	X	X				X
	50	Qal/Mixed	N	X	X				X
	70	Qal/Mixed	N	X	X				X
	80	Qal/Mixed	N	X	X				X
DBSA-20-T	90	UMCf	N	X	X				X
		UMCf	FD	X	X				X
	100	UMCf	N	X	X				X
DBSA-21-Q	5	Qal/Mixed	N			X			X
	10	Qal/Mixed	N			X			X
	20	Qal/Mixed	N	X	X				X
		Qal/Mixed	FD	X	X				X
	30	Qal/Mixed	N	X	X				X
	40	Qal/Mixed	N	X	X				X
	50	Qal/Mixed	N	X	X				X
	70	Qal/Mixed	N	X					X
DBSA-21-T	80	UMCf	N	X	X				X
	90	UMCf	N	X	X				X

TABLE 1
PROJECT LIST OF ANALYTES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 4 of 5)

Sample ID	Sample Depth	Soil Unit (Qal or UMCf)	Sample Type	Metals	Radio-nuclides	VOCs	SVOCs	Organo-chlorine Pesticides	Soil Parameters
DBSA-23-Q	5	Qal/River	N			X			X
	10	Qal/River	N			X			X
	20	Qal/River	N	X	X				X
	30	Qal/River	N	X	X				X
		Qal/River	FD	X	X				X
	40	Qal/River	N	X	X				X
	50	Qal/River	N	X	X				X
DBSA-23-T	140	UMCf	N	X	X				X
	150	UMCf	N	X	X				X
DBSA-26-Q	0	Qal/River	N					X	X
	5	Qal/River	N			X			X
	10	Qal/River	N			X			X
	20	Qal/River	N	X	X				X
	30	Qal/River	N	X	X				X
	40	Qal/River	N	X	X				X
	50	Qal/River	N	X	X				X
	60	Qal/River	N	X					
	70	Qal/River	N	X					
	80	Qal/River	N	X					
	90	Qal/River	N	X					
	100	Qal/River	N	X					
	110	Qal/River	N	X					
	150	Qal/River	N	X	X				X
	160	Qal/River	N	X	X				X
DBSA-27-Q	0	Qal/River	N					X	X
	5	Qal/River	N			X			X
	10	Qal/River	N			X			X
	20	Qal/River	N	X	X				X
		Qal/River	FD	X	X				X
	30	Qal/River	N	X	X				X
	40	Qal/River	N	X	X				X
	50	Qal/River	N	X	X				X
	60	Qal/River	N	X	X				X
	70	Qal/River	N	X	X				X
	80	Qal/River	N	X	X				X
	90	Qal/River	N	X	X				X
DBSA-27-T	100	UMCf	N	X	X				X
DBSA-29-Q	5	Qal/River	N			X			X
	10	Qal/River	N			X			X
		Qal/River	FD			X			X
	20	Qal/River	N	X	X				X
	30	Qal/River	N	X	X				X
	40	Qal/River	N	X	X				X
	50	Qal/River	N	X	X				X
	150	Qal/River	N	X					X
	160	Qal/River	N	X					X
		Qal/River	FD	X					X

TABLE 1
PROJECT LIST OF ANALYTES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 5 of 5)

Sample ID	Sample Depth	Soil Unit (Qal or UMCf)	Sample Type	Metals	Radio-nuclides	VOCs	SVOCs	Organo-chlorine Pesticides	Soil Parameters
DBSA-30-Q	5	Qal/River	N			X			X
	10	Qal/River	N			X			X
	20	Qal/River	N	X	X				X
	30	Qal/River	N	X	X				X
	40	Qal/River	N	X	X				X
	50	Qal/River	N	X	X				X
	130	UMCf*	N	X	X				X
	140	UMCf*	N	X	X				X
DBSA-30-T	150	UMCf	N	X	X				X
	160	UMCf	N	X	X				X
DBSA-32-Q	0	Qal/River	N					X	X
	5	Qal/River	N			X			X
		Qal/River	FD			X			X
	10	Qal/River	N			X			X
	20	Qal/River	N	X	X				X
	30	Qal/River	N	X	X				X
	40	Qal/River	N	X	X				X
	50	Qal/River	N	X	X				X
	60	Qal/River	N	X	X				X
	70	UMCf*	N	X	X				X
DBSA-32-T	80	UMCf	N	X	X				X
	95	UMCf	N	X	X				X
DBSA-33-Q	0	Qal/River	N					X	X
	5	Qal/River	N			X			X
	10	Qal/River	N			X			X
	20	UMCf*	N	X	X				X
		UMCf*	FD	X	X				X
DBSA-33-T	30	UMCf	N	X	X				X

Notes:
* Despite nomenclature (i.e., the use of "Q" in the sample ID), this sample appears to be UMCf, possibly transitional.
N = Normal sample.
FD = Field Duplicate sample.
Qal/McCullough = Quaternary alluvium, interpreted McCullough Range source.
Qal/River = Quaternary alluvium, interpreted River Range source.
Qal/Mixed = Quaternary alluvium, mixed River and McCullough sources.
UMCf - Upper Muddy Creek formation.

TABLE 2
DATASET ANALYTE LIST AND DETECTION FREQUENCY
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analyte Group	Analyte	2008 Deep (All Data)			2008 Supplemental Shallow			2005 BRC/TIMET Shallow		
		Sample Size	No. of Detects	Detection Frequency	Sample Size	No. of Detects	Detection Frequency	Sample Size	No. of Detects	Detection Frequency
Metals (mg/kg)	Aluminum	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Antimony	163	155	95.1%	33	13	39.4%	120	49	40.8%
	Arsenic	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Barium	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Beryllium	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Boron	163	38	23.3%	33	15	45.5%	104	34	32.7%
	Cadmium	163	139	85.3%	33	21	63.6%	120	16	13.3%
	Calcium	163	163	100.0%	33	33	100.0%	104	104	100.0%
	Chloride	--	--	--	--	--	--	104	72	69.2%
	Chromium (Total)	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Chromium (VI)	158	38	24.1%	33	0	0.0%	104	0	0.0%
	Cobalt	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Copper	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Fluoride	--	--	--	--	--	--	104	13	12.5%
	Iron	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Lead	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Lithium	163	151	92.6%	33	6	18.2%	104	104	100.0%
	Magnesium	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Manganese	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Mercury	151	55	36.4%	33	0	0.0%	120	93	77.5%
	Molybdenum	163	140	85.9%	33	33	100.0%	120	120	100.0%
	Nickel	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Niobium	163	13	8.0%	33	1	3.0%	104	0	0.0%
	Nitrate	--	--	--	--	--	--	104	90	86.5%
	Nitrite	--	--	--	--	--	--	104	5	4.8%
	Palladium	163	163	100.0%	33	33	100.0%	104	104	100.0%
	Phosphorus	163	163	100.0%	33	33	100.0%	--	--	--
	Platinum	163	9	5.5%	33	0	0.0%	104	5	4.8%
	Potassium	163	163	100.0%	33	33	100.0%	104	104	100.0%
	Selenium	163	0	0.0%	33	0	0.0%	120	52	43.3%
	Silicon	163	163	100.0%	33	33	100.0%	104	104	100.0%
	Silver	163	163	100.0%	33	14	42.4%	120	104	13.3%
	Sodium	163	163	100.0%	33	33	100.0%	104	104	100.0%
	Strontium	163	163	100.0%	33	33	100.0%	104	81	100.0%
	Sulfate	--	--	--	--	--	--	104	42	77.9%
	Thallium	163	4	2.5%	33	6	18.2%	120	16	35.0%
	Tin	163	127	77.9%	33	16	48.5%	104	104	100.0%
	Titanium	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Tungsten	163	54	33.1%	33	2	6.1%	104	0	0.0%
	Uranium	163	163	100.0%	33	33	100.0%	103	103	100.0%
	Vanadium	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Zinc	163	163	100.0%	33	33	100.0%	120	120	100.0%
	Zirconium	163	147	90.2%	33	13	39.4%	104	104	100.0%

TABLE 2
DATASET ANALYTE LIST AND DETECTION FREQUENCY
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 2 of 2)

Analyte Group	Analyte	2008 Deep (All Data)			2008 Supplemental Shallow			2005 BRC/TIMET Shallow		
		Sample Size	No. of Detects	Detection Frequency	Sample Size	No. of Detects	Detection Frequency	Sample Size	No. of Detects	Detection Frequency
Radionuclides (pCi/g)	Actinium-227	--	--	--	--	--	--	104	0	0.0%
	Actinium-228	--	--	--	--	--	--	120	120	100.0%
	Bismuth-210	--	--	--	--	--	--	104	1	1.0%
	Bismuth-211	--	--	--	--	--	--	104	0	0.0%
	Bismuth 212	--	--	--	--	--	--	120	68	56.7%
	Bismuth-214	--	--	--	--	--	--	120	120	100.0%
	Cobalt-57	--	--	--	--	--	--	104	0	0.0%
	Cobalt-60	--	--	--	--	--	--	104	0	0.0%
	Lead-210	--	--	--	--	--	--	120	2	1.7%
	Lead-211	--	--	--	--	--	--	104	0	0.0%
	Lead-212	--	--	--	--	--	--	120	120	100.0%
	Lead-214	--	--	--	--	--	--	120	120	100.0%
	Polonium-210	--	--	--	--	--	--	104	1	1.0%
	Polonium-212	--	--	--	--	--	--	104	64	61.5%
	Polonium-214	--	--	--	--	--	--	104	104	100.0%
	Polonium-215	--	--	--	--	--	--	104	0	0.0%
	Polonium-216	--	--	--	--	--	--	104	104	100.0%
	Polonium-218	--	--	--	--	--	--	104	96	92.3%
	Potassium-40	--	--	--	--	--	--	120	120	100.0%
	Protactinium-234	--	--	--	--	--	--	104	0	0.0%
	Radium-223	--	--	--	--	--	--	104	0	0.0%
	Radium-224	--	--	--	--	--	--	104	104	100.0%
	Radium 226	125	121	96.8%	33	31	93.9%	104	96	92.3%
	Radium 228	124	122	98.4%	33	28	84.8%	84	68	81.0%
	Thallium-207	--	--	--	--	--	--	104	0	0.0%
	Thallium-208	--	--	--	--	--	--	120	120	100.0%
	Thorium-227	--	--	--	--	--	--	104	0	0.0%
	Thorium-228	159	159	100.0%	33	33	100.0%	120	120	100.0%
	Thorium-230	159	159	100.0%	33	27	81.8%	120	120	100.0%
	Thorium-231	--	--	--	--	--	--	104	11	10.6%
	Thorium-232	159	159	100.0%	33	33	100.0%	120	120	100.0%
	Thorium-234	--	--	--	--	--	--	120	65	54.2%
	Uranium-233/234	141	126	89.4%	33	33	100.0%	120	61	50.8%
	Uranium-235/236	141	111	78.7%	33	11	33.3%	120	54	45.0%
	Uranium-238	141	124	87.9%	33	33	100.0%	120	120	100.0%

Notes:

mg/kg milligrams per kilogram
Max maximum concentration
Min minimum concentration
pCi/g picocuries per gram
ND Non-detect

TABLE 3
ORGANOCHLORINE PESTICIDES, SVOCs, AND VOCs ANALYTICAL RESULTS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analytical Method	Chemical	DBSA-01			DBSA-02		DBSA-03		DBSA-04		DBSA-08		DBSA-09	
		0	5	10	5	10	5	10	5	10	5	10	5	10
		N	N	N	N	N	N	N	N	N	N	N	N	N
Organo-chlorine Pesticides	2,4-DDD	< 0.11 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-DDE	6.5 J-	--	--	--	--	--	--	--	--	--	--	--	--
	4,4-DDD	2.6 J-	--	--	--	--	--	--	--	--	--	--	--	--
	4,4-DDE	16 J-	--	--	--	--	--	--	--	--	--	--	--	--
	4,4-DDT	12 J-	--	--	--	--	--	--	--	--	--	--	--	--
	Aldrin	< 0.089 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	alpha-BHC	< 0.097 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	alpha-Chlordane	< 0.1 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	beta-BHC	3.1 J-	--	--	--	--	--	--	--	--	--	--	--	--
	Chlordane	< 2.3 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	delta-BHC	< 0.084 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	Dieldrin	< 0.073 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	Endosulfan I	< 0.084 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	Endosulfan II	< 0.15 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	Endosulfan sulfate	< 0.12 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	Endrin	< 0.084 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	Endrin aldehyde	< 0.11 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	Endrin ketone	< 0.39 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	gamma-Chlordane	< 0.087 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	Heptachlor	< 0.6 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	Heptachlor epoxide	< 0.12 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	Lindane	< 0.084 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	Methoxychlor	< 0.71 UJ	--	--	--	--	--	--	--	--	--	--	--	--
	Toxaphene	< 7.2 UJ	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs	1,2,4,5-Tetrachlorobenzene	--	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--
	1,2-Diphenylhydrazine	--	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--
	1,4-Dioxane	--	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--
	2,2'-/4,4'-Dichlorobenzil	--	< 360 U	< 370 U	< 350 U	< 350 U	--	--	--	--	--	--	--	--
	2,4,5-Trichlorophenol	--	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--
	2,4,6-Trichlorophenol	--	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--
	2,4-Dichlorophenol	--	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--
	2,4-Dimethylphenol	--	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--
	2,4-Dinitrophenol	< 360 UJ	< 370 UJ	< 350 UJ	< 350 UJ	--	--	--	--	--	--	--	--	--
	2,4-Dinitrotoluene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	2,6-Dinitrotoluene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	2-Chloronaphthalene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	2-Chlorophenol	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	2-Methylnaphthalene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	2-Nitroaniline	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	2-Nitrophenol	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	3,3'-Dichlorobenzidine	**< 36 UJ**	**< 38 UJ**	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	3-Methylphenol & 4-Methylphenol	< 72 UJ	< 75 UJ	< 70 UJ	< 70 UJ	--	--	--	--	--	--	--	--	--
	3-Nitroaniline	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	4-Bromophenyl phenyl ether	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	4-Chloro-3-Methylphenol	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	4-Chlorophenyl phenyl ether	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	4-Chlorothioanisole	< 8.2 UJ	< 8.6 UJ	< 8.1 UJ	< 8 UJ	--	--	--	--	--	--	--	--	--
	4-Nitrophenol	< 360 UJ	< 370 UJ	< 350 UJ	< 350 UJ	--	--	--	--	--	--	--	--	--
	Acenaphthene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--

TABLE 3
ORGANOCHLORINE PESTICIDES, SVOCs, AND VOCs ANALYTICAL RESULTS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analytical Method	Chemical	DBSA-01			DBSA-02		DBSA-03		DBSA-04		DBSA-08		DBSA-09	
		0	5	10	5	10	5	10	5	10	5	10	5	10
		N	N	N	N	N	N	N	N	N	N	N	N	N
SVOCs	Acenaphthylene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Acetophenone	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Aniline	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Anthracene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Azobenzene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Benzenethiol	< 130 UJ	< 140 UJ	< 130 UJ	< 130 UJ	--	--	--	--	--	--	--	--	--
	Benzo(a)anthracene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Benzo(a)pyrene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Benzo(b)fluoranthene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Benzo(g,h,i)perylene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Benzo(k)fluoranthene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Benzoic acid	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Benzyl alcohol	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Benzyl butyl phthalate	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	bis(2-Chloroethoxy) methane	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	bis(2-Chloroethyl) ether	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	bis(2-Chloroisopropyl) ether	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	bis(2-Ethylhexyl) phthalate	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	bis(p-Chlorophenyl) disulfide	< 220 UJ	< 230 UJ	< 210 UJ	< 210 UJ	--	--	--	--	--	--	--	--	--
	bis(p-Chlorophenyl) sulfone	< 360 UJ	< 370 UJ	< 350 UJ	< 350 UJ	--	--	--	--	--	--	--	--	--
	Carbazole	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Chrysene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Dibenzo(a,h)anthracene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Dibenzofuran	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Dibutyl phthalate	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Diethyl phthalate	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Dimethyl phthalate	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Di-n-octyl phthalate	< 16 UJ	< 17 UJ	< 16 UJ	< 15 UJ	--	--	--	--	--	--	--	--	--
	Diphenyl sulfone	< 7.2 UJ	< 7.5 UJ	< 7 UJ	< 7 UJ	--	--	--	--	--	--	--	--	--
	Fluoranthene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Fluorene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Hexachloro-1,3-butadiene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Hexachlorobenzene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Hexachlorocyclopentadiene	< 360 UJ	< 370 UJ	< 350 UJ	< 350 UJ	--	--	--	--	--	--	--	--	--
	Hexachloroethane	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Hydroxymethyl phthalimide	< 47 UJ	< 49 UJ	< 46 UJ	< 46 UJ	--	--	--	--	--	--	--	--	--
	Indeno(1,2,3-cd)pyrene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Isophorone	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Naphthalene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Nitrobenzene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	N-nitrosodi-n-propylamine	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	N-nitrosodiphenylamine	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	o-Cresol	< 130 UJ	< 130 UJ	< 130 UJ	< 120 UJ	--	--	--	--	--	--	--	--	--
	Octachlorostyrene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	p-Chloroaniline	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	p-Chlorothiophenol	< 200 UJ	< 210 UJ	< 200 UJ	< 190 UJ	--	--	--	--	--	--	--	--	--
	Pentachlorobenzene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Pentachlorophenol	< 360 UJ	< 370 UJ	< 350 UJ	< 350 UJ	--	--	--	--	--	--	--	--	--
	Phenanthrene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--

TABLE 3
ORGANOCHLORINE PESTICIDES, SVOCs, AND VOCs ANALYTICAL RESULTS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 3 of 16)

Analytical Method	Chemical	DBSA-01			DBSA-02		DBSA-03		DBSA-04		DBSA-08		DBSA-09	
		0	5	10	5	10	5	10	5	10	5	10	5	10
		N	N	N	N	N	N	N	N	N	N	N	N	N
SVOCs	Phenol	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Phenyl Disulfide	< 31 UJ	< 32 UJ	< 30 UJ	< 30 UJ	--	--	--	--	--	--	--	--	--
	Phenyl Sulfide	< 3.8 UJ	< 4 UJ	< 3.7 UJ	< 3.7 UJ	--	--	--	--	--	--	--	--	--
	Phthalic acid	< 270 UJ	< 280 UJ	< 260 UJ	< 260 UJ	--	--	--	--	--	--	--	--	--
	p-Nitroaniline	< 360 UJ	< 370 UJ	< 350 UJ	< 350 UJ	--	--	--	--	--	--	--	--	--
	Pyrene	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
	Pyridine	< 36 UJ	< 38 UJ	< 35 UJ	< 35 UJ	--	--	--	--	--	--	--	--	--
VOCs	1,1,1,2-Tetrachloroethane	--	R	R	< 0.24 UJ	< 0.23 UJ	< 0.23 UJ	< 0.24 UJ	< 0.23 U	< 0.23 U	< 0.23 U	< 0.24 U	< 0.23 U	< 0.23 U
	1,1,1-Trichloroethane	--	R	R	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
	1,1,2,2-Tetrachloroethane	--	R	R	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
	1,1,2-Trichloroethane	--	R	R	< 0.3 UJ	< 0.3 UJ	< 0.3 UJ	< 0.3 UJ	< 0.3 U	< 0.29 U	< 0.3 U	< 0.3 U	< 0.29 U	< 0.3 U
	1,1-Dichloroethane	--	R	R	< 1 UJ	< 1 UJ	< 0.99 UJ	< 1 UJ	< 1 U	< 0.99 U	< 0.99 U	< 1 U	< 0.99 U	< 1 U
	1,1-Dichloroethylene	--	R	R	< 0.58 UJ	< 0.58 UJ	< 0.57 UJ	< 0.58 UJ	< 0.57 U	< 0.57 U	< 0.57 U	< 0.58 U	< 0.57 U	< 0.58 U
	1,1-Dichloropropene	--	R	R	< 0.31 UJ	< 0.31 UJ	< 0.3 UJ	< 0.31 UJ	< 0.3 U	< 0.3 U	< 0.3 U	< 0.31 U	< 0.3 U	< 0.31 U
	1,2,3-Trichlorobenzene	--	R	R	< 0.82 UJ	< 0.82 UJ	< 0.81 UJ	< 0.82 UJ	< 0.82 U	< 0.81 U	< 0.81 U	< 0.82 U	< 0.81 U	< 0.82 U
	1,2,3-Trichloropropane	--	R	R	< 0.59 UJ	< 0.58 UJ	< 0.58 UJ	< 0.59 UJ	< 0.58 U	< 0.58 U	< 0.58 U	< 0.59 U	< 0.58 U	< 0.58 U
	1,2,4-Trichlorobenzene	--	R	R	< 0.78 UJ	< 0.77 UJ	< 0.77 UJ	< 0.77 UJ	< 0.77 U	< 0.76 U	< 0.76 U	< 0.77 U	< 0.76 U	< 0.77 U
	1,2,4-Trimethylbenzene	--	0.51 J-	R	< 0.23 UJ	< 0.23 UJ	< 0.23 UJ	< 0.23 UJ	0.67 J	0.26 J	< 0.23 U	< 0.23 U	< 0.23 U	< 0.23 U
	1,2-Dibromo-3-chloropropane (DBC	--	R	R	< 0.94 UJ	< 0.93 UJ	< 0.93 UJ	< 0.94 UJ	< 0.93 U	< 0.92 U	< 0.93 U	< 0.94 U	< 0.93 U	< 0.93 U
	1,2-Dichlorobenzene	--	R	R	< 0.16 UJ	< 0.16 UJ	< 0.16 UJ	< 0.16 UJ	< 0.16 U	< 0.16 U	< 0.16 U	< 0.16 U	< 0.16 U	< 0.16 U
	1,2-Dichloroethane	--	R	R	< 0.46 UJ	< 0.46 UJ	< 0.46 UJ	< 0.46 UJ	< 0.46 U	< 0.46 U	< 0.46 U	< 0.46 U	< 0.46 U	< 0.46 U
	1,2-Dichloroethylene	--	R	R	< 0.57 UJ	< 0.57 UJ	< 0.57 UJ	< 0.57 UJ	< 0.57 U	< 0.56 U	< 0.57 U	< 0.57 U	< 0.56 U	< 0.57 U
	1,2-Dichloropropane	--	R	R	< 0.39 UJ	< 0.39 UJ	< 0.39 UJ	< 0.39 UJ	< 0.39 U	< 0.39 U	< 0.39 U	< 0.39 U	< 0.39 U	< 0.39 U
	1,3,5- Trichlorobenzene	--	R	R	< 0.72 UJ	< 0.71 UJ	< 0.71 UJ	< 0.71 UJ	< 0.71 U	< 0.7 U	< 0.7 U	< 0.71 U	< 0.7 U	< 0.71 U
	1,3,5-Trimethylbenzene	--	R	R	< 0.22 UJ	< 0.22 UJ	< 0.22 UJ	< 0.22 UJ	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U
	1,3-Dichlorobenzene	--	R	R	< 0.14 UJ	< 0.14 UJ	< 0.14 UJ	< 0.14 UJ	< 0.14 U	< 0.14 U	< 0.14 U	< 0.14 U	< 0.14 U	< 0.14 U
	1,3-Dichloropropane	--	R	R	< 0.19 UJ	< 0.19 UJ	< 0.19 UJ	< 0.19 UJ	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U
	1,4-Dichlorobenzene	--	R	R	< 0.11 UJ	< 0.11 UJ	< 0.11 UJ	< 0.11 UJ	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U
	1-Nonanal	--	R	R	< 0.93 UJ	< 0.92 UJ	< 0.92 UJ	< 0.93 UJ	< 0.92 U	< 0.91 U	< 0.92 U	< 0.93 U	< 0.91 U	< 0.92 U
	2,2,3-Trimethylbutane	--	R	R	< 0.22 UJ	< 0.22 UJ	< 0.22 UJ	< 0.22 UJ	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U
	2,2-Dichloropropane	--	R	R	< 0.18 UJ	< 0.18 UJ	< 0.18 UJ	< 0.18 UJ	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
	2,2-Dimethylpentane	--	R	R	< 0.29 UJ	< 0.29 UJ	< 0.29 UJ	< 0.29 UJ	< 0.29 U	< 0.29 U	< 0.29 U	< 0.29 U	< 0.29 U	< 0.29 U
	2,3-Dimethylpentane	--	R	R	< 0.24 UJ	< 0.23 UJ	< 0.23 UJ	< 0.24 UJ	< 0.23 U	< 0.23 U	< 0.23 U	< 0.24 U	< 0.23 U	< 0.23 U
	2,4-Dimethylpentane	--	R	R	< 0.2 UJ	< 0.2 UJ	< 0.2 UJ	< 0.2 UJ	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
	2-Chlorotoluene	--	R	R	< 0.48 UJ	< 0.48 UJ	< 0.48 UJ	< 0.48 UJ	< 0.48 U	< 0.47 U	< 0.48 U	< 0.48 U	< 0.47 U	< 0.48 U
	2-Nitropropane	--	R	R	< 1.8 UJ	< 1.8 UJ	< 1.8 UJ	< 1.8 UJ	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U
	2-Phenylbutane	--	R	R	< 0.26 UJ	< 0.26 UJ	< 0.26 UJ	< 0.26 UJ	< 0.26 U	< 0.26 U	< 0.26 U	< 0.26 U	< 0.26 U	< 0.26 U
	3,3-dimethylpentane	--	R	R	< 0.21 UJ	< 0.21 UJ	< 0.21 UJ	< 0.21 UJ	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U
	3-ethylpentane	--	R	R	< 0.22 UJ	< 0.22 UJ	< 0.22 UJ	< 0.22 UJ	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U
	3-Methylhexane	--	R	R	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
	4-Chlorotoluene	--	R	R	< 0.93 UJ	< 0.92 UJ	< 0.92 UJ	< 0.93 UJ	< 0.92 U	< 0.92 U	< 0.92 U	< 0.93 U	< 0.92 U	< 0.92 U
	Acetone	--	10 J-	R	< 4 UJ	23 J-	< 4 UJ	14 J-	36 J+	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
	Acetonitrile	--	R	R	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ
	Benzene	--	R	R	< 0.18 UJ	< 0.18 UJ	< 0.18 UJ	< 0.18 UJ	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
	Bromobenzene	--	R	R	< 0.24 UJ	< 0.24 UJ	< 0.24 UJ	< 0.24 UJ	< 0.24 U	< 0.23 U	< 0.24 U	< 0.24 U	< 0.23 U	< 0.24 U
	Bromodichloromethane	--	R	R	< 0.35 UJ	< 0.35 UJ	< 0.35 UJ	< 0.35 UJ	< 0.35 U	< 0.35 U	< 0.35 U	< 0.35 U	< 0.35 U	< 0.35 U
	Bromomethane	--	R	R	< 0.33 UJ	< 0.33 UJ	< 0.33 UJ	< 0.33 UJ	< 0.33 U	< 0.32 U	< 0.33 U	< 0.33 U	< 0.32 U	< 0.33 U
	Carbon disulfide	--	R	R	< 0.58 UJ	< 0.58 UJ	< 0.57 UJ	< 0.58 UJ	< 0.58 U	< 0.57 U	< 0.57 U	< 0.58 U	< 0.57 U	< 0.58 U
	Carbon tetrachloride	--	R	R	< 0.96 UJ	< 0.95 UJ	< 0.94 UJ	< 0.96 UJ	< 0.95 U	< 0.94 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.95 U

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Analytical Method	Chemical	DBSA-01			DBSA-02		DBSA-03		DBSA-04		DBSA-08		DBSA-09	
		0	5	10	5	10	5	10	5	10	5	10	5	10
		N	N	N	N	N	N	N	N	N	N	N	N	N
VOCs	CFC-11	--	R	R	< 0.53 UJ	< 0.53 UJ	< 0.53 UJ	< 0.53 UJ	< 0.53 U	< 0.52 U	< 0.52 U	< 0.53 U	< 0.52 U	< 0.53 U
	CFC-12	--	R	R	< 0.4 UJ	< 0.39 UJ	< 0.39 UJ	< 0.4 UJ	< 0.39 U	< 0.39 U	< 0.39 U	< 0.39 U	< 0.39 U	< 0.39 U
	Chlorinated fluorocarbon (Freon 11	--	R	R	< 0.57 UJ	< 0.56 UJ	< 0.56 UJ	< 0.57 UJ	< 0.56 U	< 0.56 U	< 0.56 U	< 0.56 U	< 0.56 U	< 0.56 U
	Chlorobenzene	--	R	R	< 0.13 UJ	< 0.13 UJ	< 0.13 UJ	< 0.13 UJ	< 0.13 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.13 U
	Chlorobromomethane	--	R	R	< 0.43 UJ	< 0.43 UJ	< 0.43 UJ	< 0.43 UJ	< 0.43 U	< 0.43 U	< 0.43 U	< 0.43 U	< 0.43 U	< 0.43 U
	Chlorodibromomethane	--	R	R	< 0.3 UJ	< 0.3 UJ	< 0.3 UJ	< 0.3 UJ	< 0.3 U	< 0.3 U	< 0.3 U	< 0.3 U	< 0.3 U	< 0.3 U
	Chloroethane	--	R	R	< 0.37 UJ	< 0.37 UJ	< 0.37 UJ	< 0.37 UJ	< 0.37 U	< 0.36 U	< 0.37 U	< 0.37 U	< 0.36 U	< 0.37 U
	Chloroform	--	R	R	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
	Chloromethane	--	R	R	< 0.47 UJ	< 0.47 UJ	< 0.46 UJ	< 0.47 UJ	< 0.46 U	< 0.46 U	< 0.46 U	< 0.47 U	< 0.46 U	< 0.47 U
	cis-1,2-Dichloroethylene	--	R	R	< 0.45 UJ	< 0.45 UJ	< 0.45 UJ	< 0.45 UJ	< 0.45 U	< 0.44 U	< 0.45 U	< 0.45 U	< 0.44 U	< 0.45 U
	cis-1,3-Dichloropropylene	--	R	R	< 0.77 UJ	< 0.76 UJ	< 0.76 UJ	< 0.77 UJ	< 0.76 U	< 0.76 U	< 0.76 U	< 0.77 U	< 0.76 U	< 0.76 U
	Cymene	--	R	R	< 0.25 UJ	< 0.25 UJ	< 0.25 UJ	< 0.25 UJ	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U
	Dibromomethane	--	R	R	< 0.37 UJ	< 0.37 UJ	< 0.37 UJ	< 0.37 UJ	< 0.37 U	< 0.36 U	< 0.37 U	< 0.37 U	< 0.36 U	< 0.37 U
	Dichloromethane	--	4.9 J-	R	3.3 J-	< 2.6 UJ	27 UJ	24 UJ	< 2.6 U	< 2.6 U	< 2.6 U	< 2.6 U	< 2.6 U	< 2.6 U
	Ethanol	--	R	R	< 210 UJ	< 200 UJ	< 200 UJ	< 210 UJ	< 200 UJ	< 200 UJ	< 200 UJ	< 200 UJ	< 200 U	< 200 U
	Ethylbenzene	--	R	R	< 0.2 UJ	< 0.2 UJ	< 0.19 UJ	< 0.2 UJ	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.19 U
	Hexane, 2-methyl-	--	R	R	< 0.21 UJ	< 0.21 UJ	< 0.21 UJ	< 0.21 UJ	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U
	Isopropylbenzene	--	R	R	< 0.19 UJ	< 0.19 UJ	< 0.18 UJ	< 0.19 UJ	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U
	m,p-Xylene	--	R	R	< 0.6 UJ	< 0.59 UJ	< 0.59 UJ	< 0.6 UJ	< 0.59 U	< 0.59 U	< 0.59 U	< 0.6 U	< 0.59 U	< 0.59 U
	Methyl disulfide	--	R	R	< 0.23 UJ	< 0.22 UJ	< 0.22 UJ	< 0.23 UJ	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U
	Methyl ethyl ketone	--	R	R	< 1.4 UJ	< 1.4 UJ	< 1.4 UJ	< 1.4 UJ	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U
	Methyl iodide	--	R	R	< 0.27 UJ	< 0.27 UJ	< 0.27 UJ	< 0.27 UJ	< 0.27 U	< 0.27 U	< 0.27 U	< 0.27 U	< 0.27 U	< 0.27 U
	Methyl isobutyl ketone	--	R	R	< 1.7 UJ	< 1.7 UJ	< 1.7 UJ	< 1.7 UJ	< 1.7 U	< 1.7 U	< 1.7 U	< 1.7 U	< 1.7 U	< 1.7 U
	Methyl n-butyl ketone	--	R	R	< 0.3 UJ	< 0.29 UJ	< 0.29 UJ	< 0.3 UJ	< 0.29 U	< 0.29 U	< 0.29 U	< 0.3 U	< 0.29 U	< 0.29 U
	MTBE (Methyl tert-butyl ether)	--	R	R	< 0.49 UJ	< 0.48 UJ	< 0.48 UJ	< 0.49 UJ	< 0.48 U	< 0.48 U	< 0.48 U	< 0.49 U	< 0.48 U	< 0.48 U
	n-Butyl benzene	--	R	R	< 0.56 UJ	< 0.56 UJ	< 0.55 UJ	< 0.56 UJ	< 0.56 U	< 0.55 U	< 0.55 U	< 0.56 U	< 0.55 U	< 0.56 U
	n-Heptane	--	R	R	< 0.17 UJ	< 0.17 UJ	< 0.17 UJ	< 0.17 UJ	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U
	n-Propyl benzene	--	R	R	< 1 UJ	< 0.99 UJ	< 0.99 UJ	< 1 UJ	< 0.99 U	< 0.98 U	< 0.99 U	< 1 U	< 0.98 U	< 0.99 U
	o-Xylene	--	R	R	< 0.32 UJ	< 0.32 UJ	< 0.32 UJ	< 0.32 UJ	< 0.32 U	< 0.32 U	< 0.32 U	< 0.32 U	< 0.32 U	< 0.32 U
	Styrene (monomer)	--	R	R	< 1.3 UJ	< 1.3 UJ	< 1.3 UJ	< 1.3 UJ	< 1.3 U	< 1.2 U	< 1.3 U	< 1.3 U	< 1.2 U	< 1.3 U
	tert-Butyl benzene	--	R	R	< 0.28 UJ	< 0.28 UJ	< 0.28 UJ	< 0.28 UJ	< 0.28 U	< 0.28 U	< 0.28 U	< 0.28 U	< 0.28 U	< 0.28 U
	Tetrachloroethylene	--	R	R	< 0.29 UJ	< 0.29 UJ	< 0.29 UJ	< 0.29 UJ	< 0.29 U	< 0.28 U	< 0.29 U	< 0.29 U	< 0.28 U	< 0.29 U
	Toluene	--	R	R	< 0.14 UJ	< 0.14 UJ	< 0.14 UJ	< 0.14 UJ	< 0.14 U	< 0.14 U	< 0.14 U	< 0.14 U	< 0.14 U	< 0.14 U
	trans-1,2-Dichloroethylene	--	R	R	< 0.23 UJ	< 0.23 UJ	< 0.23 UJ	< 0.23 UJ	< 0.23 U	< 0.23 U	< 0.23 U	< 0.23 U	< 0.23 U	< 0.23 U
	trans-1,3-Dichloropropylene	--	R	R	< 0.21 UJ	< 0.21 UJ	< 0.21 UJ	< 0.21 UJ	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U
	Tribromomethane	--	R	R	< 0.26 UJ	< 0.26 UJ	< 0.25 UJ	< 0.26 UJ	< 0.26 U	< 0.25 U	< 0.25 U	< 0.26 U	< 0.25 U	< 0.26 U
	Trichloroethylene	--	R	R	< 0.38 UJ	< 0.38 UJ	< 0.37 UJ	< 0.38 UJ	< 0.37 U	< 0.37 U	< 0.37 U	< 0.38 U	< 0.37 U	< 0.38 U
	Vinyl acetate	--	R	R	< 0.19 UJ	< 0.19 UJ	< 0.18 UJ	< 0.19 UJ	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U
	Vinyl chloride	--	R	R	< 0.25 UJ	< 0.25 UJ	< 0.25 UJ	< 0.25 UJ	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U
	Xylenes (total)	--	R	R	< 0.91 UJ	< 0.9 UJ	< 0.89 UJ	< 0.91 UJ	< 0.9 U	< 0.89 U	< 0.89 U	< 0.9 U	< 0.89 U	< 0.9 U

All units in µg/kg.

TABLE 3
ORGANOCHLORINE PESTICIDES, SVOCs, AND VOCs ANALYTICAL RESULTS
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Analytical Method	Chemical	DBSA-10		DBSA-11		DBSA-13		DBSA-14		DBSA-15		DBSA-17	
		5	10	5	10	5	10	5	10	5	10	5	10
		N	N	N	N	N	N	N	N	N	N	N	N
Organochlorine Pesticides	2,4-DDD	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-DDE	--	--	--	--	--	--	--	--	--	--	--	--
	4,4-DDD	--	--	--	--	--	--	--	--	--	--	--	--
	4,4-DDE	--	--	--	--	--	--	--	--	--	--	--	--
	4,4-DDT	--	--	--	--	--	--	--	--	--	--	--	--
	Aldrin	--	--	--	--	--	--	--	--	--	--	--	--
	alpha-BHC	--	--	--	--	--	--	--	--	--	--	--	--
	alpha-Chlordane	--	--	--	--	--	--	--	--	--	--	--	--
	beta-BHC	--	--	--	--	--	--	--	--	--	--	--	--
	Chlordane	--	--	--	--	--	--	--	--	--	--	--	--
	delta-BHC	--	--	--	--	--	--	--	--	--	--	--	--
	Dieldrin	--	--	--	--	--	--	--	--	--	--	--	--
	Endosulfan I	--	--	--	--	--	--	--	--	--	--	--	--
	Endosulfan II	--	--	--	--	--	--	--	--	--	--	--	--
	Endosulfan sulfate	--	--	--	--	--	--	--	--	--	--	--	--
	Endrin	--	--	--	--	--	--	--	--	--	--	--	--
	Endrin aldehyde	--	--	--	--	--	--	--	--	--	--	--	--
	Endrin ketone	--	--	--	--	--	--	--	--	--	--	--	--
	gamma-Chlordane	--	--	--	--	--	--	--	--	--	--	--	--
	Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--
	Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--
	Lindane	--	--	--	--	--	--	--	--	--	--	--	--
	Methoxychlor	--	--	--	--	--	--	--	--	--	--	--	--
	Toxaphene	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs	1,2,4,5-Tetrachlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	1,2-Diphenylhydrazine	--	--	--	--	--	--	--	--	--	--	--	--
	1,4-Dioxane	--	--	--	--	--	--	--	--	--	--	--	--
	2,2'-/4,4'-Dichlorobenzil	--	--	--	--	--	--	--	--	--	--	--	--
	2,4,5-Trichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4,6-Trichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-Dichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-Dimethylphenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-Dinitrophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-Dinitrotoluene	--	--	--	--	--	--	--	--	--	--	--	--
	2,6-Dinitrotoluene	--	--	--	--	--	--	--	--	--	--	--	--
	2-Chloronaphthalene	--	--	--	--	--	--	--	--	--	--	--	--
	2-Chlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--	--	--
	2-Nitroaniline	--	--	--	--	--	--	--	--	--	--	--	--
	2-Nitrophenol	--	--	--	--	--	--	--	--	--	--	--	--
	3,3'-Dichlorobenzidine	--	--	--	--	--	--	--	--	--	--	--	--
	3-Methylphenol & 4-Methylphenol	--	--	--	--	--	--	--	--	--	--	--	--
	3-Nitroaniline	--	--	--	--	--	--	--	--	--	--	--	--
	4-Bromophenyl phenyl ether	--	--	--	--	--	--	--	--	--	--	--	--
	4-Chloro-3-Methylphenol	--	--	--	--	--	--	--	--	--	--	--	--
	4-Chlorophenyl phenyl ether	--	--	--	--	--	--	--	--	--	--	--	--
	4-Chlorothioanisole	--	--	--	--	--	--	--	--	--	--	--	--
	4-Nitrophenol	--	--	--	--	--	--	--	--	--	--	--	--
	Acenaphthene	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 3
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2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analytical Method	Chemical	DBSA-10		DBSA-11		DBSA-13		DBSA-14		DBSA-15		DBSA-17	
		5	10	5	10	5	10	5	10	5	10	5	10
		N	N	N	N	N	N	N	N	N	N	N	N
SVOCs	Acenaphthylene	--	--	--	--	--	--	--	--	--	--	--	--
	Acetophenone	--	--	--	--	--	--	--	--	--	--	--	--
	Aniline	--	--	--	--	--	--	--	--	--	--	--	--
	Anthracene	--	--	--	--	--	--	--	--	--	--	--	--
	Azobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzenethiol	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(a)pyrene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(g,h,i)perylene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzoic acid	--	--	--	--	--	--	--	--	--	--	--	--
	Benzyl alcohol	--	--	--	--	--	--	--	--	--	--	--	--
	Benzyl butyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	bis(2-Chloroethoxy) methane	--	--	--	--	--	--	--	--	--	--	--	--
	bis(2-Chloroethyl) ether	--	--	--	--	--	--	--	--	--	--	--	--
	bis(2-Chloroisopropyl) ether	--	--	--	--	--	--	--	--	--	--	--	--
	bis(2-Ethylhexyl) phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	bis(p-Chlorophenyl) disulfide	--	--	--	--	--	--	--	--	--	--	--	--
	bis(p-Chlorophenyl) sulfone	--	--	--	--	--	--	--	--	--	--	--	--
	Carbazole	--	--	--	--	--	--	--	--	--	--	--	--
	Chrysene	--	--	--	--	--	--	--	--	--	--	--	--
	Dibenzo(a,h)anthracene	--	--	--	--	--	--	--	--	--	--	--	--
	Dibenzofuran	--	--	--	--	--	--	--	--	--	--	--	--
	Dibutyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	Diethyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	Dimethyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	Di-n-octyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	Diphenyl sulfone	--	--	--	--	--	--	--	--	--	--	--	--
	Fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
	Fluorene	--	--	--	--	--	--	--	--	--	--	--	--
	Hexachloro-1,3-butadiene	--	--	--	--	--	--	--	--	--	--	--	--
	Hexachlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	Hexachlorocyclopentadiene	--	--	--	--	--	--	--	--	--	--	--	--
	Hexachloroethane	--	--	--	--	--	--	--	--	--	--	--	--
	Hydroxymethyl phthalimide	--	--	--	--	--	--	--	--	--	--	--	--
	Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--	--	--
	Isophorone	--	--	--	--	--	--	--	--	--	--	--	--
	Naphthalene	--	--	--	--	--	--	--	--	--	--	--	--
	Nitrobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	N-nitrosodi-n-propylamine	--	--	--	--	--	--	--	--	--	--	--	--
	N-nitrosodiphenylamine	--	--	--	--	--	--	--	--	--	--	--	--
	o-Cresol	--	--	--	--	--	--	--	--	--	--	--	--
	Octachlorostyrene	--	--	--	--	--	--	--	--	--	--	--	--
	p-Chloroaniline	--	--	--	--	--	--	--	--	--	--	--	--
	p-Chlorothiophenol	--	--	--	--	--	--	--	--	--	--	--	--
	Pentachlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	Pentachlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	Phenanthrene	--	--	--	--	--	--	--	--	--	--	--	--

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Analytical Method	Chemical	DBSA-10		DBSA-11		DBSA-13		DBSA-14		DBSA-15		DBSA-17	
		5	10	5	10	5	10	5	10	5	10	5	10
		N	N	N	N	N	N	N	N	N	N	N	N
SVOCs	Phenol	--	--	--	--	--	--	--	--	--	--	--	--
	Phenyl Disulfide	--	--	--	--	--	--	--	--	--	--	--	--
	Phenyl Sulfide	--	--	--	--	--	--	--	--	--	--	--	--
	Phthalic acid	--	--	--	--	--	--	--	--	--	--	--	--
	p-Nitroaniline	--	--	--	--	--	--	--	--	--	--	--	--
	Pyrene	--	--	--	--	--	--	--	--	--	--	--	--
	Pyridine	--	--	--	--	--	--	--	--	--	--	--	--
VOCs	1,1,1,2-Tetrachloroethane	< 0.25 U	< 0.24 U	< 0.26 UJ	< 0.24 UJ	< 0.24 U	< 0.24 U	< 0.24 UJ	< 0.24 UJ	< 0.24 UJ	< 0.24 UJ	< 0.24 U	< 0.23 U
	1,1,1-Trichloroethane	< 0.16 U	< 0.16 U	< 0.17 UJ	< 0.16 UJ	< 0.15 U	< 0.16 U	< 0.16 UJ	< 0.15 UJ	< 0.16 UJ	< 0.16 UJ	< 0.16 U	< 0.15 U
	1,1,2,2-Tetrachloroethane	< 0.15 U	< 0.15 U	< 0.16 UJ	< 0.15 UJ	< 0.15 U	< 0.15 U	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 U	< 0.15 U
	1,1,2-Trichloroethane	< 0.31 U	< 0.3 U	< 0.33 UJ	< 0.31 UJ	< 0.3 U	< 0.3 U	< 0.3 UJ	< 0.3 UJ	< 0.3 UJ	< 0.3 UJ	< 0.3 U	< 0.3 U
	1,1-Dichloroethane	< 1 U	< 1 U	< 1.1 UJ	< 1 UJ	< 1 U	< 1 U	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 U	< 1 U
	1,1-Dichloroethylene	< 0.6 U	< 0.58 U	< 0.64 UJ	< 0.59 UJ	< 0.58 U	< 0.59 U	< 0.59 UJ	< 0.58 UJ	< 0.59 UJ	< 0.59 UJ	< 0.58 U	< 0.58 U
	1,1-Dichloropropene	< 0.32 U	< 0.31 U	< 0.34 UJ	< 0.31 UJ	< 0.31 U	< 0.31 U	< 0.31 UJ	< 0.31 UJ	< 0.31 UJ	< 0.31 UJ	< 0.31 U	< 0.3 U
	1,2,3-Trichlorobenzene	< 0.85 U	< 0.83 U	< 0.91 UJ	< 0.84 UJ	< 0.82 U	< 0.83 U	< 0.83 UJ	< 0.82 UJ	< 0.83 UJ	< 0.83 UJ	< 0.83 U	< 0.82 U
	1,2,3-Trichloropropane	< 0.61 U	< 0.59 U	< 0.65 UJ	< 0.6 UJ	< 0.59 U	< 0.59 U	< 0.6 UJ	< 0.59 UJ	< 0.6 UJ	< 0.59 UJ	< 0.59 U	< 0.58 U
	1,2,4-Trichlorobenzene	< 0.8 U	< 0.78 U	< 0.85 UJ	< 0.79 UJ	< 0.77 U	< 0.78 U	< 0.79 UJ	< 0.77 UJ	< 0.78 UJ	< 0.78 UJ	< 0.78 U	< 0.77 U
	1,2,4-Trimethylbenzene	< 0.24 U	< 0.23 U	< 0.25 UJ	< 0.24 UJ	0.32 J	0.39 J	< 0.23 UJ	< 0.23 UJ	< 0.23 UJ	< 0.23 UJ	< 0.23 U	< 0.23 U
	1,2-Dibromo-3-chloropropane (DBC	< 0.98 U	< 0.95 U	< 1 UJ	< 0.96 UJ	< 0.94 U	< 0.95 U	< 0.95 UJ	< 0.94 UJ	< 0.95 UJ	< 0.95 UJ	< 0.95 U	< 0.93 U
	1,2-Dichlorobenzene	< 0.16 U	< 0.16 U	< 0.17 UJ	< 0.16 UJ	< 0.16 U	< 0.16 U	< 0.16 UJ	< 0.16 UJ	< 0.16 UJ	< 0.16 UJ	< 0.16 U	< 0.16 U
	1,2-Dichloroethane	< 0.48 U	< 0.47 U	< 0.51 UJ	< 0.47 UJ	< 0.46 U	< 0.47 U	< 0.47 UJ	< 0.46 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 U	< 0.46 U
	1,2-Dichloroethylene	< 0.6 U	< 0.58 U	< 0.63 UJ	< 0.59 UJ	< 0.57 U	< 0.58 U	< 0.58 UJ	< 0.57 UJ	< 0.58 UJ	< 0.58 UJ	< 0.58 U	< 0.57 U
	1,2-Dichloropropane	< 0.41 U	< 0.4 U	< 0.43 UJ	< 0.4 UJ	< 0.39 U	< 0.4 U	< 0.4 UJ	< 0.39 UJ	< 0.4 UJ	< 0.4 UJ	< 0.4 U	< 0.39 U
	1,3,5- Trichlorobenzene	< 0.74 U	< 0.72 U	< 0.79 UJ	< 0.73 UJ	< 0.71 U	< 0.72 U	< 0.72 UJ	< 0.71 UJ	< 0.72 UJ	< 0.72 UJ	< 0.72 U	< 0.71 U
	1,3,5-Trimethylbenzene	< 0.23 U	< 0.22 U	< 0.25 UJ	< 0.23 UJ	< 0.22 U	< 0.23 U	< 0.23 UJ	< 0.22 UJ	< 0.23 UJ	< 0.22 UJ	< 0.22 U	< 0.22 U
	1,3-Dichlorobenzene	< 0.14 U	< 0.14 U	< 0.15 UJ	< 0.14 UJ	< 0.14 U	< 0.14 U	< 0.14 UJ	< 0.14 UJ	< 0.14 UJ	< 0.14 UJ	< 0.14 U	< 0.14 U
	1,3-Dichloropropane	< 0.2 U	< 0.19 U	< 0.21 UJ	< 0.19 UJ	< 0.19 U	< 0.19 U	< 0.19 UJ	< 0.19 UJ	< 0.19 UJ	< 0.19 UJ	< 0.19 U	< 0.19 U
	1,4-Dichlorobenzene	< 0.12 U	< 0.12 U	< 0.13 UJ	< 0.12 UJ	< 0.11 U	< 0.12 U	< 0.12 UJ	< 0.11 UJ	< 0.12 UJ	< 0.12 UJ	< 0.11 U	< 0.11 U
	1-Nonanal	< 0.97 U	< 0.94 U	< 1 UJ	< 0.95 UJ	< 0.93 U	< 0.94 U	< 0.94 UJ	< 0.93 UJ	< 0.94 UJ	< 0.94 UJ	< 0.93 U	< 0.92 U
	2,2,3-Trimethylbutane	< 0.23 U	< 0.22 U	< 0.24 UJ	< 0.23 UJ	< 0.22 U	< 0.22 U	< 0.23 UJ	< 0.22 UJ	< 0.22 UJ	< 0.22 UJ	< 0.22 U	< 0.22 U
	2,2-Dichloropropane	< 0.19 U	< 0.18 U	< 0.2 UJ	< 0.19 UJ	< 0.18 U	< 0.18 U	< 0.19 UJ	< 0.18 UJ	< 0.19 UJ	< 0.18 UJ	< 0.18 U	< 0.18 U
	2,2-Dimethylpentane	< 0.3 U	< 0.29 U	< 0.32 UJ	< 0.3 UJ	< 0.29 U	< 0.29 U	< 0.29 UJ	< 0.29 UJ	< 0.29 UJ	< 0.29 UJ	< 0.29 U	< 0.29 U
	2,3-Dimethylpentane	< 0.25 U	< 0.24 U	< 0.26 UJ	< 0.24 UJ	< 0.24 U	< 0.24 U	< 0.24 UJ	< 0.24 UJ	< 0.24 UJ	< 0.24 UJ	< 0.24 U	< 0.23 U
	2,4-Dimethylpentane	< 0.21 U	< 0.21 U	< 0.22 UJ	< 0.21 UJ	< 0.2 U	< 0.21 U	< 0.21 UJ	< 0.2 UJ	< 0.21 UJ	< 0.21 UJ	< 0.21 U	< 0.2 U
	2-Chlorotoluene	< 0.5 U	< 0.49 U	< 0.53 UJ	< 0.49 UJ	< 0.48 U	< 0.49 U	< 0.49 UJ	< 0.48 UJ	< 0.49 UJ	< 0.49 UJ	< 0.48 U	< 0.48 U
	2-Nitropropane	< 1.9 U	< 1.9 U	< 2 UJ	< 1.9 UJ	< 1.8 U	< 1.9 U	< 1.9 UJ	< 1.8 UJ	< 1.9 UJ	< 1.9 UJ	< 1.8 U	< 1.8 U
	2-Phenylbutane	< 0.27 U	< 0.26 U	< 0.29 UJ	< 0.27 UJ	< 0.26 U	< 0.26 U	< 0.26 UJ	< 0.26 UJ	< 0.26 UJ	< 0.26 UJ	< 0.26 U	< 0.26 U
	3,3-dimethylpentane	< 0.22 U	< 0.22 U	< 0.24 UJ	< 0.22 UJ	< 0.21 U	< 0.22 U	< 0.22 UJ	< 0.21 UJ	< 0.22 UJ	< 0.22 UJ	< 0.22 U	< 0.21 U
	3-ethylpentane	< 0.23 U	< 0.22 U	< 0.24 UJ	< 0.23 UJ	< 0.22 U	< 0.22 U	< 0.23 UJ	< 0.22 UJ	< 0.22 UJ	< 0.22 UJ	< 0.22 U	< 0.22 U
	3-Methylhexane	< 0.15 U	< 0.15 U	< 0.16 UJ	< 0.15 UJ	< 0.15 U	< 0.15 U	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 U	< 0.15 U
	4-Chlorotoluene	< 0.97 U	< 0.94 U	< 1 UJ	< 0.95 UJ	< 0.93 U	< 0.94 U	< 0.94 UJ	< 0.93 UJ	< 0.94 UJ	< 0.94 UJ	< 0.94 U	< 0.92 U
	Acetone	< 4.2 U	< 4.1 U	25 J	16 J	21 UJ	21 UJ	14 J	11 J	21 UJ	21 UJ	< 4 U	< 4 U
	Acetonitrile	< 2.2 UJ	< 2.1 UJ	< 2.3 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ
	Benzene	< 0.19 U	< 0.18 U	< 0.2 UJ	< 0.18 UJ	< 0.18 U	< 0.18 U	< 0.18 UJ	< 0.18 UJ	< 0.18 UJ	< 0.18 UJ	< 0.18 U	< 0.18 U
	Bromobenzene	< 0.25 U	< 0.24 U	< 0.26 UJ	< 0.24 UJ	< 0.24 U	< 0.24 U	< 0.24 UJ	< 0.24 UJ	< 0.24 UJ	< 0.24 UJ	< 0.24 U	< 0.24 U
	Bromodichloromethane	< 0.37 U	< 0.36 U	< 0.39 UJ	< 0.36 UJ	< 0.35 U	< 0.36 U	< 0.36 UJ	< 0.35 UJ	< 0.36 UJ	< 0.36 UJ	< 0.35 U	< 0.35 U
	Bromomethane	< 0.34 U	< 0.33 U	< 0.36 UJ	< 0.34 UJ	< 0.33 U	< 0.33 U	< 0.33 UJ	< 0.33 UJ	< 0.33 UJ	< 0.33 UJ	< 0.33 U	< 0.33 U
	Carbon disulfide	< 0.6 U	< 0.59 U	< 0.64 UJ	< 0.59 UJ	< 0.58 U	< 0.59 U	< 0.59 UJ	< 0.58 UJ	< 0.59 UJ	< 0.59 UJ	< 0.58 U	< 0.58 U
	Carbon tetrachloride	< 0.99 U	< 0.96 U	< 1.1 UJ	< 0.98 UJ	< 0.95 U	< 0.96 U	< 0.97 UJ	< 0.95 UJ	< 0.97 UJ	< 0.96 UJ	< 0.96 U	< 0.95 U

TABLE 3
ORGANOCHLORINE PESTICIDES, SVOCs, AND VOCs ANALYTICAL RESULTS
2008 DEEP BACKGROUND STUDY
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Analytical Method	Chemical	DBSA-10		DBSA-11		DBSA-13		DBSA-14		DBSA-15		DBSA-17	
		5	10	5	10	5	10	5	10	5	10	5	10
		N	N	N	N	N	N	N	N	N	N	N	N
VOCs	CFC-11	< 0.55 U	< 0.54 U	< 0.59 UJ	< 0.54 UJ	< 0.53 U	< 0.54 U	< 0.54 UJ	< 0.53 UJ	< 0.54 UJ	< 0.54 UJ	< 0.53 U	< 0.53 U
	CFC-12	< 0.41 U	< 0.4 U	< 0.44 UJ	< 0.4 UJ	< 0.39 U	< 0.4 U	< 0.4 UJ	< 0.39 UJ	< 0.4 UJ	< 0.4 UJ	< 0.4 U	< 0.39 U
	Chlorinated fluorocarbon (Freon 113	< 0.59 U	< 0.57 U	< 0.62 UJ	< 0.58 UJ	< 0.56 U	< 0.57 U	< 0.57 UJ	< 0.56 UJ	< 0.57 UJ	< 0.57 UJ	< 0.57 U	< 0.56 U
	Chlorobenzene	< 0.14 U	< 0.13 U	< 0.14 UJ	< 0.13 UJ	< 0.13 U	< 0.13 U	< 0.13 UJ	< 0.13 UJ	< 0.13 UJ	< 0.13 UJ	< 0.13 U	< 0.13 U
	Chlorobromomethane	< 0.45 U	< 0.44 U	< 0.48 UJ	< 0.44 UJ	< 0.43 U	< 0.44 U	< 0.44 UJ	< 0.43 UJ	< 0.44 UJ	< 0.44 UJ	< 0.44 U	< 0.43 U
	Chlorodibromomethane	< 0.32 U	< 0.31 U	< 0.34 UJ	< 0.31 UJ	< 0.3 U	< 0.31 U	< 0.31 UJ	< 0.3 UJ	< 0.31 UJ	< 0.31 UJ	< 0.31 U	< 0.3 U
	Chloroethane	< 0.39 U	< 0.37 U	< 0.41 UJ	< 0.38 UJ	< 0.37 U	< 0.37 U	< 0.38 UJ	< 0.37 UJ	< 0.38 UJ	< 0.37 UJ	< 0.37 U	< 0.37 U
	Chloroform	< 0.16 U	< 0.15 U	< 0.17 UJ	< 0.15 UJ	< 0.15 U	< 0.15 U	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 UJ	< 0.15 U	< 0.15 U
	Chloromethane	< 0.49 U	< 0.47 U	< 0.52 UJ	< 0.48 UJ	< 0.47 U	< 0.47 U	< 0.48 UJ	< 0.47 UJ	< 0.48 UJ	< 0.47 UJ	< 0.47 U	< 0.47 U
	cis-1,2-Dichloroethylene	< 0.47 U	< 0.46 U	< 0.5 UJ	< 0.46 UJ	< 0.45 U	< 0.46 U	< 0.46 UJ	< 0.45 UJ	< 0.46 UJ	< 0.46 UJ	< 0.45 U	< 0.45 U
	cis-1,3-Dichloropropylene	< 0.8 U	< 0.78 U	< 0.85 UJ	< 0.79 UJ	< 0.77 U	< 0.78 U	< 0.78 UJ	< 0.77 UJ	< 0.78 UJ	< 0.78 UJ	< 0.77 U	< 0.76 U
	Cymene	< 0.26 U	< 0.25 U	< 0.28 UJ	< 0.26 UJ	< 0.25 U	< 0.25 U	< 0.26 UJ	< 0.25 UJ	< 0.25 UJ	< 0.25 UJ	< 0.25 U	< 0.25 U
	Dibromomethane	< 0.39 U	< 0.37 U	< 0.41 UJ	< 0.38 UJ	< 0.37 U	< 0.37 U	< 0.38 UJ	< 0.37 UJ	< 0.38 UJ	< 0.37 UJ	< 0.37 U	< 0.37 U
	Dichloromethane	< 2.7 U	< 2.7 U	< 2.9 UJ	< 2.7 UJ	< 2.6 U	< 2.7 U	< 2.7 UJ	< 2.6 UJ	< 2.7 UJ	< 2.7 UJ	< 2.7 U	< 2.6 U
	Ethanol	< 210 UJ	< 210 UJ	< 230 UJ	< 210 UJ	< 200 UJ	< 210 UJ	< 210 UJ	< 200 UJ	< 210 UJ	< 210 UJ	< 210 UJ	< 200 UJ
	Ethylbenzene	< 0.2 U	< 0.2 U	< 0.22 UJ	< 0.2 UJ	< 0.2 U	< 0.2 U	< 0.2 UJ	< 0.2 UJ	< 0.2 UJ	< 0.2 UJ	< 0.2 U	< 0.19 U
	Hexane, 2-methyl-	< 0.22 U	< 0.22 U	< 0.24 UJ	< 0.22 UJ	< 0.21 U	< 0.22 U	< 0.22 UJ	< 0.21 UJ	< 0.22 UJ	< 0.22 UJ	< 0.22 U	< 0.21 U
	Isopropylbenzene	< 0.19 U	< 0.19 U	< 0.21 UJ	< 0.19 UJ	< 0.19 U	< 0.19 U	< 0.19 UJ	< 0.19 UJ	< 0.19 UJ	< 0.19 UJ	< 0.19 U	< 0.19 U
	m,p-Xylene	< 0.62 U	< 0.6 U	< 0.66 UJ	< 0.61 UJ	< 0.6 U	< 0.6 U	< 0.61 UJ	< 0.6 UJ	< 0.61 UJ	< 0.6 UJ	< 0.6 U	< 0.59 U
	Methyl disulfide	< 0.23 U	< 0.23 U	< 0.25 UJ	< 0.23 UJ	< 0.22 U	< 0.23 U	< 0.23 UJ	< 0.22 UJ	< 0.23 UJ	< 0.23 UJ	< 0.23 U	< 0.22 U
	Methyl ethyl ketone	< 1.5 U	< 1.5 U	< 1.6 UJ	< 1.5 UJ	< 1.4 U	< 1.5 U	< 1.5 UJ	< 1.4 UJ	< 1.5 UJ	< 1.5 UJ	< 1.5 U	< 1.4 U
	Methyl iodide	< 0.28 U	< 0.27 U	< 0.3 UJ	< 0.28 UJ	< 0.27 U	< 0.27 U	< 0.28 UJ	< 0.27 UJ	< 0.28 UJ	< 0.27 UJ	< 0.27 U	< 0.27 U
	Methyl isobutyl ketone	< 1.8 U	< 1.7 U	< 1.9 UJ	< 1.7 UJ	< 1.7 U	< 1.7 U	< 1.7 UJ	< 1.7 UJ	< 1.7 UJ	< 1.7 UJ	< 1.7 U	< 1.7 U
	Methyl n-butyl ketone	< 0.31 U	< 0.3 U	< 0.33 UJ	< 0.3 UJ	< 0.3 U	< 0.3 U	< 0.3 UJ	< 0.3 UJ	< 0.3 UJ	< 0.3 UJ	< 0.3 U	< 0.29 U
	MTBE (Methyl tert-butyl ether)	< 0.5 U	< 0.49 U	< 0.54 UJ	< 0.5 UJ	< 0.48 U	< 0.49 U	< 0.49 UJ	< 0.49 UJ	< 0.49 UJ	< 0.49 UJ	< 0.49 U	< 0.48 U
	n-Butyl benzene	< 0.58 U	< 0.57 U	< 0.62 UJ	< 0.57 UJ	< 0.56 U	< 0.57 U	< 0.57 UJ	< 0.56 UJ	< 0.57 UJ	< 0.57 UJ	< 0.56 U	< 0.56 U
	n-Heptane	< 0.18 U	< 0.17 U	< 0.19 UJ	< 0.18 UJ	< 0.17 U	< 0.17 U	< 0.17 UJ	< 0.17 UJ	< 0.17 UJ	< 0.17 UJ	< 0.17 U	< 0.17 U
	n-Propyl benzene	< 1 U	< 1 U	< 1.1 UJ	< 1 UJ	< 0.99 U	< 1 U	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 U	< 0.99 U
	o-Xylene	< 0.34 U	< 0.33 U	< 0.36 UJ	< 0.33 UJ	< 0.32 U	< 0.33 U	< 0.33 UJ	< 0.32 UJ	< 0.33 UJ	< 0.33 UJ	< 0.33 U	< 0.32 U
	Styrene (monomer)	< 1.3 U	< 1.3 U	< 1.4 UJ	< 1.3 UJ	< 1.3 U	< 1.3 U	< 1.3 UJ	< 1.3 UJ	< 1.3 UJ	< 1.3 UJ	< 1.3 U	< 1.3 U
	tert-Butyl benzene	< 0.29 U	< 0.28 U	< 0.31 UJ	< 0.29 UJ	< 0.28 U	< 0.28 U	< 0.28 UJ	< 0.28 UJ	< 0.28 UJ	< 0.28 UJ	< 0.28 U	< 0.28 U
	Tetrachloroethylene	< 0.3 U	< 0.29 U	< 0.32 UJ	< 0.3 UJ	< 0.29 U	< 0.29 U	< 0.29 UJ	< 0.29 UJ	< 0.29 UJ	< 0.29 UJ	< 0.29 U	< 0.29 U
	Toluene	< 0.14 U	< 0.14 U	< 0.15 UJ	< 0.14 UJ	< 0.14 U	5.3 U	< 0.14 UJ	< 0.14 UJ	< 0.14 UJ	< 0.14 UJ	< 0.14 U	< 0.14 U
	trans-1,2-Dichloroethylene	< 0.24 U	< 0.24 U	< 0.26 UJ	< 0.24 UJ	< 0.23 U	< 0.24 U	< 0.24 UJ	< 0.23 UJ	< 0.24 UJ	< 0.24 UJ	< 0.23 U	< 0.23 U
	trans-1,3-Dichloropropylene	< 0.22 U	< 0.22 U	< 0.24 UJ	< 0.22 UJ	< 0.21 U	< 0.22 U	< 0.22 UJ	< 0.21 UJ	< 0.22 UJ	< 0.22 UJ	< 0.21 U	< 0.21 U
	Tribromomethane	< 0.27 U	< 0.26 U	< 0.28 UJ	< 0.26 UJ	< 0.26 U	< 0.26 U	< 0.26 UJ	< 0.26 UJ	< 0.26 UJ	< 0.26 UJ	< 0.26 U	< 0.26 U
	Trichloroethylene	< 0.39 U	< 0.38 U	< 0.42 UJ	< 0.39 UJ	< 0.38 U	< 0.38 U	< 0.38 UJ	< 0.38 UJ	< 0.38 UJ	< 0.38 UJ	< 0.38 U	< 0.38 U
	Vinyl acetate	< 0.19 U	< 0.19 U	< 0.21 UJ	< 0.19 UJ	< 0.19 U	< 0.19 U	< 0.19 UJ	< 0.19 UJ	< 0.19 UJ	< 0.19 UJ	< 0.19 U	< 0.19 U
	Vinyl chloride	< 0.26 U	< 0.25 U	< 0.28 UJ	< 0.26 UJ	< 0.25 U	< 0.25 U	< 0.25 UJ	< 0.25 UJ	< 0.25 UJ	< 0.25 UJ	< 0.25 U	< 0.25 U
	Xylenes (total)	< 0.94 U	< 0.91 U	< 1 UJ	< 0.93 UJ	< 0.9 U	< 0.91 U	< 0.92 UJ	< 0.9 UJ	< 0.92 UJ	< 0.91 UJ	< 0.91 U	< 0.9 U

All units in µg/kg.

TABLE 3
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2008 DEEP BACKGROUND STUDY
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Analytical Method	Chemical	DBSA-20		DBSA-21		DBSA-23		DBSA-26			DBSA-27		
		5	10	5	10	5	10	0	5	10	0	5	10
		N	N	N	N	N	N	N	N	N	N	N	N
Organo-chlorine Pesticides	2,4-DDD	--	--	--	--	--	--	< 0.11 U	--	--	< 0.11 UJ	--	--
	2,4-DDE	--	--	--	--	--	--	< 0.09 U	--	--	< 0.09 UJ	--	--
	4,4-DDD	--	--	--	--	--	--	< 0.16 U	--	--	< 0.16 UJ	--	--
	4,4-DDE	--	--	--	--	--	--	< 0.25 U	--	--	< 0.25 UJ	--	--
	4,4-DDT	--	--	--	--	--	--	< 0.43 U	--	--	< 0.43 UJ	--	--
	Aldrin	--	--	--	--	--	--	< 0.089 U	--	--	< 0.089 UJ	--	--
	alpha-BHC	--	--	--	--	--	--	< 0.097 U	--	--	< 0.097 UJ	--	--
	alpha-Chlordane	--	--	--	--	--	--	< 0.1 U	--	--	< 0.1 UJ	--	--
	beta-BHC	--	--	--	--	--	--	< 0.35 U	--	--	< 0.35 UJ	--	--
	Chlordane	--	--	--	--	--	--	< 2.3 U	--	--	< 2.3 UJ	--	--
	delta-BHC	--	--	--	--	--	--	< 0.084 U	--	--	< 0.084 UJ	--	--
	Dieldrin	--	--	--	--	--	--	< 0.073 U	--	--	< 0.073 UJ	--	--
	Endosulfan I	--	--	--	--	--	--	< 0.084 U	--	--	< 0.084 UJ	--	--
	Endosulfan II	--	--	--	--	--	--	< 0.15 U	--	--	< 0.15 UJ	--	--
	Endosulfan sulfate	--	--	--	--	--	--	< 0.12 U	--	--	< 0.12 UJ	--	--
	Endrin	--	--	--	--	--	--	< 0.084 U	--	--	< 0.084 UJ	--	--
	Endrin aldehyde	--	--	--	--	--	--	< 0.11 U	--	--	< 0.11 UJ	--	--
	Endrin ketone	--	--	--	--	--	--	< 0.39 U	--	--	< 0.39 UJ	--	--
	gamma-Chlordane	--	--	--	--	--	--	< 0.086 U	--	--	< 0.086 UJ	--	--
	Heptachlor	--	--	--	--	--	--	< 0.6 U	--	--	< 0.6 UJ	--	--
	Heptachlor epoxide	--	--	--	--	--	--	< 0.12 U	--	--	< 0.12 UJ	--	--
	Lindane	--	--	--	--	--	--	< 0.084 U	--	--	< 0.084 UJ	--	--
	Methoxychlor	--	--	--	--	--	--	< 0.71 U	--	--	< 0.71 UJ	--	--
	Toxaphene	--	--	--	--	--	--	< 7.2 U	--	--	< 7.2 UJ	--	--
SVOCs	1,2,4,5-Tetrachlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	1,2-Diphenylhydrazine	--	--	--	--	--	--	--	--	--	--	--	--
	1,4-Dioxane	--	--	--	--	--	--	--	--	--	--	--	--
	2,2'-/4,4'-Dichlorobenzil	--	--	--	--	--	--	--	--	--	--	--	--
	2,4,5-Trichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4,6-Trichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-Dichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-Dimethylphenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-Dinitrophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-Dinitrotoluene	--	--	--	--	--	--	--	--	--	--	--	--
	2,6-Dinitrotoluene	--	--	--	--	--	--	--	--	--	--	--	--
	2-Chloronaphthalene	--	--	--	--	--	--	--	--	--	--	--	--
	2-Chlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--	--	--
	2-Nitroaniline	--	--	--	--	--	--	--	--	--	--	--	--
	2-Nitrophenol	--	--	--	--	--	--	--	--	--	--	--	--
	3,3'-Dichlorobenzidine	--	--	--	--	--	--	--	--	--	--	--	--
	3-Methylphenol & 4-Methylphenol	--	--	--	--	--	--	--	--	--	--	--	--
	3-Nitroaniline	--	--	--	--	--	--	--	--	--	--	--	--
	4-Bromophenyl phenyl ether	--	--	--	--	--	--	--	--	--	--	--	--
	4-Chloro-3-Methylphenol	--	--	--	--	--	--	--	--	--	--	--	--
	4-Chlorophenyl phenyl ether	--	--	--	--	--	--	--	--	--	--	--	--
	4-Chlorothioanisole	--	--	--	--	--	--	--	--	--	--	--	--
	4-Nitrophenol	--	--	--	--	--	--	--	--	--	--	--	--
	Acenaphthene	--	--	--	--	--	--	--	--	--	--	--	--

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Analytical Method	Chemical	DBSA-20		DBSA-21		DBSA-23		DBSA-26			DBSA-27		
		5	10	5	10	5	10	0	5	10	0	5	10
		N	N	N	N	N	N	N	N	N	N	N	N
SVOCs	Acenaphthylene	--	--	--	--	--	--	--	--	--	--	--	--
	Acetophenone	--	--	--	--	--	--	--	--	--	--	--	--
	Aniline	--	--	--	--	--	--	--	--	--	--	--	--
	Anthracene	--	--	--	--	--	--	--	--	--	--	--	--
	Azobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzenethiol	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(a)pyrene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(g,h,i)perylene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzoic acid	--	--	--	--	--	--	--	--	--	--	--	--
	Benzyl alcohol	--	--	--	--	--	--	--	--	--	--	--	--
	Benzyl butyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	bis(2-Chloroethoxy) methane	--	--	--	--	--	--	--	--	--	--	--	--
	bis(2-Chloroethyl) ether	--	--	--	--	--	--	--	--	--	--	--	--
	bis(2-Chloroisopropyl) ether	--	--	--	--	--	--	--	--	--	--	--	--
	bis(2-Ethylhexyl) phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	bis(p-Chlorophenyl) disulfide	--	--	--	--	--	--	--	--	--	--	--	--
	bis(p-Chlorophenyl) sulfone	--	--	--	--	--	--	--	--	--	--	--	--
	Carbazole	--	--	--	--	--	--	--	--	--	--	--	--
	Chrysene	--	--	--	--	--	--	--	--	--	--	--	--
	Dibenzo(a,h)anthracene	--	--	--	--	--	--	--	--	--	--	--	--
	Dibenzofuran	--	--	--	--	--	--	--	--	--	--	--	--
	Dibutyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	Diethyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	Dimethyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	Di-n-octyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	Diphenyl sulfone	--	--	--	--	--	--	--	--	--	--	--	--
	Fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
	Fluorene	--	--	--	--	--	--	--	--	--	--	--	--
	Hexachloro-1,3-butadiene	--	--	--	--	--	--	--	--	--	--	--	--
	Hexachlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	Hexachlorocyclopentadiene	--	--	--	--	--	--	--	--	--	--	--	--
	Hexachloroethane	--	--	--	--	--	--	--	--	--	--	--	--
	Hydroxymethyl phthalimide	--	--	--	--	--	--	--	--	--	--	--	--
	Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--	--	--
	Isophorone	--	--	--	--	--	--	--	--	--	--	--	--
	Naphthalene	--	--	--	--	--	--	--	--	--	--	--	--
	Nitrobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	N-nitrosodi-n-propylamine	--	--	--	--	--	--	--	--	--	--	--	--
	N-nitrosodiphenylamine	--	--	--	--	--	--	--	--	--	--	--	--
	o-Cresol	--	--	--	--	--	--	--	--	--	--	--	--
	Octachlorostyrene	--	--	--	--	--	--	--	--	--	--	--	--
	p-Chloroaniline	--	--	--	--	--	--	--	--	--	--	--	--
	p-Chlorothiophenol	--	--	--	--	--	--	--	--	--	--	--	--
	Pentachlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	Pentachlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	Phenanthrene	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 3
ORGANOCHLORINE PESTICIDES, SVOCs, AND VOCs ANALYTICAL RESULTS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analytical Method	Chemical	DBSA-20		DBSA-21		DBSA-23		DBSA-26			DBSA-27		
		5	10	5	10	5	10	0	5	10	0	5	10
		N	N	N	N	N	N	N	N	N	N	N	N
SVOCs	Phenol	--	--	--	--	--	--	--	--	--	--	--	--
	Phenyl Disulfide	--	--	--	--	--	--	--	--	--	--	--	--
	Phenyl Sulfide	--	--	--	--	--	--	--	--	--	--	--	--
	Phthalic acid	--	--	--	--	--	--	--	--	--	--	--	--
	p-Nitroaniline	--	--	--	--	--	--	--	--	--	--	--	--
	Pyrene	--	--	--	--	--	--	--	--	--	--	--	--
	Pyridine	--	--	--	--	--	--	--	--	--	--	--	--
VOCs	1,1,1,2-Tetrachloroethane	< 0.23 U	< 0.24 U	< 0.24 U	< 0.24 U	< 0.23 U	< 0.23 U	--	< 0.23 U	< 0.23 U	--	< 0.25 UJ	< 0.26 UJ
	1,1,1-Trichloroethane	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	--	< 0.15 U	< 0.15 U	--	< 0.16 UJ	< 0.17 UJ
	1,1,2,2-Tetrachloroethane	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.15 U	--	< 0.15 U	< 0.14 U	--	< 0.15 UJ	< 0.16 UJ
	1,1,2-Trichloroethane	< 0.3 U	< 0.3 U	< 0.3 U	< 0.3 U	< 0.29 U	< 0.3 U	--	< 0.29 U	< 0.29 U	--	< 0.31 UJ	< 0.32 UJ
	1,1-Dichloroethane	< 0.99 U	< 1 U	< 1 U	< 1 U	< 0.98 U	< 1 U	--	< 0.99 U	< 0.98 U	--	< 1 UJ	< 1.1 UJ
	1,1-Dichloroethylene	< 0.57 U	< 0.58 U	< 0.58 U	< 0.58 U	< 0.56 U	< 0.58 U	--	< 0.57 U	< 0.56 U	--	< 0.6 UJ	< 0.63 UJ
	1,1-Dichloropropene	< 0.3 U	< 0.31 U	< 0.31 U	< 0.31 U	< 0.3 U	< 0.3 U	--	< 0.3 U	< 0.3 U	--	< 0.32 UJ	< 0.33 UJ
	1,2,3-Trichlorobenzene	< 0.81 U	< 0.82 U	< 0.82 U	< 0.82 U	< 0.8 U	< 0.82 U	--	< 0.81 U	< 0.8 U	--	< 0.85 UJ	< 0.89 UJ
	1,2,3-Trichloropropane	< 0.58 U	< 0.58 U	< 0.59 U	< 0.58 U	< 0.57 U	< 0.58 U	--	< 0.58 U	< 0.57 U	--	< 0.61 UJ	< 0.64 UJ
	1,2,4-Trichlorobenzene	< 0.77 U	< 0.77 U	< 0.77 U	< 0.77 U	< 0.75 U	< 0.77 U	--	< 0.76 U	< 0.75 U	--	< 0.8 UJ	< 0.84 UJ
	1,2,4-Trimethylbenzene	< 0.23 U	< 0.23 U	< 0.23 U	< 0.23 U	< 0.22 U	0.44 J	--	< 0.23 U	5.1 U	--	< 0.24 UJ	0.34 J-
	1,2-Dibromo-3-chloropropane (DBC	< 0.93 U	< 0.93 U	< 0.94 U	< 0.93 U	< 0.91 U	< 0.93 U	--	< 0.92 U	< 0.91 U	--	< 0.98 UJ	< 1 UJ
	1,2-Dichlorobenzene	< 0.16 U	< 0.16 U	< 0.16 U	< 0.16 U	< 0.15 U	< 0.16 U	--	< 0.16 U	< 0.15 U	--	< 0.16 UJ	< 0.17 UJ
	1,2-Dichloroethane	< 0.46 U	< 0.46 U	< 0.46 U	< 0.46 U	< 0.45 U	< 0.46 U	--	< 0.45 U	< 0.45 U	--	< 0.48 UJ	< 0.5 UJ
	1,2-Dichloroethylene	< 0.57 U	< 0.57 U	< 0.57 U	< 0.57 U	< 0.56 U	< 0.57 U	--	< 0.56 U	< 0.56 U	--	< 0.6 UJ	< 0.62 UJ
	1,2-Dichloropropane	< 0.39 U	< 0.39 U	< 0.39 U	< 0.39 U	< 0.38 U	< 0.39 U	--	< 0.39 U	< 0.38 U	--	< 0.41 UJ	< 0.43 UJ
	1,3,5- Trichlorobenzene	< 0.71 U	< 0.71 U	< 0.71 U	< 0.71 U	< 0.69 U	< 0.71 U	--	< 0.7 U	< 0.69 U	--	< 0.74 UJ	< 0.77 UJ
	1,3,5-Trimethylbenzene	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	--	< 0.22 U	< 0.22 U	--	< 0.23 UJ	< 0.24 UJ
	1,3-Dichlorobenzene	< 0.14 U	< 0.14 U	< 0.14 U	< 0.14 U	< 0.13 U	< 0.14 U	--	< 0.13 U	< 0.13 U	--	< 0.14 UJ	< 0.15 UJ
	1,3-Dichloropropane	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	--	< 0.19 U	< 0.18 U	--	< 0.2 UJ	< 0.21 UJ
	1,4-Dichlorobenzene	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U	< 0.11 U	--	< 0.11 U	< 0.11 U	--	< 0.12 UJ	< 0.12 UJ
	1-Nonanal	< 0.92 U	< 0.92 U	< 0.93 U	< 0.92 U	< 0.9 U	< 0.92 U	--	< 0.91 U	< 0.9 U	--	< 0.97 UJ	< 1 UJ
	2,2,3-Trimethylbutane	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	--	< 0.22 U	< 0.22 U	--	< 0.23 UJ	< 0.24 UJ
	2,2-Dichloropropane	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	--	< 0.18 U	< 0.18 U	--	< 0.19 UJ	< 0.2 UJ
	2,2-Dimethylpentane	< 0.29 U	< 0.29 U	< 0.29 U	< 0.29 U	< 0.28 U	< 0.29 U	--	< 0.29 U	< 0.28 U	--	< 0.3 UJ	< 0.32 UJ
	2,3-Dimethylpentane	< 0.23 U	< 0.24 U	< 0.24 U	< 0.24 U	< 0.23 U	< 0.23 U	--	< 0.23 U	< 0.23 U	--	< 0.25 UJ	< 0.26 UJ
	2,4-Dimethylpentane	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	--	< 0.2 U	< 0.2 U	--	< 0.21 UJ	< 0.22 UJ
	2-Chlorotoluene	< 0.48 U	< 0.48 U	< 0.48 U	< 0.48 U	< 0.47 U	< 0.48 U	--	< 0.47 U	< 0.47 U	--	< 0.5 UJ	< 0.52 UJ
	2-Nitropropane	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	--	< 1.8 U	< 1.8 U	--	< 1.9 UJ	< 2 UJ
	2-Phenylbutane	< 0.26 U	< 0.26 U	< 0.26 U	< 0.26 U	< 0.25 U	< 0.26 U	--	< 0.26 U	< 0.25 U	--	< 0.27 UJ	< 0.28 UJ
	3,3-dimethylpentane	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.22 UJ	< 0.23 UJ
	3-ethylpentane	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	--	< 0.22 U	< 0.22 U	--	< 0.23 UJ	< 0.24 UJ
	3-Methylhexane	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.15 U	--	< 0.15 U	< 0.14 U	--	< 0.15 UJ	< 0.16 UJ
	4-Chlorotoluene	< 0.92 U	< 0.92 U	< 0.93 U	< 0.93 U	< 0.9 U	< 0.92 U	--	< 0.91 U	< 0.9 U	--	< 0.97 UJ	< 1 UJ
	Acetone	< 4 U	< 4 U	< 4 U	< 4 U	< 3.9 U	21 U	--	< 4 U	< 3.9 U	--	8.7 J-	7.1 J-
	Acetonitrile	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2 UJ	< 2.1 UJ	--	< 2.1 UJ	< 2 UJ	--	< 2.2 UJ	< 2.3 UJ
	Benzene	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.17 U	< 0.18 U	--	< 0.18 U	< 0.17 U	--	< 0.19 UJ	< 0.19 UJ
	Bromobenzene	< 0.24 U	< 0.24 U	< 0.24 U	< 0.24 U	< 0.23 U	< 0.24 U	--	< 0.23 U	< 0.23 U	--	< 0.25 UJ	< 0.26 UJ
	Bromodichloromethane	< 0.35 U	< 0.35 U	< 0.35 U	< 0.35 U	< 0.34 U	< 0.35 U	--	< 0.35 U	< 0.34 U	--	< 0.37 UJ	< 0.38 UJ
	Bromomethane	< 0.33 U	< 0.33 U	< 0.33 U	< 0.33 U	< 0.32 U	< 0.33 U	--	< 0.32 U	< 0.32 U	--	< 0.34 UJ	< 0.36 UJ
	Carbon disulfide	< 0.57 U	< 0.58 U	< 0.58 U	< 0.58 U	< 0.56 U	< 0.58 U	--	< 0.57 U	< 0.56 U	--	< 0.6 UJ	< 0.63 UJ
	Carbon tetrachloride	< 0.94 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.93 U	< 0.95 U	--	< 0.94 U	< 0.93 U	--	< 0.99 UJ	< 1 UJ

TABLE 3
ORGANOCHLORINE PESTICIDES, SVOCs, AND VOCs ANALYTICAL RESULTS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
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Analytical Method	Chemical	DBSA-20		DBSA-21		DBSA-23		DBSA-26			DBSA-27		
		5	10	5	10	5	10	0	5	10	0	5	10
		N	N	N	N	N	N	N	N	N	N	N	N
VOCs	CFC-11	< 0.53 U	< 0.53 U	< 0.53 U	< 0.53 U	< 0.52 U	< 0.53 U	--	< 0.52 U	< 0.52 U	--	< 0.55 UJ	< 0.58 UJ
	CFC-12	< 0.39 U	< 0.39 U	< 0.39 U	< 0.39 U	< 0.38 U	< 0.39 U	--	< 0.39 U	< 0.38 U	--	< 0.41 UJ	< 0.43 UJ
	Chlorinated fluorocarbon (Freon 113	< 0.56 U	< 0.56 U	< 0.56 U	< 0.56 U	< 0.55 U	< 0.56 U	--	< 0.56 U	< 0.55 U	--	< 0.59 UJ	< 0.61 UJ
	Chlorobenzene	< 0.13 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.13 U	--	< 0.13 U	< 0.13 U	--	< 0.14 UJ	< 0.14 UJ
	Chlorobromomethane	< 0.43 U	< 0.43 U	< 0.43 U	< 0.43 U	< 0.42 U	< 0.43 U	--	< 0.43 U	< 0.42 U	--	< 0.45 UJ	< 0.47 UJ
	Chlorodibromomethane	< 0.3 U	< 0.3 U	< 0.3 U	< 0.3 U	< 0.3 U	< 0.3 U	--	< 0.3 U	< 0.3 U	--	< 0.32 UJ	< 0.33 UJ
	Chloroethane	< 0.37 U	< 0.37 U	< 0.37 U	< 0.37 U	< 0.36 U	< 0.37 U	--	< 0.36 U	< 0.36 U	--	< 0.39 UJ	< 0.4 UJ
	Chloroform	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	--	< 0.15 U	< 0.15 U	--	< 0.16 UJ	< 0.16 UJ
	Chloromethane	< 0.46 U	< 0.47 U	< 0.47 U	< 0.47 U	< 0.46 U	< 0.47 U	--	< 0.46 U	< 0.46 U	--	< 0.49 UJ	< 0.51 UJ
	cis-1,2-Dichloroethylene	< 0.45 U	< 0.45 U	< 0.45 U	< 0.45 U	< 0.44 U	< 0.45 U	--	< 0.44 U	< 0.44 U	--	< 0.47 UJ	< 0.49 UJ
	cis-1,3-Dichloropropylene	< 0.76 U	< 0.76 U	< 0.77 U	< 0.76 U	< 0.75 U	< 0.76 U	--	< 0.76 U	< 0.75 U	--	< 0.8 UJ	< 0.83 UJ
	Cymene	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U	< 0.24 U	< 0.25 U	--	< 0.25 U	< 0.24 U	--	< 0.26 UJ	< 0.27 UJ
	Dibromomethane	< 0.37 U	< 0.37 U	< 0.37 U	< 0.37 U	< 0.36 U	< 0.37 U	--	< 0.36 U	< 0.36 U	--	< 0.39 UJ	< 0.4 UJ
	Dichloromethane	< 2.6 U	< 2.6 U	< 2.6 U	< 2.6 U	< 2.6 U	< 2.6 U	--	< 2.6 U	< 2.6 U	--	23 UJ	< 2.9 UJ
	Ethanol	< 200 UJ	< 200 UJ	< 200 UJ	< 200 UJ	< 200 UJ	< 200 UJ	--	< 200 UJ	< 200 UJ	--	< 210 UJ	< 220 UJ
	Ethylbenzene	< 0.19 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.19 U	--	< 0.19 U	< 0.19 U	--	< 0.2 UJ	< 0.21 UJ
	Hexane, 2-methyl-	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.22 UJ	< 0.23 UJ
	Isopropylbenzene	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	--	< 0.18 U	< 0.18 U	--	< 0.19 UJ	< 0.2 UJ
	m,p-Xylene	< 0.59 U	< 0.6 U	< 0.6 U	< 0.6 U	< 0.58 U	< 0.59 U	--	< 0.59 U	< 0.58 U	--	< 0.62 UJ	< 0.65 UJ
	Methyl disulfide	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	--	< 0.22 U	< 0.22 U	--	< 0.23 UJ	< 0.24 UJ
	Methyl ethyl ketone	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	--	< 1.4 U	< 1.4 U	--	< 1.5 UJ	< 1.6 UJ
	Methyl iodide	< 0.27 U	< 0.27 U	< 0.27 U	< 0.27 U	< 0.26 U	< 0.27 U	--	< 0.27 U	< 0.26 U	--	< 0.28 UJ	< 0.29 UJ
	Methyl isobutyl ketone	< 1.7 U	< 1.7 U	< 1.7 U	< 1.7 U	< 1.7 U	< 1.7 U	--	< 1.7 U	< 1.7 U	--	< 1.8 UJ	< 1.8 UJ
	Methyl n-butyl ketone	< 0.29 U	< 0.29 U	< 0.3 U	< 0.3 U	< 0.29 U	< 0.29 U	--	< 0.29 U	< 0.29 U	--	< 0.31 UJ	< 0.32 UJ
	MTBE (Methyl tert-butyl ether)	< 0.48 U	< 0.48 U	< 0.48 U	< 0.48 U	< 0.47 U	< 0.48 U	--	< 0.48 U	< 0.47 U	--	< 0.5 UJ	< 0.53 UJ
	n-Butyl benzene	< 0.55 U	< 0.56 U	< 0.56 U	< 0.56 U	< 0.54 U	< 0.56 U	--	< 0.55 U	< 0.54 U	--	< 0.58 UJ	< 0.61 UJ
	n-Heptane	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	--	< 0.17 U	< 0.17 U	--	< 0.18 UJ	< 0.19 UJ
	n-Propyl benzene	< 0.99 U	< 0.99 U	< 1 U	< 0.99 U	< 0.97 U	< 0.99 U	--	< 0.98 U	< 0.97 U	--	< 1 UJ	< 1.1 UJ
	o-Xylene	< 0.32 U	< 0.32 U	< 0.32 U	< 0.32 U	< 0.31 U	< 0.32 U	--	< 0.32 U	< 0.31 U	--	< 0.34 UJ	< 0.35 UJ
	Styrene (monomer)	< 1.3 U	< 1.3 U	< 1.3 U	< 1.3 U	< 1.2 U	< 1.3 U	--	< 1.2 U	< 1.2 U	--	< 1.3 UJ	< 1.4 UJ
	tert-Butyl benzene	< 0.28 U	< 0.28 U	< 0.28 U	< 0.28 U	< 0.27 U	< 0.28 U	--	< 0.28 U	< 0.27 U	--	< 0.29 UJ	< 0.3 UJ
	Tetrachloroethylene	< 0.29 U	< 0.29 U	< 0.29 U	< 0.29 U	< 0.28 U	< 0.29 U	--	< 0.28 U	< 0.28 U	--	< 0.3 UJ	< 0.31 UJ
	Toluene	< 0.14 U	< 0.14 U	< 0.14 U	< 0.14 U	< 0.13 U	< 0.14 U	--	< 0.14 U	< 0.13 U	--	< 0.14 UJ	0.27 J-
	trans-1,2-Dichloroethylene	< 0.23 U	< 0.23 U	< 0.23 U	< 0.23 U	< 0.23 U	< 0.23 U	--	< 0.23 U	< 0.23 U	--	< 0.24 UJ	< 0.25 UJ
	trans-1,3-Dichloropropylene	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	< 0.21 U	--	< 0.21 U	< 0.21 U	--	< 0.22 UJ	< 0.23 UJ
	Tribromomethane	< 0.25 U	< 0.26 U	< 0.26 U	< 0.26 U	< 0.25 U	< 0.26 U	--	< 0.25 U	< 0.25 U	--	< 0.27 UJ	< 0.28 UJ
	Trichloroethylene	< 0.37 U	< 0.38 U	< 0.38 U	< 0.38 U	< 0.37 U	< 0.38 U	--	< 0.37 U	< 0.37 U	--	< 0.39 UJ	< 0.41 UJ
	Vinyl acetate	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	--	< 0.18 U	< 0.18 U	--	< 0.19 UJ	< 0.2 UJ
	Vinyl chloride	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U	< 0.24 U	< 0.25 U	--	< 0.25 U	< 0.24 U	--	< 0.26 UJ	< 0.27 UJ
	Xylenes (total)	< 0.89 U	< 0.9 U	< 0.9 U	< 0.9 U	< 0.88 U	< 0.9 U	--	< 0.89 U	< 0.88 U	--	< 0.94 UJ	< 0.98 UJ

All units in µg/kg.

TABLE 3
ORGANOCHLORINE PESTICIDES, SVOCs, AND VOCs ANALYTICAL RESULTS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analytical Method	Chemical	DBSA-29			DBSA-30		DBSA-32				DBSA-33		
		5	10	10	5	10	0	5	5	10	0	5	10
		N	N	FD	N	N	N	N	FD	N	N	N	N
Organo-chlorine Pesticides	2,4-DDD	--	--	--	--	--	< 0.11 U	--	--	--	< 0.11 U	--	--
	2,4-DDE	--	--	--	--	--	< 0.09 U	--	--	--	< 0.089 U	--	--
	4,4-DDD	--	--	--	--	--	< 0.16 U	--	--	--	< 0.16 U	--	--
	4,4-DDE	--	--	--	--	--	< 0.25 U	--	--	--	< 0.25 U	--	--
	4,4-DDT	--	--	--	--	--	< 0.43 U	--	--	--	< 0.43 U	--	--
	Aldrin	--	--	--	--	--	< 0.088 U	--	--	--	< 0.088 U	--	--
	alpha-BHC	--	--	--	--	--	< 0.097 U	--	--	--	< 0.096 U	--	--
	alpha-Chlordane	--	--	--	--	--	< 0.1 U	--	--	--	< 0.1 U	--	--
	beta-BHC	--	--	--	--	--	< 0.35 U	--	--	--	< 0.35 U	--	--
	Chlordane	--	--	--	--	--	< 2.3 U	--	--	--	< 2.3 U	--	--
	delta-BHC	--	--	--	--	--	< 0.084 U	--	--	--	< 0.083 U	--	--
	Dieldrin	--	--	--	--	--	< 0.073 U	--	--	--	< 0.073 U	--	--
	Endosulfan I	--	--	--	--	--	< 0.084 U	--	--	--	< 0.083 U	--	--
	Endosulfan II	--	--	--	--	--	< 0.15 U	--	--	--	< 0.15 U	--	--
	Endosulfan sulfate	--	--	--	--	--	< 0.12 U	--	--	--	< 0.12 U	--	--
	Endrin	--	--	--	--	--	< 0.084 U	--	--	--	< 0.083 U	--	--
	Endrin aldehyde	--	--	--	--	--	< 0.11 U	--	--	--	< 0.11 U	--	--
	Endrin ketone	--	--	--	--	--	< 0.39 U	--	--	--	< 0.39 U	--	--
	gamma-Chlordane	--	--	--	--	--	< 0.086 U	--	--	--	< 0.086 U	--	--
	Heptachlor	--	--	--	--	--	< 0.59 U	--	--	--	< 0.59 U	--	--
	Heptachlor epoxide	--	--	--	--	--	< 0.12 U	--	--	--	< 0.12 U	--	--
	Lindane	--	--	--	--	--	< 0.084 U	--	--	--	< 0.083 U	--	--
	Methoxychlor	--	--	--	--	--	< 0.71 U	--	--	--	< 0.7 U	--	--
	Toxaphene	--	--	--	--	--	< 7.2 U	--	--	--	< 7.1 U	--	--
SVOCs	1,2,4,5-Tetrachlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	1,2-Diphenylhydrazine	--	--	--	--	--	--	--	--	--	--	--	--
	1,4-Dioxane	--	--	--	--	--	--	--	--	--	--	--	--
	2,2'-/4,4'-Dichlorobenzil	--	--	--	--	--	--	--	--	--	--	--	--
	2,4,5-Trichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4,6-Trichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-Dichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-Dimethylphenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-Dinitrophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2,4-Dinitrotoluene	--	--	--	--	--	--	--	--	--	--	--	--
	2,6-Dinitrotoluene	--	--	--	--	--	--	--	--	--	--	--	--
	2-Chloronaphthalene	--	--	--	--	--	--	--	--	--	--	--	--
	2-Chlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	2-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--	--	--
	2-Nitroaniline	--	--	--	--	--	--	--	--	--	--	--	--
	2-Nitrophenol	--	--	--	--	--	--	--	--	--	--	--	--
	3,3'-Dichlorobenzidine	--	--	--	--	--	--	--	--	--	--	--	--
	3-Methylphenol & 4-Methylphenol	--	--	--	--	--	--	--	--	--	--	--	--
	3-Nitroaniline	--	--	--	--	--	--	--	--	--	--	--	--
	4-Bromophenyl phenyl ether	--	--	--	--	--	--	--	--	--	--	--	--
	4-Chloro-3-Methylphenol	--	--	--	--	--	--	--	--	--	--	--	--
	4-Chlorophenyl phenyl ether	--	--	--	--	--	--	--	--	--	--	--	--
	4-Chlorothioanisole	--	--	--	--	--	--	--	--	--	--	--	--
	4-Nitrophenol	--	--	--	--	--	--	--	--	--	--	--	--
	Acenaphthene	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 3
ORGANOCHLORINE PESTICIDES, SVOCs, AND VOCs ANALYTICAL RESULTS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analytical Method	Chemical	DBSA-29			DBSA-30		DBSA-32				DBSA-33		
		5	10	10	5	10	0	5	5	10	0	5	10
		N	N	FD	N	N	N	N	FD	N	N	N	N
SVOCs	Acenaphthylene	--	--	--	--	--	--	--	--	--	--	--	--
	Acetophenone	--	--	--	--	--	--	--	--	--	--	--	--
	Aniline	--	--	--	--	--	--	--	--	--	--	--	--
	Anthracene	--	--	--	--	--	--	--	--	--	--	--	--
	Azobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzenethiol	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(a)pyrene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(g,h,i)perylene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
	Benzoic acid	--	--	--	--	--	--	--	--	--	--	--	--
	Benzyl alcohol	--	--	--	--	--	--	--	--	--	--	--	--
	Benzyl butyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	bis(2-Chloroethoxy) methane	--	--	--	--	--	--	--	--	--	--	--	--
	bis(2-Chloroethyl) ether	--	--	--	--	--	--	--	--	--	--	--	--
	bis(2-Chloroisopropyl) ether	--	--	--	--	--	--	--	--	--	--	--	--
	bis(2-Ethylhexyl) phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	bis(p-Chlorophenyl) disulfide	--	--	--	--	--	--	--	--	--	--	--	--
	bis(p-Chlorophenyl) sulfone	--	--	--	--	--	--	--	--	--	--	--	--
	Carbazole	--	--	--	--	--	--	--	--	--	--	--	--
	Chrysene	--	--	--	--	--	--	--	--	--	--	--	--
	Dibenzo(a,h)anthracene	--	--	--	--	--	--	--	--	--	--	--	--
	Dibenzofuran	--	--	--	--	--	--	--	--	--	--	--	--
	Dibutyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	Diethyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	Dimethyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	Di-n-octyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--
	Diphenyl sulfone	--	--	--	--	--	--	--	--	--	--	--	--
	Fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
	Fluorene	--	--	--	--	--	--	--	--	--	--	--	--
	Hexachloro-1,3-butadiene	--	--	--	--	--	--	--	--	--	--	--	--
	Hexachlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	Hexachlorocyclopentadiene	--	--	--	--	--	--	--	--	--	--	--	--
	Hexachloroethane	--	--	--	--	--	--	--	--	--	--	--	--
	Hydroxymethyl phthalimide	--	--	--	--	--	--	--	--	--	--	--	--
	Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--	--	--
	Isophorone	--	--	--	--	--	--	--	--	--	--	--	--
	Naphthalene	--	--	--	--	--	--	--	--	--	--	--	--
	Nitrobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	N-nitrosodi-n-propylamine	--	--	--	--	--	--	--	--	--	--	--	--
	N-nitrosodiphenylamine	--	--	--	--	--	--	--	--	--	--	--	--
	o-Cresol	--	--	--	--	--	--	--	--	--	--	--	--
	Octachlorostyrene	--	--	--	--	--	--	--	--	--	--	--	--
	p-Chloroaniline	--	--	--	--	--	--	--	--	--	--	--	--
	p-Chlorothiophenol	--	--	--	--	--	--	--	--	--	--	--	--
	Pentachlorobenzene	--	--	--	--	--	--	--	--	--	--	--	--
	Pentachlorophenol	--	--	--	--	--	--	--	--	--	--	--	--
	Phenanthrene	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 3
ORGANOCHLORINE PESTICIDES, SVOCs, AND VOCs ANALYTICAL RESULTS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analytical Method	Chemical	DBSA-29			DBSA-30		DBSA-32				DBSA-33		
		5	10	10	5	10	0	5	5	10	0	5	10
		N	N	FD	N	N	N	N	FD	N	N	N	N
SVOCs	Phenol	--	--	--	--	--	--	--	--	--	--	--	--
	Phenyl Disulfide	--	--	--	--	--	--	--	--	--	--	--	--
	Phenyl Sulfide	--	--	--	--	--	--	--	--	--	--	--	--
	Phthalic acid	--	--	--	--	--	--	--	--	--	--	--	--
	p-Nitroaniline	--	--	--	--	--	--	--	--	--	--	--	--
	Pyrene	--	--	--	--	--	--	--	--	--	--	--	--
	Pyridine	--	--	--	--	--	--	--	--	--	--	--	--
VOCs	1,1,1,2-Tetrachloroethane	< 0.23 U	< 0.24 U	< 0.24 U	< 0.23 U	< 0.23 U	--	< 0.24 U	< 0.23 U	< 0.25 U	--	< 0.24 U	< 0.24 U
	1,1,1-Trichloroethane	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	--	< 0.15 U	< 0.15 U	< 0.16 U	--	< 0.16 U	< 0.15 U
	1,1,2,2-Tetrachloroethane	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	--	< 0.15 U	< 0.15 U	< 0.16 U	--	< 0.15 U	< 0.15 U
	1,1,2-Trichloroethane	< 0.3 U	< 0.3 U	< 0.3 U	< 0.3 U	< 0.29 U	--	< 0.3 U	< 0.29 U	< 0.32 U	--	< 0.3 U	< 0.3 U
	1,1-Dichloroethane	< 0.99 U	< 1 U	< 1 U	< 1 U	< 0.99 U	--	< 1 U	< 0.99 U	< 1.1 U	--	< 1 U	< 1 U
	1,1-Dichloroethylene	< 0.57 U	< 0.58 U	< 0.59 U	< 0.57 U	< 0.57 U	--	< 0.58 U	< 0.57 U	< 0.62 U	--	< 0.58 U	< 0.58 U
	1,1-Dichloropropene	< 0.3 U	< 0.31 U	< 0.31 U	< 0.3 U	< 0.3 U	--	< 0.31 U	< 0.3 U	< 0.33 U	--	< 0.31 U	< 0.31 U
	1,2,3-Trichlorobenzene	< 0.81 U	< 0.82 U	< 0.83 U	< 0.81 U	< 0.81 U	--	< 0.82 U	< 0.81 U	< 0.87 U	--	< 0.83 U	< 0.82 U
	1,2,3-Trichloropropane	< 0.58 U	< 0.59 U	< 0.6 U	< 0.58 U	< 0.58 U	--	< 0.59 U	< 0.58 U	< 0.62 U	--	< 0.59 U	< 0.59 U
	1,2,4-Trichlorobenzene	< 0.76 U	< 0.78 U	< 0.79 U	< 0.77 U	< 0.76 U	--	< 0.78 U	< 0.76 U	< 0.82 U	--	< 0.78 U	< 0.77 U
	1,2,4-Trimethylbenzene	5.2 U	5.3 U	5.4 U	5.2 U	< 0.23 U	--	0.31 J	0.26 J	0.28 J	--	5.3 U	5.3 U
	1,2-Dibromo-3-chloropropane (DBC	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 U	< 0.92 U	--	< 0.94 U	< 0.92 U	< 1 U	--	< 0.95 U	< 0.94 U
	1,2-Dichlorobenzene	< 0.16 U	< 0.16 U	< 0.16 U	< 0.16 U	< 0.16 U	--	< 0.16 U	< 0.16 U	< 0.17 U	--	< 0.16 U	< 0.16 U
	1,2-Dichloroethane	< 0.46 U	< 0.46 U	< 0.47 U	< 0.46 U	< 0.45 U	--	< 0.46 U	< 0.45 U	< 0.49 U	--	< 0.47 U	< 0.46 U
	1,2-Dichloroethylene	< 0.57 U	< 0.57 U	< 0.58 U	< 0.57 U	< 0.56 U	--	< 0.57 U	< 0.56 U	< 0.61 U	--	< 0.58 U	< 0.57 U
	1,2-Dichloropropane	< 0.39 U	< 0.39 U	< 0.4 U	< 0.39 U	< 0.39 U	--	< 0.39 U	< 0.39 U	< 0.42 U	--	< 0.4 U	< 0.39 U
	1,3,5- Trichlorobenzene	< 0.71 U	< 0.72 U	< 0.72 U	< 0.71 U	< 0.7 U	--	< 0.72 U	< 0.7 U	< 0.76 U	--	< 0.72 U	< 0.71 U
	1,3,5-Trimethylbenzene	< 0.22 U	< 0.22 U	< 0.23 U	< 0.22 U	< 0.22 U	--	< 0.22 U	< 0.22 U	< 0.24 U	--	< 0.22 U	< 0.22 U
	1,3-Dichlorobenzene	< 0.14 U	< 0.14 U	< 0.14 U	< 0.14 U	< 0.13 U	--	< 0.14 U	< 0.14 U	< 0.15 U	--	< 0.14 U	< 0.14 U
	1,3-Dichloropropane	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	--	< 0.19 U	< 0.19 U	< 0.2 U	--	< 0.19 U	< 0.19 U
	1,4-Dichlorobenzene	< 0.11 U	< 0.11 U	< 0.12 U	< 0.11 U	< 0.11 U	--	< 0.11 U	< 0.11 U	< 0.12 U	--	< 0.11 U	< 0.11 U
	1-Nonanal	< 0.92 U	< 0.93 U	< 0.94 U	< 0.92 U	< 0.91 U	--	< 0.93 U	< 0.91 U	< 0.99 U	--	< 0.94 U	< 0.93 U
	2,2,3-Trimethylbutane	< 0.22 U	< 0.22 U	< 0.23 U	< 0.22 U	< 0.22 U	--	< 0.22 U	< 0.22 U	< 0.24 U	--	< 0.22 U	< 0.22 U
	2,2-Dichloropropane	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	--	< 0.18 U	< 0.18 U	< 0.19 U	--	< 0.18 U	< 0.18 U
	2,2-Dimethylpentane	< 0.29 U	< 0.29 U	< 0.29 U	< 0.29 U	< 0.28 U	--	< 0.29 U	< 0.29 U	< 0.31 U	--	< 0.29 U	< 0.29 U
	2,3-Dimethylpentane	< 0.23 U	< 0.24 U	< 0.24 U	< 0.23 U	< 0.23 U	--	< 0.24 U	< 0.23 U	< 0.25 U	--	< 0.24 U	< 0.24 U
	2,4-Dimethylpentane	< 0.2 U	< 0.2 U	< 0.21 U	< 0.2 U	< 0.2 U	--	< 0.2 U	< 0.2 U	< 0.2 U	--	< 0.21 U	< 0.2 U
	2-Chlorotoluene	< 0.48 U	< 0.48 U	< 0.49 U	< 0.48 U	< 0.47 U	--	< 0.48 U	< 0.47 U	< 0.51 U	--	< 0.49 U	< 0.48 U
	2-Nitropropane	< 1.8 U	< 1.8 U	< 1.9 U	< 1.8 U	< 1.8 U	--	< 1.8 U	< 1.8 U	< 2 U	--	< 1.9 U	< 1.8 U
	2-Phenylbutane	< 0.26 U	< 0.26 U	< 0.26 U	< 0.26 U	< 0.25 U	--	< 0.26 U	< 0.26 U	< 0.28 U	--	< 0.26 U	< 0.26 U
	3,3-dimethylpentane	< 0.21 U	< 0.21 U	< 0.22 U	< 0.21 U	< 0.21 U	--	< 0.21 U	< 0.21 U	< 0.23 U	--	< 0.22 U	< 0.21 U
	3-ethylpentane	< 0.22 U	< 0.22 U	< 0.23 U	< 0.22 U	< 0.22 U	--	< 0.22 U	< 0.22 U	< 0.24 U	--	< 0.22 U	< 0.22 U
	3-Methylhexane	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.14 U	--	< 0.15 U	< 0.15 U	< 0.16 U	--	< 0.15 U	< 0.15 U
	4-Chlorotoluene	< 0.92 U	< 0.93 U	< 0.94 U	< 0.92 U	< 0.91 U	--	< 0.93 U	< 0.92 U	< 0.99 U	--	< 0.94 U	< 0.93 U
	Acetone	< 4 U	< 4 U	< 4.1 U	< 4 U	< 3.9 U	--	< 4 U	< 4 U	< 4.3 U	--	7.6	8.3
	Acetonitrile	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	< 2.1 UJ	--	< 2.1 UJ	< 2.1 UJ	< 2.2 UJ	--	< 2.1 UJ	< 2.1 UJ
	Benzene	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	--	< 0.18 U	< 0.18 U	< 0.19 U	--	< 0.18 U	< 0.18 U
	Bromobenzene	< 0.24 U	< 0.24 U	< 0.24 U	< 0.24 U	< 0.23 U	--	< 0.24 U	< 0.23 U	< 0.25 U	--	< 0.24 U	< 0.24 U
	Bromodichloromethane	< 0.35 U	< 0.35 U	< 0.36 U	< 0.35 U	< 0.35 U	--	< 0.35 U	< 0.35 U	< 0.37 U	--	< 0.36 U	< 0.35 U
	Bromomethane	< 0.33 U	< 0.33 U	< 0.33 U	< 0.33 U	< 0.32 U	--	< 0.33 U	< 0.32 U	< 0.35 U	--	< 0.33 U	< 0.33 U
	Carbon disulfide	< 0.57 U	< 0.58 U	< 0.59 U	< 0.58 U	< 0.57 U	--	< 0.58 UJ	< 0.57 UJ	< 0.62 UJ	--	< 0.59 U	< 0.58 U
	Carbon tetrachloride	< 0.94 U	< 0.96 U	< 0.97 U	< 0.95 U	< 0.94 U	--	< 0.96 U	< 0.94 U	< 1 U	--	< 0.96 U	< 0.95 U

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Analytical Method	Chemical	DBSA-29			DBSA-30		DBSA-32				DBSA-33		
		5	10	10	5	10	0	5	5	10	0	5	10
		N	N	FD	N	N	N	N	FD	N	N	N	N
VOCs	CFC-11	< 0.52 U	< 0.53 U	< 0.54 U	< 0.53 U	< 0.52 U	--	< 0.53 U	< 0.52 U	< 0.56 U	--	< 0.54 U	< 0.53 U
	CFC-12	< 0.39 U	< 0.4 U	< 0.4 U	< 0.39 U	< 0.39 U	--	< 0.4 U	< 0.39 U	< 0.42 U	--	< 0.4 U	< 0.39 U
	Chlorinated fluorocarbon (Freon 113	< 0.56 U	< 0.57 U	< 0.57 U	< 0.56 U	< 0.55 U	--	< 0.57 U	< 0.56 U	< 0.6 U	--	< 0.57 U	< 0.56 U
	Chlorobenzene	< 0.13 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.13 U	--	< 0.13 U	< 0.13 U	< 0.14 U	--	< 0.13 U	< 0.13 U
	Chlorobromomethane	< 0.43 U	< 0.43 U	< 0.44 U	< 0.43 U	< 0.43 U	--	< 0.44 U	< 0.43 U	< 0.44 U	--	< 0.44 U	< 0.43 U
	Chlorodibromomethane	< 0.3 U	< 0.3 U	< 0.31 U	< 0.3 U	< 0.3 U	--	< 0.3 U	< 0.3 U	< 0.31 U	--	< 0.31 U	< 0.3 U
	Chloroethane	< 0.37 U	< 0.37 U	< 0.38 U	< 0.37 U	< 0.36 U	--	< 0.37 U	< 0.36 U	< 0.39 U	--	< 0.37 U	< 0.37 U
	Chloroform	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	--	< 0.15 U	< 0.15 U	< 0.16 U	--	< 0.15 U	< 0.15 U
	Chloromethane	< 0.46 U	< 0.47 U	< 0.48 U	< 0.46 U	< 0.46 U	--	< 0.47 U	< 0.46 U	< 0.5 U	--	< 0.47 U	< 0.47 U
	cis-1,2-Dichloroethylene	< 0.45 U	< 0.45 U	< 0.46 U	< 0.45 U	< 0.44 U	--	< 0.45 U	< 0.44 U	< 0.48 U	--	< 0.46 U	< 0.45 U
	cis-1,3-Dichloropropylene	< 0.76 U	< 0.77 U	< 0.78 U	< 0.76 U	< 0.75 U	--	< 0.77 U	< 0.76 U	< 0.82 U	--	< 0.77 U	< 0.77 U
	Cymene	< 0.25 U	< 0.25 U	< 0.26 U	< 0.25 U	< 0.25 U	--	< 0.25 U	< 0.25 U	< 0.25 U	--	< 0.25 U	< 0.25 U
	Dibromomethane	< 0.37 U	< 0.37 U	< 0.38 U	< 0.37 U	< 0.36 U	--	< 0.37 U	< 0.36 U	< 0.39 U	--	< 0.37 U	< 0.37 U
	Dichloromethane	< 2.6 U	< 2.6 U	< 2.7 U	< 2.6 U	< 2.6 U	--	< 2.6 U	< 2.6 U	< 2.8 U	--	< 2.7 U	< 2.6 U
	Ethanol	< 200 UJ	< 210 UJ	< 210 UJ	< 200 UJ	< 200 UJ	--	< 210 UJ	< 200 UJ	< 220 UJ	--	< 210 UJ	< 200 UJ
	Ethylbenzene	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.19 U	--	< 0.2 U	< 0.19 U	< 0.21 U	--	< 0.2 U	< 0.2 U
	Hexane, 2-methyl-	< 0.21 U	< 0.21 U	< 0.22 U	< 0.21 U	< 0.21 U	--	< 0.21 U	< 0.21 U	< 0.23 U	--	< 0.22 U	< 0.21 U
	Isopropylbenzene	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	--	< 0.19 U	< 0.18 U	< 0.2 U	--	< 0.19 U	< 0.19 U
	m,p-Xylene	< 0.59 U	< 0.6 U	< 0.61 U	< 0.59 U	< 0.59 U	--	< 0.6 U	< 0.59 U	< 0.64 U	--	< 0.6 U	< 0.6 U
	Methyl disulfide	< 0.22 U	< 0.23 U	< 0.23 U	< 0.22 U	< 0.22 U	--	< 0.23 U	< 0.22 U	< 0.24 U	--	< 0.23 U	< 0.22 U
	Methyl ethyl ketone	< 1.4 U	< 1.4 U	< 1.5 U	< 1.4 U	< 1.4 U	--	< 1.5 U	< 1.4 U	< 1.5 U	--	< 1.5 U	< 1.4 U
	Methyl iodide	< 0.27 U	< 0.27 U	< 0.28 U	< 0.27 U	< 0.27 U	--	< 0.27 U	< 0.27 U	< 0.29 U	--	< 0.27 U	< 0.27 U
	Methyl isobutyl ketone	< 1.7 U	< 1.7 U	< 1.7 U	< 1.7 U	< 1.7 U	--	< 1.7 U	< 1.7 U	< 1.8 U	--	< 1.7 U	< 1.7 U
	Methyl n-butyl ketone	< 0.29 U	< 0.3 U	< 0.3 U	< 0.29 U	< 0.29 U	--	< 0.3 U	< 0.29 U	< 0.32 U	--	< 0.3 U	< 0.3 U
	MTBE (Methyl tert-butyl ether)	< 0.48 U	< 0.49 U	< 0.49 U	< 0.48 U	< 0.48 U	--	< 0.49 U	< 0.48 U	< 0.52 U	--	< 0.49 U	< 0.49 U
	n-Butyl benzene	< 0.55 U	< 0.56 U	< 0.57 U	< 0.56 U	< 0.55 U	--	< 0.56 U	< 0.55 U	< 0.6 U	--	< 0.57 U	< 0.56 U
	n-Heptane	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	--	< 0.17 U	< 0.17 U	< 0.17 U	--	< 0.17 U	< 0.17 U
	n-Propyl benzene	< 0.99 U	< 1 U	< 1 U	< 0.99 U	< 0.98 U	--	< 1 U	< 0.98 U	< 1.1 U	--	< 1 U	< 1 U
	o-Xylene	< 0.32 U	< 0.32 U	< 0.33 U	< 0.32 U	< 0.32 U	--	< 0.32 U	< 0.32 U	< 0.34 U	--	< 0.33 U	< 0.32 U
	Styrene (monomer)	< 1.3 U	< 1.3 U	< 1.3 U	< 1.3 U	< 1.2 U	--	< 1.3 U	< 1.2 U	< 1.3 U	--	< 1.3 U	< 1.3 U
	tert-Butyl benzene	< 0.28 U	< 0.28 U	< 0.28 U	< 0.28 U	< 0.27 U	--	< 0.28 U	< 0.28 U	< 0.3 U	--	< 0.28 U	< 0.28 U
	Tetrachloroethylene	< 0.29 U	< 0.29 U	< 0.29 U	< 0.29 U	< 0.28 U	--	< 0.29 U	< 0.28 U	< 0.31 U	--	< 0.29 U	< 0.29 U
	Toluene	< 0.14 U	< 0.14 U	0.15 J	< 0.14 U	< 0.14 U	--	5.3 U	5.2 U	5.6 U	--	< 0.14 U	< 0.14 U
	trans-1,2-Dichloroethylene	< 0.23 U	< 0.23 U	< 0.24 U	< 0.23 U	< 0.23 U	--	< 0.23 U	< 0.23 U	< 0.25 U	--	< 0.24 U	< 0.23 U
	trans-1,3-Dichloropropylene	< 0.21 U	< 0.21 U	< 0.22 U	< 0.21 U	< 0.21 U	--	< 0.21 U	< 0.21 U	< 0.23 U	--	< 0.21 U	< 0.21 U
	Tribromomethane	< 0.25 U	< 0.26 U	< 0.26 U	< 0.26 U	< 0.25 U	--	< 0.26 U	< 0.25 U	< 0.27 U	--	< 0.26 U	< 0.26 U
	Trichloroethylene	< 0.37 U	< 0.38 U	< 0.38 U	< 0.37 U	< 0.37 U	--	< 0.38 U	< 0.37 U	< 0.4 U	--	< 0.38 U	< 0.38 U
	Vinyl acetate	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	--	< 0.19 U	< 0.18 U	< 0.2 U	--	< 0.19 U	< 0.19 U
	Vinyl chloride	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U	--	< 0.25 U	< 0.25 U	< 0.27 U	--	< 0.25 U	< 0.25 U
	Xylenes (total)	< 0.89 U	< 0.91 U	< 0.92 U	< 0.9 U	< 0.89 U	--	< 0.91 U	< 0.89 U	< 0.96 U	--	< 0.91 U	< 0.9 U

All units in µg/kg.

TABLE 4
DESCRIPTIVE SUMMARY STATISTICS FOR METALS AND RADIONUCLIDES IN 2008 DEEP BACKGROUND SOIL SAMPLES - ALL DATA
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analyte Group	Analyte	Sample Size	Detection Frequency	Censored (Non-Detect) Data							Detected Data						
				ND Count	Min	Q1	Median	Mean	Q3	Max	Detect Count	Min	Q1	Median	Mean	Q3	Max
Metals (mg/kg)	Aluminum	163	100.0%	0	--	--	--	--	--	--	163	3190	7550	8790	8970	10100	19700
	Antimony	163	95.1%	8	0.1046	0.105	0.105	0.105	0.105	0.1046	155	0.066	0.14	0.16	0.173	0.2	0.37
	Arsenic	163	100.0%	0	--	--	--	--	--	--	163	2.1	3.7	5.7	6.12	7.5	24.8
	Barium	163	100.0%	0	--	--	--	--	--	--	163	64.5	134	191	276	399	1350
	Beryllium	163	100.0%	0	--	--	--	--	--	--	163	0.17	0.47	0.54	0.538	0.6	1.1
	Boron	163	23.3%	125	2.824	2.82	2.82	2.83	2.82	3.53	38	3	4.58	5.9	7.9	7.25	24.1
	Cadmium	163	85.3%	24	0.01	0.01	0.01	0.01	0.01	0.01	139	0.034	0.077	0.088	0.0928	0.11	0.2
	Calcium	163	100.0%	0	--	--	--	--	--	--	163	0.43	17800	23200	23600	29400	46600
	Chromium (Total)	163	100.0%	0	--	--	--	--	--	--	163	1.1	9.4	10.6	11.6	13.4	27.9
	Chromium (VI)	158	24.1%	120	0.16	0.17	0.17	0.17	0.17	0.21	38	0.16	0.20	0.27	0.39	0.42	1.6
	Cobalt	163	100.0%	0	--	--	--	--	--	--	163	1.6	5.3	7	6.75	7.9	12.9
	Copper	163	100.0%	0	--	--	--	--	--	--	163	4.1	11.1	15.1	14.2	16.7	24
	Iron	163	100.0%	0	--	--	--	--	--	--	163	3620	11800	13900	13800	16000	22500
	Lead	163	100.0%	0	--	--	--	--	--	--	163	4.4	6.9	9.2	10	11.6	35.1
	Lithium	163	92.6%	12	1.4628	3.66	3.66	3.47	3.66	3.657	151	7.5	17.6	21.9	28.1	30	189
	Magnesium	163	100.0%	0	--	--	--	--	--	--	163	2780	7620	9170	9360	10400	31000
	Manganese	163	100.0%	0	--	--	--	--	--	--	163	87.5	236	296	313	371	836
	Mercury	151	36.4%	96	0.00668	0.00668	0.00668	0.00668	0.00668	0.00668	55	0.007	0.0085	0.0102	0.0118	0.0141	0.0254
	Molybdenum	163	85.9%	23	0.1046	0.105	0.105	0.105	0.105	0.1046	140	0.12	0.4	0.52	0.583	0.67	1.9
	Nickel	163	100.0%	0	--	--	--	--	--	--	163	4.5	13.3	14.9	14.6	15.9	30.9
	Niobium	163	8.0%	150	1.5118	1.51	1.51	1.51	1.51	1.88975	13	1.7	2.7	3	3.08	3.55	4
	Palladium	163	100.0%	0	--	--	--	--	--	--	163	0.16	0.41	0.61	0.636	0.79	2.2
	Phosphorus	163	100.0%	0	--	--	--	--	--	--	163	299	859	1080	1100	1380	1930
	Platinum	163	5.5%	154	0.02	0.02	0.02	0.0201	0.02	0.025	9	0.022	0.024	0.027	0.0318	0.041	0.049
	Potassium	163	100.0%	0	--	--	--	--	--	--	163	850	1410	1920	2440	2870	12600
	Selenium	163	0.0%	163	0.32	0.32	0.32	0.321	0.32	0.4	0	--	--	--	--	--	--
	Silicon	163	100.0%	0	--	--	--	--	--	--	163	109	238	465	512	743	1340
	Silver	163	100.0%	0	--	--	--	--	--	--	163	0.046	0.096	0.13	0.215	0.21	2.2
	Sodium	163	100.0%	0	--	--	--	--	--	--	163	235	500	752	868	1050	3250
	Strontium	163	100.0%	0	--	--	--	--	--	--	163	68.5	199	246	257	293	793
	Thallium	163	2.5%	159	0.2	0.2	0.2	0.201	0.2	0.25	4	0.15	0.163	0.21	0.228	0.31	0.34
	Tin	163	77.9%	36	0.0526	0.0526	0.0526	0.0528	0.0526	0.059	127	0.24	0.45	0.53	0.522	0.6	0.96
	Titanium	163	100.0%	0	--	--	--	--	--	--	163	175	505	589	590	679	1000
	Tungsten	163	33.1%	109	0.2	0.2	0.2	0.201	0.2	0.25	54	0.19	0.26	0.33	0.421	0.453	3.6
	Uranium	163	100.0%	0	--	--	--	--	--	--	163	0.31	1.1	1.3	1.36	1.5	4.4
	Vanadium	163	100.0%	0	--	--	--	--	--	--	163	10	33.4	39.2	39.6	44.9	73.3
	Zinc	163	100.0%	0	--	--	--	--	--	--	163	16.1	30.3	33.2	34.1	36.5	68.2
	Zirconium	163	90.2%	16	0.5	0.5	0.5	0.504	0.5	0.56	147	6.2	16.4	21.6	21.3	26.1	36.7
Radionuclides (pCi/g)	Radium-226	125	96.8%	4							121	0.394	1	1.29	1.35	1.7	2.29
	Radium-228	124	98.4%	2							122	0.452	1.19	1.36	1.38	1.54	2.31
	Thorium-228	159	100.0%	0							159	0.944	1.39	1.58	1.6	1.79	2.3
	Thorium-230	159	100.0%	0							159	0.495	1.02	1.32	1.36	1.62	2.72
	Thorium-232	159	100.0%	0							159	0.898	1.32	1.47	1.47	1.6	2.05
	Uranium-233/234	141	89.4%	15							126	0.626	1.03	1.35	1.39	1.66	2.63
	Uranium-235/236	141	78.7%	30							111	-0.000681	0.0357	0.0479	0.0522	0.0729	0.116
	Uranium-238	141	87.9%	17							124	0.57	1	1.25	1.33	1.55	2.79

Notes:

mg/kg milligrams per kilogram
Max maximum concentration
Min minimum concentration
pCi/g picocuries per gram
Q1 1st quartile (25th percentile)
Q3 3rd quartile (75th percentile)

TABLE 5
DESCRIPTIVE SUMMARY STATISTICS FOR METALS AND RADIONUCLIDES IN 2008 DEEP BACKGROUND SOIL SAMPLES - Qal/McCULLOUGH
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analyte Group	Analyte	Sample Size	Detection Frequency	Censored (Non-Detect) Data							Detected Data						
				ND Count	Min	Q1	Median	Mean	Q3	Max	Detect Count	Min	Q1	Median	Mean	Q3	Max
Metals (mg/kg)	Aluminum	79	100.0%	0	--	--	--	--	--	--	79	5060	7230	8790	8690	9860	15100
	Antimony	79	92.4%	6	0.1046	0.105	0.105	0.105	0.105	0.1046	73	0.089	0.13	0.15	0.148	0.165	0.22
	Arsenic	79	100.0%	0	--	--	--	--	--	--	79	2.2	3.1	3.8	4.38	5	13.1
	Barium	79	100.0%	0	--	--	--	--	--	--	79	84.7	117	138	156	173	539
	Beryllium	79	100.0%	0	--	--	--	--	--	--	79	0.29	0.51	0.55	0.556	0.6	0.67
	Boron	79	25.3%	59	2.824	2.82	2.82	2.82	2.82	2.824	20	3	3.98	5.6	5.36	6.35	7.6
	Cadmium	79	92.4%	6	0.01	0.01	0.01	0.01	0.01	0.01	73	0.05	0.075	0.084	0.0871	0.0975	0.13
	Calcium	79	100.0%	0	--	--	--	--	--	--	79	10700	19300	24500	25000	29600	46600
	Chromium (Total)	79	100.0%	0	--	--	--	--	--	--	79	7.1	9.3	10.3	10.6	11.8	16.6
	Chromium (VI)	80	22.5%	62	0.16	0.17	0.17	0.17	0.17	0.19	18	0.18	0.20	0.26	0.41	0.39	1.6
	Cobalt	79	100.0%	0	--	--	--	--	--	--	79	5.3	6.8	7.5	7.78	8.6	10.8
	Copper	79	100.0%	0	--	--	--	--	--	--	79	8.8	15.3	16.4	16.3	17.3	24
	Iron	79	100.0%	0	--	--	--	--	--	--	79	11200	13100	14700	15400	17000	22500
	Lead	79	100.0%	0	--	--	--	--	--	--	79	4.9	6.4	7.1	7.44	8.4	15.8
	Lithium	79	84.8%	12	1.4628	3.66	3.66	3.47	3.66	3.657	67	7.5	15.4	17.4	20.1	21.3	124
	Magnesium	79	100.0%	0	--	--	--	--	--	--	79	4990	8650	9530	9550	10600	12500
	Manganese	79	100.0%	0	--	--	--	--	--	--	79	217	276	319	343	390	579
	Mercury	79	44.3%	44	0.00668	0.00668	0.00668	0.00668	0.00668	0.00668	35	0.0072	0.0086	0.0129	0.0126	0.0146	0.0235
	Molybdenum	79	78.5%	17	0.1046	0.105	0.105	0.105	0.105	0.1046	62	0.31	0.47	0.575	0.67	0.815	1.9
	Nickel	79	100.0%	0	--	--	--	--	--	--	79	8.5	14.4	15.3	15.5	16.3	27.5
	Niobium	79	7.6%	73	1.5118	1.51	1.51	1.51	1.51	1.5118	6	1.7	2.68	3.35	3.12	3.58	3.8
	Palladium	79	100.0%	0	--	--	--	--	--	--	79	0.2	0.39	0.61	0.672	0.83	2.2
	Phosphorus	79	100.0%	0	--	--	--	--	--	--	79	649	1240	1390	1370	1500	1930
	Platinum	79	8.9%	72	0.02	0.02	0.02	0.02	0.02	0.02	7	0.022	0.023	0.025	0.0323	0.046	0.049
	Potassium	79	100.0%	0	--	--	--	--	--	--	79	850	1240	1430	1500	1720	2450
	Selenium	79	0.0%	79	0.32	0.32	0.32	0.32	0.32	0.32	0	--	--	--	--	--	--
	Silicon	79	100.0%	0	--	--	--	--	--	--	79	139	370	617	591	823	1080
	Silver	79	100.0%	0	--	--	--	--	--	--	79	0.074	0.11	0.15	0.251	0.2	2.2
	Sodium	79	100.0%	0	--	--	--	--	--	--	79	428	644	776	864	1000	3250
	Strontium	79	100.0%	0	--	--	--	--	--	--	79	123	207	250	275	311	793
	Thallium	79	5.1%	75	0.2	0.2	0.2	0.2	0.2	0.2	4	0.15	0.163	0.21	0.228	0.31	0.34
	Tin	79	96.2%	3	0.0526	0.0526	0.0526	0.0526	0.0526	0.0526	76	0.25	0.513	0.55	0.549	0.62	0.78
	Titanium	79	100.0%	0	--	--	--	--	--	--	79	445	597	671	680	751	912
	Tungsten	79	31.6%	54	0.2	0.2	0.2	0.2	0.2	0.2	25	0.19	0.27	0.31	0.454	0.375	3.6
	Uranium	79	100.0%	0	--	--	--	--	--	--	79	0.89	1.2	1.4	1.55	1.8	2.8
	Vanadium	79	100.0%	0	--	--	--	--	--	--	79	26.7	38.3	43.2	46	53.5	73.3
	Zinc	79	100.0%	0	--	--	--	--	--	--	79	18.1	29.9	32	31.9	34	41.2
	Zirconium	79	100.0%	0	--	--	--	--	--	--	79	15.9	22.3	25.5	25.2	27.3	33.9
Radionuclides (pCi/g)	Radium-226	65	100.0%	0							65	0.981	1.4	1.64	1.67	1.97	2.29
	Radium-228	64	100.0%	0							64	0.855	1.23	1.4	1.46	1.68	2.31
	Thorium-228	79	100.0%	0							79	1.11	1.57	1.75	1.76	1.96	2.3
	Thorium-230	79	100.0%	0							79	1.05	1.42	1.58	1.68	1.92	2.72
	Thorium-232	79	100.0%	0							79	0.908	1.44	1.54	1.56	1.69	2.01
	Uranium-233/234	76	100.0%	0							76	0.868	1.4	1.62	1.65	1.79	2.63
	Uranium-235/236	76	89.5%	8							68	0.0121	0.0465	0.065	0.0631	0.077	0.116
	Uranium-238	76	100.0%	0							76	0.993	1.28	1.51	1.55	1.7	2.79

Notes:

mg/kg milligrams per kilogram
Max maximum concentration
Min minimum concentration
pCi/g picocuries per gram
Q1 1st quartile (25th percentile)
Q3 3rd quartile (75th percentile)

TABLE 6
DESCRIPTIVE SUMMARY STATISTICS FOR METALS AND RADIONUCLIDES IN 2008 DEEP BACKGROUND SOIL SAMPLES - Qal/RIVER
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 1)

Analyte Group	Analyte	Sample Size	Detection Frequency	Censored (Non-Detect) Data							Detected Data						
				ND Count	Min	Q1	Median	Mean	Q3	Max	Detect Count	Min	Q1	Median	Mean	Q3	Max
Metals (mg/kg)	Aluminum	36	100.0%	0	--	--	--	--	--	--	36	5680	7860	8360	8610	8900	13400
	Antimony	36	100.0%	0	--	--	--	--	--	--	36	0.14	0.193	0.21	0.222	0.238	0.37
	Arsenic	36	100.0%	0	--	--	--	--	--	--	36	4.7	5.75	7.2	7.51	8.18	13.9
	Barium	36	100.0%	0	--	--	--	--	--	--	36	188	269	329	399	478	1350
	Beryllium	36	100.0%	0	--	--	--	--	--	--	36	0.34	0.44	0.46	0.471	0.515	0.72
	Boron	36	22.2%	28	2.824	2.82	2.82	2.82	2.82	2.824	8	5	5.45	6.15	8.36	7.18	24.1
	Cadmium	36	72.2%	10	0.01	0.01	0.01	0.01	0.01	0.01	26	0.034	0.0748	0.0985	0.096	0.12	0.16
	Calcium	36	100.0%	0	--	--	--	--	--	--	36	4680	16800	22000	21700	27700	45600
	Chromium (Total)	36	100.0%	0	--	--	--	--	--	--	36	7.2	9.43	10.4	11.1	11.4	24.2
	Chromium (VI)	41	39.0%	25	0.16	0.16	0.16	0.17	0.17	0.2	16	0.16	0.22	0.38	0.41	0.54	1.1
	Cobalt	36	100.0%	0	--	--	--	--	--	--	36	3.5	4.2	4.6	4.61	5.08	5.7
	Copper	36	100.0%	0	--	--	--	--	--	--	36	8	9.23	10.3	10.3	11	13.9
	Iron	36	100.0%	0	--	--	--	--	--	--	36	7250	9320	10900	10500	11800	13100
	Lead	36	100.0%	0	--	--	--	--	--	--	36	9.5	10.6	11.8	14.1	13.9	35.1
	Lithium	36	100.0%	0	--	--	--	--	--	--	36	20	25.2	30.3	30.9	36.3	47.2
	Magnesium	36	100.0%	0	--	--	--	--	--	--	36	5210	6500	7210	7630	8690	13900
	Manganese	36	100.0%	0	--	--	--	--	--	--	36	87.5	141	162	213	263	777
	Mercury	28	17.9%	23	0.00668	0.00668	0.00668	0.00668	0.00668	0.00668	5	0.007	0.00725	0.0077	0.00832	0.0097	0.0102
	Molybdenum	36	86.1%	5	0.1046	0.105	0.105	0.105	0.105	0.1046	31	0.26	0.34	0.4	0.432	0.52	0.72
	Nickel	36	100.0%	0	--	--	--	--	--	--	36	9.2	12.3	13.3	13.3	14.8	17.5
	Niobium	36	8.3%	33	1.5118	1.51	1.51	1.51	1.51	1.5118	3	2.5	2.5	2.6	2.7	3	3
	Palladium	36	100.0%	0	--	--	--	--	--	--	36	0.24	0.39	0.6	0.577	0.775	1.1
	Phosphorus	36	100.0%	0	--	--	--	--	--	--	36	511	739	820	829	911	1320
	Platinum	36	0.0%	36	0.02	0.02	0.02	0.0201	0.02	0.023	0	--	--	--	--	--	--
	Potassium	36	100.0%	0	--	--	--	--	--	--	36	2560	2950	3330	4370	5030	12600
	Selenium	36	0.0%	36	0.32	0.32	0.32	0.321	0.32	0.36	0	--	--	--	--	--	--
	Silicon	36	100.0%	0	--	--	--	--	--	--	36	224	451	618	634	797	1340
	Silver	36	100.0%	0	--	--	--	--	--	--	36	0.046	0.0695	0.12	0.194	0.245	1.4
	Sodium	36	100.0%	0	--	--	--	--	--	--	36	600	942	1250	1400	1890	2770
	Strontium	36	100.0%	0	--	--	--	--	--	--	36	146	202	252	270	312	559
	Thallium	36	0.0%	36	0.2	0.2	0.2	0.201	0.2	0.23	0	--	--	--	--	--	--
	Tin	36	44.4%	20	0.0526	0.0526	0.0526	0.0529	0.0526	0.059	16	0.25	0.323	0.355	0.366	0.418	0.49
	Titanium	36	100.0%	0	--	--	--	--	--	--	36	309	440	525	515	589	712
	Tungsten	36	25.0%	27	0.2	0.2	0.2	0.201	0.2	0.23	9	0.26	0.265	0.38	0.398	0.525	0.6
	Uranium	36	100.0%	0	--	--	--	--	--	--	36	0.64	0.885	1.2	1.15	1.38	2.2
	Vanadium	36	100.0%	0	--	--	--	--	--	--	36	24.6	28	31.3	31.8	35.8	40.9
	Zinc	36	100.0%	0	--	--	--	--	--	--	36	25.5	33.8	37.9	39.6	42.4	68.2
	Zirconium	36	80.6%	7	0.5	0.5	0.5	0.509	0.5	0.56	29	10	13.5	15.9	15.7	17.6	20.5
Radionuclides (pCi/g)	Radium-226	28	100.0%	0							28	0.491	0.781	0.984	0.966	1.14	1.39
	Radium-228	28	100.0%	0							28	0.879	1.08	1.37	1.3	1.48	1.76
	Thorium-228	33	100.0%	0							33	0.944	1.26	1.38	1.38	1.5	1.71
	Thorium-230	33	100.0%	0							33	0.552	0.831	1.02	1.03	1.14	1.85
	Thorium-232	33	100.0%	0							33	0.898	1.14	1.35	1.31	1.45	1.67
	Uranium-233/234	32	96.9%	1							31	0.641	0.892	1.04	1.1	1.22	2.1
	Uranium-235/236	32	56.3%	14							18	-0.000681	0.02	0.0378	0.0372	0.0473	0.0961
	Uranium-238	32	93.8%	2							30	0.57	0.949	1	1.07	1.21	2.17

Notes:

mg/kg	milligrams per kilogram
Max	maximum concentration
Min	minimum concentration
pCi/g	picocuries per gram
Q1	1st quartile (25th percentile)
Q3	3rd quartile (75th percentile)

TABLE 7
DESCRIPTIVE SUMMARY STATISTICS FOR METALS AND RADIONUCLIDES IN 2008 DEEP BACKGROUND SOIL SAMPLES - Qal/MIXED
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analyte Group	Analyte	Sample Size	Detection Frequency	Censored (Non-Detect) Data							Detected Data						
				ND Count	Min	Q1	Median	Mean	Q3	Max	Detect Count	Min	Q1	Median	Mean	Q3	Max
Metals (mg/kg)	Aluminum	24	100.0%	0	--	--	--	--	--	--	24	7060	8380	9380	9510	10500	12300
	Antimony	24	95.8%	1	0.1046	--	0.105	0.105	--	0.1046	23	0.12	0.15	0.16	0.172	0.2	0.26
	Arsenic	24	100.0%	0	--	--	--	--	--	--	24	4.4	6.23	6.95	7.1	8.25	10
	Barium	24	100.0%	0	--	--	--	--	--	--	24	262	410	488	500	555	743
	Beryllium	24	100.0%	0	--	--	--	--	--	--	24	0.44	0.493	0.56	0.558	0.605	0.73
	Boron	24	12.5%	21	2.824	2.82	2.82	2.82	2.82	2.824	3	4	4	4.5	4.5	5	5
	Cadmium	24	91.7%	2	0.01	--	0.01	0.01	--	0.01	22	0.051	0.081	0.0995	0.0948	0.11	0.13
	Calcium	24	100.0%	0	--	--	--	--	--	--	24	0.43	16300	23100	22800	30000	40500
	Chromium (Total)	24	100.0%	0	--	--	--	--	--	--	24	1.1	13	15	14.2	16.2	18.3
	Chromium (VI)	14	14.3%	12	0.17	0.17	0.17	0.18	0.18	0.19	2	0.18	--	0.26	0.26	--	0.34
	Cobalt	24	100.0%	0	--	--	--	--	--	--	24	4.7	6.75	7.5	7.49	8	12.9
	Copper	24	100.0%	0	--	--	--	--	--	--	24	9.9	13.4	15.2	15	16.5	18.8
	Iron	24	100.0%	0	--	--	--	--	--	--	24	11900	14300	15400	15100	16400	17200
	Lead	24	100.0%	0	--	--	--	--	--	--	24	7.4	10.4	11.4	11.8	12.8	21.3
	Lithium	24	100.0%	0	--	--	--	--	--	--	24	13	18.5	20.9	21.4	23.1	33.4
	Magnesium	24	100.0%	0	--	--	--	--	--	--	24	5920	8620	9440	9390	10200	12800
	Manganese	24	100.0%	0	--	--	--	--	--	--	24	158	241	328	368	397	836
	Mercury	24	41.7%	14	0.00668	0.00668	0.00668	0.00668	0.00668	0.00668	10	0.0076	0.00828	0.0094	0.0117	0.0144	0.0254
	Molybdenum	24	100.0%	0	--	--	--	--	--	--	24	0.28	0.45	0.56	0.613	0.685	1.8
	Nickel	24	100.0%	0	--	--	--	--	--	--	24	9.7	13	15.1	14.5	15.7	17.3
	Niobium	24	12.5%	21	1.5118	1.51	1.51	1.51	1.51	1.5118	3	2.8	2.8	2.9	3.1	3.6	3.6
	Palladium	24	100.0%	0	--	--	--	--	--	--	24	0.41	0.52	0.705	0.693	0.853	1.1
	Phosphorus	24	100.0%	0	--	--	--	--	--	--	24	594	881	920	930	1010	1200
	Platinum	24	0.0%	24	0.02	0.02	0.02	0.02	0.02	0.02	0	--	--	--	--	--	--
	Potassium	24	100.0%	0	--	--	--	--	--	--	24	1220	1610	1960	2040	2400	3440
	Selenium	24	0.0%	24	0.32	0.32	0.32	0.32	0.32	0.32	0	--	--	--	--	--	--
	Silicon	24	100.0%	0	--	--	--	--	--	--	24	109	166	193	212	237	516
	Silver	24	100.0%	0	--	--	--	--	--	--	24	0.077	0.0925	0.11	0.135	0.15	0.35
	Sodium	24	100.0%	0	--	--	--	--	--	--	24	235	279	319	337	390	537
	Strontium	24	100.0%	0	--	--	--	--	--	--	24	153	175	219	230	271	362
	Thallium	24	0.0%	24	0.2	0.2	0.2	0.2	0.2	0.2	0	--	--	--	--	--	--
	Tin	24	62.5%	9	0.0526	0.0526	0.0526	0.0526	0.0526	0.0526	15	0.43	0.45	0.49	0.502	0.53	0.6
	Titanium	24	100.0%	0	--	--	--	--	--	--	24	323	462	500	495	547	638
	Tungsten	24	62.5%	9	0.2	0.2	0.2	0.2	0.2	0.2	15	0.24	0.26	0.33	0.395	0.55	0.76
	Uranium	24	100.0%	0	--	--	--	--	--	--	24	0.75	0.973	1.1	1.1	1.18	1.6
	Vanadium	24	100.0%	0	--	--	--	--	--	--	24	29.4	36.3	39.5	39.2	42.4	44.9
	Zinc	24	100.0%	0	--	--	--	--	--	--	24	26.8	30.7	33.3	33.4	36.1	46.4
	Zirconium	24	62.5%	9	0.5	0.5	0.5	0.5	0.5	0.5	15	7.7	12.1	15.2	14.3	16.7	17.7
Radionuclides (pCi/g)	Radium-226	14	100.0%	0							14	0.394	0.908	0.98	1.01	1.25	1.32
	Radium-228	14	92.9%	1							13	0.452	1.17	1.33	1.31	1.49	1.79
	Thorium-228	23	100.0%	0							23	1.07	1.39	1.59	1.57	1.7	1.91
	Thorium-230	23	100.0%	0							23	0.602	0.923	1.09	1.07	1.17	1.49
	Thorium-232	23	100.0%	0							23	1.12	1.31	1.51	1.51	1.66	1.89
	Uranium-233/234	11	63.6%	4							7	0.977	1	1.01	1.08	1.18	1.32
	Uranium-235/236	11	90.9%	1							10	0.0235	0.0303	0.0394	0.0407	0.0479	0.0624
	Uranium-238	11	63.6%	4							7	0.897	1	1.02	1.03	1.08	1.16

Notes:

mg/kg milligrams per kilogram
Max maximum concentration
Min minimum concentration
pCi/g picocuries per gram
Q1 1st quartile (25th percentile)
Q3 3rd quartile (75th percentile)

TABLE 8
DESCRIPTIVE SUMMARY STATISTICS FOR METALS AND RADIONUCLIDES IN 2008 DEEP BACKGROUND SOIL SAMPLES - UMCf
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analyte Group	Analyte	Sample Size	Detection Frequency	Censored (Non-Detect) Data							Detected Data						
				ND Count	Min	Q1	Median	Mean	Q3	Max	Detect Count	Min	Q1	Median	Mean	Q3	Max
Metals (mg/kg)	Aluminum	24	100.0%	0	--	--	--	--	--	--	24	3190	7100	9340	9850	13400	19700
	Antimony	24	95.8%	1	0.1046	--	0.105	0.105	--	0.1046	23	0.066	0.14	0.16	0.175	0.19	0.34
	Arsenic	24	100.0%	0	--	--	--	--	--	--	24	2.1	4.9	7.7	8.8	11.5	24.8
	Barium	24	100.0%	0	--	--	--	--	--	--	24	64.5	141	203	264	386	620
	Beryllium	24	100.0%	0	--	--	--	--	--	--	24	0.17	0.355	0.59	0.557	0.693	1.1
	Boron	24	29.2%	17	2.824	2.82	2.82	2.87	2.82	3.53	7	4.4	6	21.5	16.1	22.5	22.9
	Cadmium	24	75.0%	6	0.01	0.01	0.01	0.01	0.01	0.01	18	0.06	0.0833	0.11	0.109	0.123	0.2
	Calcium	24	100.0%	0	--	--	--	--	--	--	24	4190	14600	22200	22600	31900	38600
	Chromium (Total)	24	100.0%	0	--	--	--	--	--	--	24	2.9	5.7	13.2	13.2	17.7	27.9
	Chromium (VI)	23	8.7%	21	0.16	0.16	0.18	0.18	0.19	0.21	2	0.18	--	0.19	0.19	--	0.19
	Cobalt	24	100.0%	0	--	--	--	--	--	--	24	1.6	2.6	6.45	5.8	8.33	9.7
	Copper	24	100.0%	0	--	--	--	--	--	--	24	4.1	5.85	13.8	12.2	16	21.3
	Iron	24	100.0%	0	--	--	--	--	--	--	24	3620	6940	12800	12600	17400	20100
	Lead	24	100.0%	0	--	--	--	--	--	--	24	4.4	8.63	11.3	10.8	13.1	16.1
	Lithium	24	100.0%	0	--	--	--	--	--	--	24	18.3	23.3	32.3	52.6	47.1	189
	Magnesium	24	100.0%	0	--	--	--	--	--	--	24	2780	7150	10300	11300	13600	31000
	Manganese	24	100.0%	0	--	--	--	--	--	--	24	126	167	295	307	378	786
	Mercury	20	25.0%	15	0.00668	0.00668	0.00668	0.00668	0.00668	0.00668	5	0.008	0.00825	0.0101	0.01	0.0117	0.012
	Molybdenum	24	95.8%	1	0.1046	--	0.105	0.105	--	0.1046	23	0.12	0.32	0.51	0.523	0.65	1.1
	Nickel	24	100.0%	0	--	--	--	--	--	--	24	4.5	7.05	14.4	13.7	16.2	30.9
	Niobium	24	4.2%	23	1.5118	1.51	1.51	1.53	1.51	1.88975	1	4	--	4	4	--	4
	Palladium	24	100.0%	0	--	--	--	--	--	--	24	0.16	0.303	0.615	0.55	0.74	1
	Phosphorus	24	100.0%	0	--	--	--	--	--	--	24	299	562	843	794	1030	1370
	Platinum	24	8.3%	22	0.02	0.02	0.02	0.0202	0.02	0.025	2	0.027	--	0.03	0.03	--	0.033
	Potassium	24	100.0%	0	--	--	--	--	--	--	24	1030	2170	2820	3070	3580	6190
	Selenium	24	0.0%	24	0.32	0.32	0.32	0.323	0.32	0.4	0	--	--	--	--	--	--
	Silicon	24	100.0%	0	--	--	--	--	--	--	24	188	222	304	373	452	1000
	Silver	24	100.0%	0	--	--	--	--	--	--	24	0.051	0.0805	0.14	0.21	0.275	0.82
	Sodium	24	100.0%	0	--	--	--	--	--	--	24	259	367	460	610	883	1200
	Strontium	24	100.0%	0	--	--	--	--	--	--	24	68.5	172	224	207	250	324
	Thallium	24	0.0%	24	0.2	0.2	0.2	0.202	0.2	0.25	0	--	--	--	--	--	--
	Tin	24	83.3%	4	0.0526	0.0526	0.0526	0.0526	0.0526	0.0526	20	0.24	0.345	0.6	0.557	0.728	0.96
	Titanium	24	100.0%	0	--	--	--	--	--	--	24	175	262	565	503	612	1000
	Tungsten	24	20.8%	19	0.2	0.2	0.2	0.203	0.2	0.25	5	0.26	0.265	0.33	0.38	0.52	0.58
	Uranium	24	100.0%	0	--	--	--	--	--	--	24	0.31	0.793	1.15	1.27	1.58	4.4
	Vanadium	24	100.0%	0	--	--	--	--	--	--	24	10	13.6	33.4	30.6	41.9	45.8
	Zinc	24	100.0%	0	--	--	--	--	--	--	24	16.1	22	33.7	33.7	40.2	61.3
	Zirconium	24	100.0%	0	--	--	--	--	--	--	24	6.2	14.8	18	19.7	25.1	36.7
Radionuclides (pCi/g)	Radium-226	18	77.8%	4							14	0.754	0.888	1	1.04	1.1	1.63
	Radium-228	18	94.4%	1							17	0.989	1.08	1.26	1.25	1.37	1.55
	Thorium-228	24	100.0%	0							24	1.01	1.18	1.34	1.38	1.51	2.15
	Thorium-230	24	100.0%	0							24	0.495	0.846	0.979	1.02	1.15	2.09
	Thorium-232	24	100.0%	0							24	0.966	1.19	1.3	1.34	1.47	2.05
	Uranium-233/234	22	54.5%	10							12	0.626	1	1.02	1.11	1.22	1.81
	Uranium-235/236	22	68.2%	7							15	0.0112	0.0212	0.039	0.0426	0.0557	0.101
	Uranium-238	22	50.0%	11							11	0.839	1	1	1.1	1.19	1.75

Notes:

mg/kg milligrams per kilogram
Max maximum concentration
Min minimum concentration
pCi/g picocuries per gram
Q1 1st quartile (25th percentile)
Q3 3rd quartile (75th percentile)

TABLE 9
DESCRIPTIVE SUMMARY STATISTICS FOR METALS AND RADIONUCLIDES IN 2008 SUPPLEMENTAL SHALLOW BACKGROUND SOIL SAMPLES - Qal/RIVER - 0 FEET BGS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analyte Group	Analyte	Sample Size	Detection Frequency	Censored (Non-Detect) Data							Detected Data						
				ND Count	Min	Q1	Median	Mean	Q3	Max	Detect Count	Min	Q1	Median	Mean	Q3	Max
Metals (mg/kg)	Aluminum	12	100.0%	0	--	--	--	--	--	--	12	6630	8500	10600	10900	13200	15500
	Antimony	12	41.7%	7	0.126	0.126	0.126	0.126	0.126	0.126	5	0.24	0.27	0.33	0.378	0.51	0.61
	Arsenic	12	100.0%	0	--	--	--	--	--	--	12	4.5	6	6.95	7.22	8.53	10.5
	Barium	12	100.0%	0	--	--	--	--	--	--	12	282	310	404	440	543	710
	Beryllium	12	100.0%	0	--	--	--	--	--	--	12	0.35	0.378	0.415	0.492	0.648	0.78
	Boron	12	33.3%	8	6.6	6.6	6.6	6.6	6.6	6.6	4	9.7	9.9	11.1	12.9	17.7	19.7
	Cadmium	12	58.3%	5	0.04	0.04	0.04	0.04	0.04	0.04	7	0.079	0.092	0.13	0.144	0.17	0.26
	Calcium	12	100.0%	0	--	--	--	--	--	--	12	20700	23200	25700	29500	32200	51400
	Chromium (Total)	12	100.0%	0	--	--	--	--	--	--	12	3.2	7.7	10.7	12.2	16.8	23.6
	Chromium (VI)	12	0.0%	12	0.41	0.41	0.42	0.43	0.45	0.5	0	--	--	--	--	--	--
	Cobalt	12	100.0%	0	--	--	--	--	--	--	12	4.1	4.33	5.1	5.68	7.05	8.9
	Copper	12	100.0%	0	--	--	--	--	--	--	12	8.6	10	12.9	15.7	18	36.2
	Iron	12	100.0%	0	--	--	--	--	--	--	12	6630	7840	9690	11600	15500	21700
	Lead	12	100.0%	0	--	--	--	--	--	--	12	9	10.6	15.1	19.9	22.9	53
	Lithium	12	0.0%	12	3.657	3.66	5.49	7.31	12.8	14.628	0	--	--	--	--	--	--
	Magnesium	12	100.0%	0	--	--	--	--	--	--	12	5470	7550	8290	8840	10300	13300
	Manganese	12	100.0%	0	--	--	--	--	--	--	12	199	302	360	542	593	2070
	Mercury	12	0.0%	12	0.00668	0.00668	0.00668	0.00668	0.00668	0.00668	0	--	--	--	--	--	--
	Molybdenum	12	100.0%	0	--	--	--	--	--	--	12	0.28	0.415	0.6	0.772	0.848	2.3
	Nickel	12	100.0%	0	--	--	--	--	--	--	12	9.8	11.2	14	14.2	17	22
	Niobium	12	8.3%	11	3	3	3	3	3	3	1	4.6	--	4.6	4.6	--	4.6
	Palladium	12	100.0%	0	--	--	--	--	--	--	12	0.45	0.548	0.645	0.648	0.75	0.87
	Phosphorus	12	100.0%	0	--	--	--	--	--	--	12	461	696	785	873	1030	1710
	Platinum	12	0.0%	12	0.048	0.048	0.048	0.048	0.048	0.048	0	--	--	--	--	--	--
	Potassium	12	100.0%	0	--	--	--	--	--	--	12	1370	2750	5480	5160	6860	9000
	Selenium	12	0.0%	12	0.32	0.32	0.32	0.32	0.32	0.32	0	--	--	--	--	--	--
	Silicon	12	100.0%	0	--	--	--	--	--	--	12	461	964	1460	2060	2720	7480
	Silver	12	50.0%	6	0.11	0.11	0.11	0.11	0.11	0.11	6	0.071	0.08	0.135	0.126	0.163	0.17
	Sodium	12	100.0%	0	--	--	--	--	--	--	12	274	548	805	1150	1540	4210
	Strontium	12	100.0%	0	--	--	--	--	--	--	12	183	253	328	316	385	430
	Thallium	12	41.7%	7	0.3	0.3	0.3	0.3	0.3	0.3	5	0.43	0.435	0.45	0.758	1.24	2
	Tin	12	58.3%	5	0.3	0.3	0.3	0.3	0.3	0.3	7	0.36	0.42	0.57	0.583	0.64	1
	Titanium	12	100.0%	0	--	--	--	--	--	--	12	247	293	390	413	533	611
	Tungsten	12	8.3%	11	0.5	0.5	0.5	0.5	0.5	0.5	1	0.96	--	0.96	0.96	--	0.96
	Uranium	12	100.0%	0	--	--	--	--	--	--	12	0.65	0.708	0.845	0.892	1.14	1.2
	Vanadium	12	100.0%	0	--	--	--	--	--	--	12	19	25.5	31.6	30.4	34.9	39.8
	Zinc	12	100.0%	0	--	--	--	--	--	--	12	25	27.5	38.6	40.6	51.5	70.5
	Zirconium	12	41.7%	7	0.8	0.8	0.8	0.8	0.8	0.8	5	10.7	11.5	12.7	13.2	15.2	16.8
Radionuclides (pCi/g)	Radium-226	11	100.0%	0							11	0.574	0.725	0.807	0.864	0.952	1.3
	Radium-228	11	81.8%	2							9	0.751	1.08	1.35	1.45	1.94	2.3
	Thorium-228	11	100.0%	0							11	1.1	1.29	1.58	1.76	2.31	2.56
	Thorium-230	11	81.8%	2							9	1	1.02	1.3	1.29	1.44	1.98
	Thorium-232	11	100.0%	0							11	1.35	1.36	1.5	1.56	1.76	1.85
	Uranium-233/234	11	100.0%	0							11	0.7	0.801	0.865	0.945	0.885	1.82
	Uranium-235/236	11	18.2%	9							2	0.0249	0.0493	0.0605	0.07	0.113	0.118
	Uranium-238	11	100.0%	0							11	0.564	0.74	0.773	0.818	0.881	1.1

Notes:

mg/kg milligrams per kilogram
Max maximum concentration
Min minimum concentration
pCi/g picocuries per gram
Q1 1st quartile (25th percentile)
Q3 3rd quartile (75th percentile)

TABLE 10
DESCRIPTIVE SUMMARY STATISTICS FOR METALS AND RADIONUCLIDES IN 2008 SUPPLEMENTAL SHALLOW BACKGROUND SOIL SAMPLES - Qal/RIVER - 10 FEET BGS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analyte Group	Analyte	Sample Size	Detection Frequency	Censored (Non-Detect) Data							Detected Data						
				ND Count	Min	Q1	Median	Mean	Q3	Max	Detect Count	Min	Q1	Median	Mean	Q3	Max
Metals (mg/kg)	Aluminum	10	100.0%	0	--	--	--	--	--	--	10	5330	5770	7910	8790	12700	13900
	Antimony	10	40.0%	6	0.126	0.126	0.126	0.126	0.126	0.126	4	0.27	0.273	0.29	0.318	0.39	0.42
	Arsenic	10	100.0%	0	--	--	--	--	--	--	10	4.8	7.78	9.25	10.5	10.2	27.6
	Barium	10	100.0%	0	--	--	--	--	--	--	10	211	238	291	409	617	755
	Beryllium	10	100.0%	0	--	--	--	--	--	--	10	0.28	0.298	0.355	0.409	0.535	0.67
	Boron	10	60.0%	4	6.6	6.6	6.6	6.6	6.6	6.6	6	7.1	7.25	9.1	17.2	24.5	57
	Cadmium	10	80.0%	2	0.04	--	0.04	0.04	--	0.04	8	0.069	0.0753	0.102	0.108	0.128	0.19
	Calcium	10	100.0%	0	--	--	--	--	--	--	10	3760	18800	30300	31200	39900	71300
	Chromium (Total)	10	100.0%	0	--	--	--	--	--	--	10	5.4	6.88	12.2	11.2	13.7	19.8
	Chromium (VI)	10	0.0%	10	0.41	0.42	0.42	0.45	0.48	0.56	0	--	--	--	--	--	--
	Cobalt	10	100.0%	0	--	--	--	--	--	--	10	3.7	3.88	4.6	4.71	5.63	6.2
	Copper	10	100.0%	0	--	--	--	--	--	--	10	8	8.28	10.2	11	13.3	16.4
	Iron	10	100.0%	0	--	--	--	--	--	--	10	6210	7120	9600	9700	11900	14100
	Lead	10	100.0%	0	--	--	--	--	--	--	10	7.7	8.35	11.7	12.7	15.5	23.7
	Lithium	10	40.0%	6	14.628	14.6	14.6	14.6	14.6	14.628	4	31.2	31.4	33	32.8	33.9	33.9
	Magnesium	10	100.0%	0	--	--	--	--	--	--	10	1550	5710	7170	7310	8860	11900
	Manganese	10	100.0%	0	--	--	--	--	--	--	10	178	215	274	377	380	1320
	Mercury	10	0.0%	10	0.00668	0.00668	0.00668	0.00668	0.00668	0.00668	0	--	--	--	--	--	--
	Molybdenum	10	100.0%	0	--	--	--	--	--	--	10	0.4	0.46	0.8	0.838	1.15	1.4
	Nickel	10	100.0%	0	--	--	--	--	--	--	10	10.7	11.4	12.3	12.7	13.5	16.9
	Niobium	10	0.0%	10	3	3	3	3	3	3	0	--	--	--	--	--	--
	Palladium	10	100.0%	0	--	--	--	--	--	--	10	0.35	0.475	0.805	0.841	1.09	1.6
	Phosphorus	10	100.0%	0	--	--	--	--	--	--	10	442	579	738	814	1030	1320
	Platinum	10	0.0%	10	0.048	0.048	0.048	0.048	0.048	0.048	0	--	--	--	--	--	--
	Potassium	10	100.0%	0	--	--	--	--	--	--	10	1090	1690	2490	2380	2890	4150
	Selenium	10	0.0%	10	0.32	0.32	0.32	0.32	0.32	0.32	0	--	--	--	--	--	--
	Silicon	10	100.0%	0	--	--	--	--	--	--	10	479	692	1110	1070	1430	1670
	Silver	10	40.0%	6	0.11	0.11	0.11	0.11	0.11	0.11	4	0.054	0.0573	0.072	0.0743	0.0935	0.099
	Sodium	10	100.0%	0	--	--	--	--	--	--	10	853	1330	1990	2070	3010	3310
	Strontium	10	100.0%	0	--	--	--	--	--	--	10	172	240	413	417	531	761
	Thallium	10	0.0%	10	0.3	0.3	0.3	0.3	0.3	0.3	0	--	--	--	--	--	--
	Tin	10	50.0%	5	0.3	0.3	0.3	0.3	0.3	0.3	5	0.32	0.325	0.36	0.424	0.555	0.6
	Titanium	10	100.0%	0	--	--	--	--	--	--	10	215	269	378	396	532	539
	Tungsten	10	10.0%	9	0.5	0.5	0.5	0.5	0.5	0.5	1	1	--	1	1	--	1
	Uranium	10	100.0%	0	--	--	--	--	--	--	10	0.61	0.743	1.55	1.66	1.98	4.3
	Vanadium	10	100.0%	0	--	--	--	--	--	--	10	21.9	25.5	32.1	33.5	37.7	55.3
	Zinc	10	100.0%	0	--	--	--	--	--	--	10	31.1	31.6	37.6	37.8	43.1	44.7
	Zirconium	10	40.0%	6	0.8	0.8	0.8	0.8	0.8	0.8	4	9.2	9.58	11.1	10.9	12.1	12.3
Radionuclides (pCi/g)	Radium-226	10	90.0%	1							9	0.153	0.912	1.34	1.39	1.92	2.75
	Radium-228	10	80.0%	2							8	0.947	1.03	1.31	1.37	1.53	2.1
	Thorium-228	10	100.0%	0							10	1.29	1.31	1.65	1.87	2.23	3.37
	Thorium-230	10	100.0%	0							10	1.12	1.5	1.98	1.97	2.15	3.64
	Thorium-232	10	100.0%	0							10	1.15	1.26	1.42	1.59	1.8	2.8
	Uranium-233/234	10	100.0%	0							10	0.985	1.38	1.92	2.08	2.41	4.78
	Uranium-235/236	10	50.0%	5							5	0.0734	0.078	0.141	0.137	0.19	0.21
	Uranium-238	10	100.0%	0							10	0.545	1.09	1.43	1.7	2.12	4.01

Notes:

mg/kg milligrams per kilogram
Max maximum concentration
Min minimum concentration
pCi/g picocuries per gram
Q1 1st quartile (25th percentile)
Q3 3rd quartile (75th percentile)

TABLE 11
DESCRIPTIVE SUMMARY STATISTICS FOR METALS AND RADIONUCLIDES IN 2005 BRC/TIMET SHALLOW BACKGROUND SOIL SAMPLES - Qal/McCULLOUGH - 0 FEET BGS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analyte Group	Analyte	Sample Size	Detection Frequency	Censored (Non-Detect) Data							Detected Data						
				ND Count	Min	Q1	Median	Mean	Q3	Max	Detect Count	Min	Q1	Median	Mean	Q3	Max
Metals (mg/kg)	Aluminum	37	100.0%	0	--	--	--	--	--	--	37	6340	7370	10400	10000	12300	13900
	Antimony	37	62.2%	14	0.0394	0.257	0.33	0.268	0.33	0.3298	23	0.12	0.2	0.25	0.277	0.36	0.5
	Arsenic	37	100.0%	0	--	--	--	--	--	--	37	2.1	2.95	3.7	4.14	5.35	7.2
	Barium	37	100.0%	0	--	--	--	--	--	--	37	90.4	144	171	180	215	445
	Beryllium	37	100.0%	0	--	--	--	--	--	--	37	0.16	0.445	0.66	0.618	0.79	0.89
	Boron	34	47.1%	18	3.2	3.2	3.2	3.2	3.2	3.2	16	5.2	5.73	6.1	6.96	8.1	11.6
	Cadmium	37	8.1%	34	0.1291	0.129	0.129	0.129	0.129	0.1291	3	0.11	0.11	0.13	0.133	0.16	0.16
	Calcium	34	100.0%	0	--	--	--	--	--	--	34	11200	16400	19900	22200	26900	43200
	Chromium (Total)	37	100.0%	0	--	--	--	--	--	--	37	3.6	7.85	11.1	10.6	13.4	16.7
	Chromium (VI)	34	0.0%	34	0.25	0.25	0.25	0.251	0.25	0.26	0	--	--	--	--	--	--
	Cobalt	37	100.0%	0	--	--	--	--	--	--	37	5.7	7.8	9.3	9.05	9.7	14.6
	Copper	37	100.0%	0	--	--	--	--	--	--	37	12.1	16.9	18.7	18.6	20.2	25.9
	Iron	37	100.0%	0	--	--	--	--	--	--	37	9030	12700	14600	14500	16700	19700
	Lead	37	100.0%	0	--	--	--	--	--	--	37	6	8.6	10.5	11.7	12.2	35.1
	Lithium	34	100.0%	0	--	--	--	--	--	--	34	7.5	9.93	12.2	13.8	18.1	23.9
	Magnesium	37	100.0%	0	--	--	--	--	--	--	37	7380	8930	10200	10900	12600	17500
	Manganese	37	100.0%	0	--	--	--	--	--	--	37	263	406	455	460	509	747
	Mercury	37	89.2%	4	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	33	0.0091	0.0155	0.022	0.0247	0.0325	0.082
	Molybdenum	37	100.0%	0	--	--	--	--	--	--	37	0.3	0.37	0.46	0.521	0.67	0.9
	Nickel	37	100.0%	0	--	--	--	--	--	--	37	10.9	15.5	17.1	17.6	18.9	30
	Niobium	34	0.0%	34	1.015	1.02	1.02	1.02	1.02	1.015	0	--	--	--	--	--	--
	Palladium	34	100.0%	0	--	--	--	--	--	--	34	0.21	0.26	0.3	0.368	0.388	1.5
	Phosphorus	34	100.0%	0	--	--	--	--	--	--	34	1220	1340	1540	1540	1710	1990
	Platinum	34	2.9%	33	0.0435	0.0435	0.0435	0.0435	0.0435	0.0435	1	0.082	--	0.082	0.082	--	0.082
	Potassium	34	100.0%	0	--	--	--	--	--	--	34	1240	1610	1880	2280	3010	3890
	Selenium	37	59.5%	15	0.1579	0.158	0.158	0.158	0.158	0.1579	22	0.17	0.268	0.315	0.321	0.363	0.6
	Silicon	34	100.0%	0	--	--	--	--	--	--	34	335	570	1040	1450	2560	4150
	Silver	37	8.1%	34	0.2609	0.261	0.261	0.261	0.261	0.2609	3	0.044	0.044	0.057	0.0613	0.083	0.083
	Sodium	34	100.0%	0	--	--	--	--	--	--	34	128	150	170	259	342	693
	Strontium	34	100.0%	0	--	--	--	--	--	--	34	97.7	124	145	174	177	808
	Thallium	37	35.1%	24	0.5428	0.543	0.543	0.543	0.543	0.5428	13	0.13	0.71	1.2	1.1	1.5	1.7
	Tin	34	100.0%	0	--	--	--	--	--	--	34	0.38	0.518	0.56	0.571	0.63	0.8
	Titanium	37	100.0%	0	--	--	--	--	--	--	37	371	475	558	581	666	936
	Tungsten	34	0.0%	34	0.0175	0.0175	0.0175	0.0175	0.0175	0.0175	0	--	--	--	--	--	--
	Uranium	34	100.0%	0	--	--	--	--	--	--	34	0.62	0.818	0.925	0.947	1.03	1.8
	Vanadium	37	100.0%	0	--	--	--	--	--	--	37	23.6	33.7	36.1	38.3	43.9	57.3
	Zinc	37	100.0%	0	--	--	--	--	--	--	37	29.3	38.1	43.1	45.9	51.2	121
	Zirconium	34	100.0%	0	--	--	--	--	--	--	34	99.3	118	125	131	142	176
Radionuclides (pCi/g)	Radium-226	34	94.1%	2							32	0.494	0.887	1.01	1.03	1.17	1.58
	Radium-228	29	75.9%	7							22	1.11	1.69	1.93	1.9	2.08	2.66
	Thorium-228	37	100.0%	0							37	1.15	1.67	1.83	1.8	1.96	2.28
	Thorium-230	37	100.0%	0							37	0.73	0.93	1.16	1.13	1.26	1.7
	Thorium-232	37	100.0%	0							37	1.32	1.54	1.77	1.74	1.9	2.23
	Uranium-233/234	37	32.4%	25							12	0.63	0.83	0.93	0.934	1.03	1.23
	Uranium-235/236	37	40.5%	22							15	0.011	0.045	0.06	0.0659	0.0935	0.13
	Uranium-238	37	100.0%	0							37	0.65	0.82	0.92	0.942	1.06	1.38

Notes:

mg/kg milligrams per kilogram
Max maximum concentration
Min minimum concentration
pCi/g picocuries per gram
Q1 1st quartile (25th percentile)
Q3 3rd quartile (75th percentile)

TABLE 12
DESCRIPTIVE SUMMARY STATISTICS FOR METALS AND RADIONUCLIDES IN 2005 BRC/TIMET SHALLOW BACKGROUND SOIL SAMPLES - Qal/McCULLOUGH - 10 FEET BGS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 1)

Analyte Group	Analyte	Sample Size	Detection Frequency	Censored (Non-Detect) Data							Detected Data						
				ND Count	Min	Q1	Median	Mean	Q3	Max	Detect Count	Min	Q1	Median	Mean	Q3	Max
Metals (mg/kg)	Aluminum	30	100.0%	0	--	--	--	--	--	--	30	3740	6500	8350	8410	10400	13300
	Antimony	30	33.3%	20	0.3298	0.33	0.33	0.33	0.33	0.3298	10	0.12	0.135	0.155	0.2	0.26	0.41
	Arsenic	30	100.0%	0	--	--	--	--	--	--	30	3.1	3.68	4.15	4.37	5.03	6.7
	Barium	30	100.0%	0	--	--	--	--	--	--	30	82.5	136	168	170	193	340
	Beryllium	30	100.0%	0	--	--	--	--	--	--	30	0.29	0.438	0.51	0.556	0.64	0.89
	Boron	30	26.7%	22	3.2	3.2	3.2	3.2	3.2	3.2	8	5.5	5.9	7.4	7.45	8.58	10.2
	Cadmium	30	0.0%	30	0.1291	0.129	0.129	0.129	0.129	0.1291	0	--	--	--	--	--	--
	Calcium	30	100.0%	0	--	--	--	--	--	--	30	17900	21100	32200	34600	45600	70200
	Chromium (Total)	30	100.0%	0	--	--	--	--	--	--	30	2.6	6.15	8.2	8.09	9.53	14.1
	Chromium (VI)	30	0.0%	30	0.26	0.26	0.26	0.261	0.26	0.27	0	--	--	--	--	--	--
	Cobalt	30	100.0%	0	--	--	--	--	--	--	30	3.7	6.55	8.95	8.55	10.2	16.3
	Copper	30	100.0%	0	--	--	--	--	--	--	30	10.2	14.6	17	17.1	19.8	23.9
	Iron	30	100.0%	0	--	--	--	--	--	--	30	5410	9080	12600	12000	14800	19100
	Lead	30	100.0%	0	--	--	--	--	--	--	30	3	5.2	6	5.88	6.7	7.8
	Lithium	30	100.0%	0	--	--	--	--	--	--	30	9.9	11.8	13.9	15.5	18.4	26.5
	Magnesium	30	100.0%	0	--	--	--	--	--	--	30	5530	8800	11100	10700	12800	16900
	Manganese	30	100.0%	0	--	--	--	--	--	--	30	151	289	394	382	463	641
	Mercury	30	73.3%	8	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	22	0.0092	0.011	0.0135	0.0232	0.0213	0.11
	Molybdenum	30	100.0%	0	--	--	--	--	--	--	30	0.33	0.428	0.515	0.566	0.603	1.9
	Nickel	30	100.0%	0	--	--	--	--	--	--	30	7.9	11.7	15.2	15.2	18.3	22.1
	Niobium	30	0.0%	30	1.015	1.02	1.02	1.02	1.02	1.015	0	--	--	--	--	--	--
	Palladium	30	100.0%	0	--	--	--	--	--	--	30	0.25	0.398	0.585	0.631	0.845	1.2
	Phosphorus	30	100.0%	0	--	--	--	--	--	--	30	862	1110	1430	1410	1650	1960
	Platinum	30	6.7%	28	0.0435	0.0435	0.0435	0.0435	0.0435	0.0435	2	0.064	--	0.064	0.064	--	0.064
	Potassium	30	100.0%	0	--	--	--	--	--	--	30	625	913	1220	1280	1430	2270
	Selenium	30	16.7%	25	0.1579	0.158	0.158	0.158	0.158	0.1579	5	0.26	0.265	0.27	0.28	0.3	0.31
	Silicon	30	100.0%	0	--	--	--	--	--	--	30	423	548	666	766	952	1380
	Silver	30	0.0%	30	0.2609	0.261	0.261	0.261	0.261	0.2609	0	--	--	--	--	--	--
	Sodium	30	100.0%	0	--	--	--	--	--	--	30	196	517	646	659	805	1190
	Strontium	30	100.0%	0	--	--	--	--	--	--	30	114	196	272	313	409	684
	Thallium	30	23.3%	23	0.5428	0.543	0.543	0.543	0.543	0.5428	7	1.1	1.2	1.2	1.33	1.5	1.6
	Tin	30	100.0%	0	--	--	--	--	--	--	30	0.24	0.378	0.42	0.436	0.513	0.63
	Titanium	30	100.0%	0	--	--	--	--	--	--	30	262	416	504	521	617	858
	Tungsten	30	0.0%	30	0.0175	0.0175	0.0175	0.0175	0.0175	0.0175	0	--	--	--	--	--	--
	Uranium	30	100.0%	0	--	--	--	--	--	--	30	0.68	0.915	1.1	1.18	1.3	2.7
	Vanadium	30	100.0%	0	--	--	--	--	--	--	30	20.2	33.8	39.2	39.6	46.4	57.5
	Zinc	30	100.0%	0	--	--	--	--	--	--	30	15.4	24	34.6	32.8	40.1	51.7
	Zirconium	30	100.0%	0	--	--	--	--	--	--	30	86.1	103	125	127	150	177
Radionuclides (pCi/g)	Radium-226	30	93.3%	2							28	0.507	0.983	1.25	1.33	1.66	2.36
	Radium-228	25	84.0%	4							21	0.946	1.71	2.02	1.94	2.16	2.92
	Thorium-228	30	100.0%	0							30	1.16	1.38	1.53	1.61	1.85	2.13
	Thorium-230	30	100.0%	0							30	0.81	1.15	1.56	1.54	1.72	3.01
	Thorium-232	30	100.0%	0							30	1.23	1.36	1.52	1.58	1.81	2.1
	Uranium-233/234	30	70.0%	9							21	0.85	1.12	1.34	1.55	1.93	2.84
	Uranium-235/236	30	53.3%	14							16	0.001	0.0493	0.082	0.0848	0.103	0.21
	Uranium-238	30	100.0%	0							30	0.85	1.07	1.39	1.46	1.78	2.37

Notes:

mg/kg milligrams per kilogram
Max maximum concentration
Min minimum concentration
pCi/g picocuries per gram
Q1 1st quartile (25th percentile)
Q3 3rd quartile (75th percentile)

TABLE 13
DESCRIPTIVE SUMMARY STATISTICS FOR METALS AND RADIONUCLIDES IN 2005 BRC/TIMET SHALLOW BACKGROUND SOIL SAMPLES - Qal/MIXED - 0 FEET BGS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analyte Group	Analyte	Sample Size	Detection Frequency	Censored (Non-Detect) Data							Detected Data						
				ND Count	Min	Q1	Median	Mean	Q3	Max	Detect Count	Min	Q1	Median	Mean	Q3	Max
Metals (mg/kg)	Aluminum	4	100.0%	0	--	--	--	--	--	--	4	5530	5710	6270	7170	9530	10600
	Antimony	4	75.0%	1	0.0394	--	0.0394	0.0394	--	0.0394	3	0.2	0.2	0.22	0.287	0.44	0.44
	Arsenic	4	100.0%	0	--	--	--	--	--	--	4	3.3	3.58	4.85	4.73	5.75	5.9
	Barium	4	100.0%	0	--	--	--	--	--	--	4	260	287	397	414	559	604
	Beryllium	4	100.0%	0	--	--	--	--	--	--	4	0.38	0.405	0.545	0.523	0.618	0.62
	Boron	3	0.0%	3	3.2	3.2	3.2	3.2	3.2	3.2	0	--	--	--	--	--	--
	Cadmium	4	25.0%	3	0.1291	0.129	0.129	0.129	0.129	0.1291	1	0.11	--	0.11	0.11	--	0.11
	Calcium	3	100.0%	0	--	--	--	--	--	--	3	10900	10900	16100	14500	16600	16600
	Chromium (Total)	4	100.0%	0	--	--	--	--	--	--	4	7.8	8.3	10.3	10	11.5	11.7
	Chromium (VI)	3	0.0%	3	0.25	0.25	0.25	0.25	0.25	0.25	0	--	--	--	--	--	--
	Cobalt	4	100.0%	0	--	--	--	--	--	--	4	5.4	5.58	6.25	6.93	8.95	9.8
	Copper	4	100.0%	0	--	--	--	--	--	--	4	11.1	12.7	18.1	17.6	22	23.2
	Iron	4	100.0%	0	--	--	--	--	--	--	4	11000	11600	13500	13000	13900	14000
	Lead	4	100.0%	0	--	--	--	--	--	--	4	8.9	11.1	18.8	16.9	20.8	21
	Lithium	3	100.0%	0	--	--	--	--	--	--	3	9.1	9.1	13.5	12.5	14.9	14.9
	Magnesium	4	100.0%	0	--	--	--	--	--	--	4	5450	5750	6770	6610	7320	7470
	Manganese	4	100.0%	0	--	--	--	--	--	--	4	422	430	480	618	944	1090
	Mercury	4	75.0%	1	0.0072	--	0.0072	0.0072	--	0.0072	3	0.0097	0.0097	0.017	0.0152	0.019	0.019
	Molybdenum	4	100.0%	0	--	--	--	--	--	--	4	0.27	0.385	0.78	0.733	1.03	1.1
	Nickel	4	100.0%	0	--	--	--	--	--	--	4	10.3	10.6	11.8	11.9	13.4	13.8
	Niobium	3	0.0%	3	1.015	1.02	1.02	1.02	1.02	1.015	0	--	--	--	--	--	--
	Palladium	3	100.0%	0	--	--	--	--	--	--	3	0.19	0.19	0.2	0.203	0.22	0.22
	Phosphorus	3	100.0%	0	--	--	--	--	--	--	3	636	636	745	728	804	804
	Platinum	3	0.0%	3	0.0435	0.0435	0.0435	0.0435	0.0435	0.0435	0	--	--	--	--	--	--
	Potassium	3	100.0%	0	--	--	--	--	--	--	3	1520	1520	1840	1730	1840	1840
	Selenium	4	100.0%	0	--	--	--	--	--	--	4	0.17	0.185	0.245	0.313	0.508	0.59
	Silicon	3	100.0%	0	--	--	--	--	--	--	3	761	761	789	783	798	798
	Silver	4	25.0%	3	0.2609	0.261	0.261	0.261	0.261	0.2609	1	0.056	--	0.056	0.056	--	0.056
	Sodium	3	100.0%	0	--	--	--	--	--	--	3	111	111	123	127	146	146
	Strontium	3	100.0%	0	--	--	--	--	--	--	3	86.8	86.8	91.4	91.8	97.3	97.3
	Thallium	4	75.0%	1	0.5428	--	0.543	0.543	--	0.5428	3	0.16	0.16	1	0.853	1.4	1.4
	Tin	3	100.0%	0	--	--	--	--	--	--	3	0.28	0.28	0.33	0.317	0.34	0.34
	Titanium	4	100.0%	0	--	--	--	--	--	--	4	244	258	306	312	372	392
	Tungsten	3	0.0%	3	0.0175	0.0175	0.0175	0.0175	0.0175	0.0175	0	--	--	--	--	--	--
	Uranium	3	100.0%	0	--	--	--	--	--	--	3	0.43	0.43	0.51	0.523	0.63	0.63
	Vanadium	4	100.0%	0	--	--	--	--	--	--	4	23.2	23.4	24	24.3	25.6	26
	Zinc	4	100.0%	0	--	--	--	--	--	--	4	24.8	27.3	35	35.6	44.7	47.8
	Zirconium	3	100.0%	0	--	--	--	--	--	--	3	60.1	60.1	63.5	63.2	66.1	66.1
Radionuclides (pCi/g)	Radium-226	3	33.3%	2							1	0.63	0.63	0.835	0.779	0.872	0.872
	Radium-228	1	100.0%	0							1	2.94	--	2.94	2.94	--	2.94
	Thorium-228	4	100.0%	0							4	1.34	1.37	1.46	1.47	1.59	1.62
	Thorium-230	4	100.0%	0							4	0.72	0.735	0.9	0.9	1.07	1.08
	Thorium-232	4	100.0%	0							4	1.26	1.3	1.43	1.4	1.47	1.47
	Uranium-233/234	4	25.0%	3							1	0.47	0.53	0.735	0.685	0.79	0.8
	Uranium-235/236	4	75.0%	1							3	0.035	0.0398	0.059	0.0708	0.114	0.13
	Uranium-238	4	100.0%	0							4	0.57	0.575	0.745	0.75	0.93	0.94

Notes:

mg/kg milligrams per kilogram
Max maximum concentration
Min minimum concentration
pCi/g picocuries per gram
Q1 1st quartile (25th percentile)
Q3 3rd quartile (75th percentile)

TABLE 14
DESCRIPTIVE SUMMARY STATISTICS FOR METALS AND RADIONUCLIDES IN 2005 BRC/TIMET SHALLOW BACKGROUND SOIL SAMPLES - Qal/MIXED - 10 FEET BGS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Analyte Group	Analyte	Sample Size	Detection Frequency	Censored (Non-Detect) Data							Detected Data						
				ND Count	Min	Q1	Median	Mean	Q3	Max	Detect Count	Min	Q1	Median	Mean	Q3	Max
Metals (mg/kg)	Aluminum	3	100.0%	0	--	--	--	--	--	--	3	6150	6150	6180	6230	6370	6370
	Antimony	3	66.7%	1	0.3298	--	0.33	0.33	--	0.3298	2	0.13	--	0.19	0.19	--	0.25
	Arsenic	3	100.0%	0	--	--	--	--	--	--	3	5.3	5.3	5.5	5.53	5.8	5.8
	Barium	3	100.0%	0	--	--	--	--	--	--	3	573	573	697	702	836	836
	Beryllium	3	100.0%	0	--	--	--	--	--	--	3	0.54	0.54	0.54	0.547	0.56	0.56
	Boron	3	0.0%	3	3.2	3.2	3.2	3.2	3.2	3.2	0	--	--	--	--	--	--
	Cadmium	3	0.0%	3	0.1291	0.129	0.129	0.129	0.129	0.1291	0	--	--	--	--	--	--
	Calcium	3	100.0%	0	--	--	--	--	--	--	3	26600	26600	30400	31100	36400	36400
	Chromium (Total)	3	100.0%	0	--	--	--	--	--	--	3	7.9	7.9	8.8	8.77	9.6	9.6
	Chromium (VI)	3	0.0%	3	0.26	0.26	0.26	0.26	0.26	0.26	0	--	--	--	--	--	--
	Cobalt	3	100.0%	0	--	--	--	--	--	--	3	5.2	5.2	5.4	7.63	12.3	12.3
	Copper	3	100.0%	0	--	--	--	--	--	--	3	14.3	14.3	18.3	18.7	23.4	23.4
	Iron	3	100.0%	0	--	--	--	--	--	--	3	9180	9180	10800	10500	11400	11400
	Lead	3	100.0%	0	--	--	--	--	--	--	3	9.4	9.4	9.9	10.3	11.7	11.7
	Lithium	3	100.0%	0	--	--	--	--	--	--	3	11.7	11.7	12.6	12.5	13.2	13.2
	Magnesium	3	100.0%	0	--	--	--	--	--	--	3	5240	5240	5340	5500	5920	5920
	Manganese	3	100.0%	0	--	--	--	--	--	--	3	345	345	469	434	488	488
	Mercury	3	66.7%	1	0.0072	--	0.0072	0.0072	--	0.0072	2	0.014	--	0.0145	0.0145	--	0.015
	Molybdenum	3	100.0%	0	--	--	--	--	--	--	3	0.89	0.89	0.9	1.03	1.3	1.3
	Nickel	3	100.0%	0	--	--	--	--	--	--	3	8.9	8.9	11.2	10.9	12.6	12.6
	Niobium	3	0.0%	3	1.015	1.02	1.02	1.02	1.02	1.015	0	--	--	--	--	--	--
	Palladium	3	100.0%	0	--	--	--	--	--	--	3	0.34	0.34	0.4	0.407	0.48	0.48
	Phosphorus	3	100.0%	0	--	--	--	--	--	--	3	722	722	727	756	820	820
	Platinum	3	0.0%	3	0.0435	0.0435	0.0435	0.0435	0.0435	0.0435	0	--	--	--	--	--	--
	Potassium	3	100.0%	0	--	--	--	--	--	--	3	1240	1240	1380	1330	1380	1380
	Selenium	3	66.7%	1	0.1579	--	0.158	0.158	--	0.1579	2	0.39	--	0.395	0.395	--	0.4
	Silicon	3	100.0%	0	--	--	--	--	--	--	3	680	680	680	748	883	883
	Silver	3	0.0%	3	0.2609	0.261	0.261	0.261	0.261	0.2609	0	--	--	--	--	--	--
	Sodium	3	100.0%	0	--	--	--	--	--	--	3	432	432	711	681	901	901
	Strontium	3	100.0%	0	--	--	--	--	--	--	3	160	160	199	193	219	219
	Thallium	3	0.0%	3	0.5428	0.543	0.543	0.543	0.543	0.5428	0	--	--	--	--	--	--
	Tin	3	66.7%	1	0.187	--	0.187	0.187	--	0.187	2	0.21	--	0.23	0.23	--	0.25
	Titanium	3	100.0%	0	--	--	--	--	--	--	3	200	200	221	216	227	227
	Tungsten	3	0.0%	3	0.0175	0.0175	0.0175	0.0175	0.0175	0.0175	0	--	--	--	--	--	--
	Uranium	3	100.0%	0	--	--	--	--	--	--	3	0.71	0.71	0.73	0.76	0.84	0.84
	Vanadium	3	100.0%	0	--	--	--	--	--	--	3	19.2	19.2	21.7	21.4	23.2	23.2
	Zinc	3	100.0%	0	--	--	--	--	--	--	3	21.4	21.4	23.9	23.5	25.2	25.2
	Zirconium	3	100.0%	0	--	--	--	--	--	--	3	68.4	68.4	69	74.3	85.6	85.6
Radionuclides (pCi/g)	Radium-226	3	100.0%	0							3	0.583	0.583	0.784	0.764	0.926	0.926
	Radium-228	0	--	0							0	--	--	--	--	--	--
	Thorium-228	3	100.0%	0							3	1.17	1.17	1.23	1.25	1.36	1.36
	Thorium-230	3	100.0%	0							3	0.66	0.66	0.78	0.753	0.82	0.82
	Thorium-232	3	100.0%	0							3	1.05	1.05	1.26	1.2	1.29	1.29
	Uranium-233/234	3	0.0%	3							0	0.58	0.58	0.68	0.717	0.89	0.89
	Uranium-235/236	3	0.0%	3							0	0.046	0.046	0.053	0.0507	0.053	0.053
	Uranium-238	3	100.0%	0							3	0.58	0.58	0.76	0.717	0.81	0.81

Notes:

mg/kg milligrams per kilogram
Max maximum concentration
Min minimum concentration
pCi/g picocuries per gram
Q1 1st quartile (25th percentile)
Q3 3rd quartile (75th percentile)

APPENDIX A

NDEP COMMENTS AND BRC'S RESPONSE TO COMMENTS

Response to NDEP Comments Received May 11, 2009 on the 2008 Deep Soil Background Report dated March 2009

General Comments:

1. Comments made on the recent *Supplemental Shallow Background Report (Revision 4)* should be considered for this document.

Response: *In making revisions to the Deep Background Report, the project team has considered NDEP's recent comments on the supplemental shallow background report and has incorporated similar revisions accordingly.*

2. Some cleanup is required. For example, some statistical methods are partially described, but do not seem to have been used; there are some apparent "cut and paste" issues that appear to have been carried over from the *Supplemental Shallow Background Report (Revision 4)*.

Response: *During this round of revisions to the report, BRC has sought out and removed such "cut and paste" wording issues.*

3. More discussion regarding the overall results of the component results sections is needed. Some sections provide overall conclusions, but some do not.

Response: *During this round of revisions to the report, the discussion has been expanded to provide overall conclusions within each section, where it did not previously exist.*

4. Further interpretation of results would be helpful in some sections. The reader is sometimes pointed to a particular Appendix to see what was found in terms of results, but there is very little interpretation of these results in the main text. Sections 3.6.5, 3.6.6, and 3.6.7 can use more text along these lines. It is understood that BRC is to assemble a summary report across all background datasets, however it does not mean that conclusions cannot be drawn and documented as a result of this investigation.

Response: *The discussion has been revised in this version of the report to include expanded interpretation of results, particularly in sections 3.6.5 through 3.6.7.*

5. More generally, the conclusions should be cast in terms of differentiating between subsets of background data that are not statistically similar. There is sufficient evidence to support the contention that these data represent background conditions, but the point ultimately is that there are subsets of the background data that should be considered before use in a comparison with site data from a sub-area at the BMI Complex and Common Areas.

Response: *In this version of the report, the conclusions presented have been re-cast to better differentiate between subsets of background data that are not statistically similar.*

6. A previous comment by NDEP (general comment #4) was not entirely addressed. Only one sentence was added but nothing that addresses variability in arsenic concentrations.

Response: *The prior General NDEP comment read as follows:* "Note also that one of the points of doing this study was to see of arsenic concentrations are different in the TMC. There has been some suspicion that they might be higher and more variable. Since arsenic is usually a risk driver, this is important to understand, and important to discuss in the conclusions." *In the revised report, the conclusions section has been expanded to discuss the specific issue of arsenic variability.*

Specific Comments:

7. Page iv, Abbreviation and Acronym List, please verify this list is complete. Based upon NDEP's review of the document it appears that this list is not complete.

Response: *During this last round of revisions, the abbreviation and acronym list has been reviewed and edited for completeness.*

8. Page 1-1, Footnote 1. The word "site" should be capitalized as "Site".

Response: *The word "Site" is capitalized in the revised document in the subject footnote and throughout the report.*

9. Page 1-2, 2nd paragraph, Item 2. It would be helpful to describe where the Muddy Creek formation (MCf) daylights at the BMI Common Areas.

Response: *The subject text has been revised on page 1-2 to indicate that there are some outcrops to the northeast of the site, but the UMCf does not appear to outcrop within the Site.*

10. Page 2-1, Footnote 2. A period is needed after the word omitted, instead of a comma.

Response: *The punctuation in the subject sentence has been revised on page 2-1.*

11. Page 2-4, 1st paragraph, 2nd to last sentence. Please change "…exhibit obvious lower variance…" to "… show lower variance than site samples…"

Response: *The wording in the subject sentence has been revised as suggested on page 2-4.*

12. Page 2-4, 3rd paragraph. Why have reporting detection limits (RDLs) been introduced? NDEP guidance discusses sample quantitation limits (SQLs) as the preferred language, based on BRC's use of SQLs in various data validation summary report (DVSRs), sampling and

analysis plans (SAPs) and related documents (and United States Environmental Protection Agency (USEPA) guidance). Please clarify.

Response: *The term RDL has been replaced with the term SQL here and throughout the revised report.*

13. Page 2-5, Section 2.3. NDEP has data validation guidance that should be referenced and followed.

Response: *NDEP's data validation guidance was issued after the data review was conducted for the deep background soil data, as presented in the DVSR; however, the data were later reviewed for potential effects on the DVSR associated with NDEP's guidance. The results of that review and a citation to that guidance have been added to the subject text on page 2-6.*

14. Page 2-9, 2nd paragraph under Criterion IV. RDLs are introduced here. Although these are described later in the report as the same as SQLs, recent NDEP guidance documents use the term SQL (largely because of the previous use of this term in BRC SAPs and risk assessment reports). Please use the term SQL to maintain consistency between reports. See also comment above.

Response: *The term RDL has been replaced with the term SQL here and throughout the revised report.*

15. Page 2-9, 3rd paragraph under Criterion IV. The paragraph attempted to say that multiple detection limits are unlikely to have an effect on the use of these data for background comparisons with site data. This is not correct and is one of the problems that has been identified by NDEP, resulting in NDEP guidance on detection limits. When detection limits are very different between two datasets that are being compared, then results of statistical tests can be driven by non-detects.

Response: *The subject paragraph has been substantially rewritten on pages 2-9 and 2-10 in the revised report to more thoroughly explain the issue.*

16. Page 2-9, 3rd paragraph under Criterion IV. It does not seem that several of these 2-sample tests have been used to support this study. For example, t-tests, Gehan's test, the quantile test and the slippage test do not appear to have been used in this report. Consequently, it is not clear why these tests are described here and elsewhere in this report.

Response: *References to statistical tests not performed as part of this study have been removed.*

17. Page 2-9, Criterion IV section. Please include text to describe the minimum detectable activity (MDA)) for radionuclides.

Response: *The section of text has been revised on page 2-9 to include a reference to MDAs for radionuclide analyses.*

18. Page 2-10, 2nd paragraph 6th sentence and elsewhere in the text. Please reword "high cooler temperatures" to something like "high temperatures of the storage coolers".

Response: *The subject wording has been revised as suggested on pages 2-11 and 2-15.*

19. Page 2-12, Precision paragraph. Some reference is needed to justify some of the statements at the end of this paragraph. Otherwise, some more explanation is needed.

Response: *The subject text has been expanded on page 2-13, including a reference to the data usability tables in Appendix E where the qualified data are presented.*

20. Page 2-13, Accuracy paragraph. Some reference is needed to justify some of the statements at the end of this paragraph. Otherwise, some more explanation is needed.

Response: *The subject text has been expanded on page 2-13 to identify the accuracy issues noted.*

21. Page 2-14, Last paragraph. This sentence (paragraph) is associated with the comparability paragraph. It should be connected to that paragraph for clarity. The discussion should also be expanded to provide context for the basic concern. The sentence starts by saying "As previously note", but it is not clear where this is previously noted.

Response: *The subject text has been revised on page 2-15 as suggested.*

22. Page 3-1, 1st paragraph. Other background reports should also be referenced.

Response: *References to the BRC/TIMET and Supplemental Shallow Soil background reports have been added to the subject text on page 3-1.*

23. Page 3-2, 2nd last paragraph. Please also check the BRC Supplemental Shallow Background Report to confirm that the summary statistics tables do not include non-detects for radionuclides.

Response: *These tables were corrected where necessary in the revised Supplement Shallow Background Report.*

24. Page 3-2, last paragraph. It is not clear that t-tests and WRS tests have been conducted in this study? Please clarify.

Response: *The subject text has been deleted from the report because these analyses were not applied to the deep soil background dataset.*

25. Page 3-3, 1st sentence. Please change "…Gehan test…" to "…Gehan ranking system…"

Response: *The subject text has been deleted from the report because this method was not applied to the deep soil background dataset.*

26. Page 3-3, 2nd paragraph. Although USEPA suggests that a method detection limit (MDL) is established as some form of confidence interval, this is in fact incorrect. The number of (low concentration) samples analyzed is not taken into account in the calculation of an MDL, in which case it is not a confidence construct. It is instead an estimated 99th quantile of the distribution for the low concentration samples analyzed, often assuming a normal distribution. Please change the text to say 99% probability instead of 99% confidence, since that is actually a more accurate statement.

Response: *The subject text has been revised on page 3-3 as suggested.*

27. Page 3-3, Section 3.1.4. This section should be rewritten following the redline comments provided for the Supplemental Shallow Background Report.

Response: *The subject text has been rewritten on pages 3-3 and 3-4 to be consistent with the comparable text in the Supplemental Shallow Soil Background Report.*

28. Page 3-4, Section 3.1.4, last paragraph. Correlation analysis has not been brought into this argument. It should be included, also see previous comments.

Response: *The subject text has been rewritten on pages 3-3 and 3-4 to be consistent with the comparable text in the Supplemental Shallow Soil Background Report, including a discussion of correlation analysis.*

29. Page 3-5, Probability Plots. Part of the purpose of these plots is to compare datasets for the four geologic units included in this study. This should also be explained.

Response: *The subject text has been rewritten on page 3-5 to note that one purpose of the plots in this particular study is to compare datasets for the various lithologies evaluated.*

30. Page 3-5, Probability Plots. Inflection points are not very reliable. They might be useful in data exploration, but reliance on them is fraught with problems. Random data from a known distribution will often demonstrate so-called inflection points. The argument here should be less definite and placed in context of exploratory data analysis.

Response: *The subject text has been rewritten page 3-5 to note that use of probability plots may be helpful in data exploration. However, use of inflection points is unreliable and should be used with considerable caution (DON 2002).*

31. Page 3-5, Probability Plots, last sentence. This does not imply as stated that the populations of data are referred to as normally distributed. The best that can be said is that the data appear to follow a normal distribution.

Response: *The subject text has been rewritten on page 3-5 to note that "… populations of data that plot as a straight line in a linear scale may be inferred to follow a normal distribution."*

32. Page 3-5, Box Plots. The median is represented with a line in the middle of the box rather than a point.

Response: *The text has been revised on page 3-5 to refer to a line representing the median in the box plots instead of a point.*

33. Page 3-5, Box Plots. The median is represented with a line in the middle of the box rather than a point.

Response: *See response to comment #32 above.*

34. Page 3-6, 2nd full paragraph. The need to specify the enormity of the dataset should be removed from the text.

Response: *The statement referring to the enormity of the dataset has been removed from the revised report.*

35. Page 3-6, Footnote 12. This is not NDEP's current understanding. The implication seems to be that only the northern River data will be used for comparisons with the Deep Background data. It is not clear why the original River background data were not compared as well.

Response: *As discussed in the Supplemental Shallow Background report, although it is appropriate to perform comparisons of background to Site data using either the 2008 (North) River or the 2005 (South) River datasets based on the geologic conditions at the Site, given the proximity of the 2008 River dataset to the Site, this is considered the more appropriate dataset for comparison purposes.*

36. Section 3.4, general comment. For some of the analytes that are listed in this section, RDLs appear to be similar but the frequency of detection (FOD) is very different. Although differences in concentration are possible in the geologies that are characteristic of these data

sets, this magnitude of difference might not always be expected, and sometimes, chemical analytical issues are indicated instead. Please clarify.

Response: *Differences due to different laboratory or different analytical methods are minimized as the same laboratory and the same methods were used to generate all the background soil datasets. In addition, the chemical analyses have been reviewed as part of the laboratory's QA/QC protocols. The laboratory reported no concerns with the analytical protocols for any of the background events nor did they report or provide any evidence that there existed analytical issues with the data. No edits to the text were made in response to this comment.*

37. Page 3-7, Footnote 13. The wording that describes the range of values is confusing. Instead of stating "…for each stratigraphic unit.", the footnote should read "…across all stratigraphic units."

Response: *The subject footnote has been revised on page 3-6 for clarification.*

38. Page 3-8, Chromium (VI) section. It appears that Tables 5-8 list the range for the MDL, not the RDL (compared Tables to the raw dataset that accompanied this report). It is suggested that the raw data set RDL values be compared to the values presented in Tables 5-8. Please check and clarify.

Response: *As seen in the database excerpt to the report, the MDL for chromium (VI) is the same value as its SQL. The reporting limit summaries presented in Tables 5 through 8 and the range of mean reporting limits presented in the text on page 3-8 correctly reflect the SQLs for chromium (VI).*

It should be noted that for most metals in the background dataset, the SQL is usually twice the value of the MDL because of 2-fold dilutions associated with their analyses. However, for chromium (VI) the dilution is 1-fold (i.e., non-diluted). This is also the case for mercury, for which the MDL and SQL are also the same values. No changes to the text were made in response to this comment.

39. Page 3-9. Silver section. Reviewing the raw data for silver indicates that the RDL is 0.04, however this section is left blank. Please clarify.

Response: *As noted in the row headings for the tables within this portion of the text, the reporting limits presented (SQLs) are the values for mean reporting limits for <u>non-detections</u>. Since silver was reported as detections in 100% of the 2008 Deep Soil background samples, there were no reporting limits associated with non-detections, so the section was left blank. No edits to the text were made in response to this comment.*

40. Page 3-11. Section 3.5.1. This section requires a rewrite. Classical statistics is set up so that the null hypothesis can be rejected, but not so that the alternative hypothesis can be accepted.

This is a limitation of classical statistics. The text should state something along the lines of "(i) fail to reject the null hypothesis or (ii) reject the null hypothesis". Of course, most practitioners assume that a rejected null hypothesis implies acceptance of the alternative, despite the technical flaws in doing so. NDEP recognizes the challenge, but such overt admittance to accepting null hypotheses should be avoided or placed in context. The 2nd paragraph of this section also needs to be reworked. However, the word "datasets" is still used in the text when defining the null hypothesis. Hypothesis tests are about comparing parameters. If the null and alternative hypotheses were clearly stated, this would become clear. Also, the null hypothesis is not that the mean/median are comparable, it is that they are the same (identical). Furthermore the second sentence fragment in this paragraph refers to "*hypotheses*". If there is one null *hypothesis* you can't reject or fail to reject multiple hypotheses. Please state either fail to reject the null hypothesis or reject the null hypothesis. The 2nd, 3rd, and 4th paragraphs can all benefit from some rewording. Also change "null hypothesis was that" to "null hypothesis is that". Please rewrite along the lines of the redline version of comments provided for the Supplemental Shallow Background Report.

Response: *The subject text has been rewritten consistent with the approved text edits for the Supplemental Shallow Background Report.*

41. Page 3-12, Section 3.5.2. 1st sentence under last bullet. Please remove irrelevant references as well as the sentence fragment "…for its validity…".

Response: *The subject text has been rewritten consistent with the approved text edits for the Supplemental Shallow Background Report.*

42. Sections 3.5.2 and 3.5.2.1. It is unclear in these sections what level of significance is being used for multiple comparison tests. In one instance (Section 3.5.2), an alpha of 0.05 is specified and the other instance (Section 3.5.2.1), a correction factor is applied to this alpha level.

Response: *The subject text has been rewritten consistent with the approved text edits for the Supplemental Shallow Background Report.*

43. Page 3-13, Kruskal-Wallis Test, 1st sentence. Change "Kruskal-Wallis test is a non-parametric one-way ANOVA for ranks" to "The Kruskal-Wallis test is a non-parametric analog for the one-way ANOVA that is based on ranks".

Response: *The subject sentence has been revised on page 3-12 as noted in the comment.*

44. Page 3-13, Last paragraph, 2nd sentence. The correct reference should be included in this sentence (i.e., deep soil background investigation study), rather than Supplemental Shallow Background Study.

Response: *The subject sentence has been deleted from this section during the course of more substantial edits.*

45. Page 3-13, Section 3.5.2.2. This section should be rewritten along the lines of the redline version of comments provided for the Supplemental Shallow Background Report.

Response: *The subject section has been revised along the lines of the Supplemental Shallow Background Report.*

46. Page 3-14, List Item 1. Please change "comparable" to "similar".

Response: *The subject text has been revised on page 3-14 as suggested.*

47. Page 3-14, List Item 2. It is not clear that any 2-sample comparison tests have been performed (other than the Tukey HSD tests). Please clarify.

Response: *The reference to 2-sample comparison tests has been removed.*

48. Page 3-14, Section 3.5.2.3, last paragraph. "Analytical DQOs" is a misnomer. DQOs are aimed at the decision to be made, not at analytical quality. Please change the last part-sentence to "one may only conclude that these constituents are present….".

Response: *The subject text has been revised on page 3-14 in response to the comment.*

49. Page 3-15, Section 3.6, 1st sentence. This sentence needs to be reworded. The objective of the investigation is to look at the deep soil background dataset, not compare whether or not the supplemental shallow and 2005 BRC/TIMET background data are similar.

Response: *The subject text has been revised on page 3-15 in response to the comment.*

50. Page 3-15, Section 3.6.1.1, 1st sentence. This sentence should be expanded to include the possibility of using appropriate subsets of these data for future background comparison. Note also the formatting problem with the title of this subsection.

Response: *The subject text has been revised on page 3-15 in response to the comment.*

51. Page 3-16, 2nd paragraph under bullets and other similar instances in the results section. Please reference Table G-1 in the text.

Response: *References to the applicable Appendix G tables have been inserted throughout Section 3.6.*

52. Sections 3.6.1 through 3.6.4, general comment. Each of these sections needs conclusions that relate to the statistical difference between the relevant subsets of background data, so that future use of these data is cast in terms of comparison of Site data with appropriate subsets of the full background dataset.

Response: *In the above-referenced sections, conclusions have been added relating to the statistical differences between the relevant subsets of background data, casting future use of these data in terms of comparison of Site data with appropriate subsets of the full background dataset.*

53. Page 3-18, 1st paragraph, last sentence. When referring to the specific number of elements that have significant differences, it is recommended that the wording be consistent (e.g., 18 elements with significant differences).

Response: *The wording of the subject sentence has been revised for consistency.*

54. Page 3-19, 1st set of bullets. According to the post-hoc comparison tests, boron and uranium-233/234 should also be included in this list.

Response: *Boron and uranium 233/234 have been added to the bullet list in response to the comment.*

55. Page 3-20, last paragraph. The second sentence of this paragraph is a bit unclear. Are the 18 elements referring to the combined total of significant differences for the deep/surface and deep/10' comparisons? If so, there are more than 18 instances. Please clarify.

Response: *A footnote has been added to clarify the manner in which the significant differences were tallied. Specifically, 18 elements had significant differences in the comparisons between Deep and Surface datasets and/or Deep and Subsurface datasets. 13 elements had significant differences in the comparisons between Deep and Surface datasets, and 15 elements (10 of which were the same as in the former comparison) had significant differences in the comparisons between Deep and Subsurface datasets.*

56. Page 3-22, 1st (partial) paragraph, last sentence. Why has a normality test been performed if there are few data? Please clarify.

Response: *The subject sentence was removed.*

57. Page 3-22, 1st full paragraph. This seems to contradict the preceding paragraph. Were any tests performed for these data? Please clarify.

Response: *The discussion has been modified to be consistent with the revised method/adjustment when multiple tests have been applied to evaluate a single hypothesis.*

58. Page 3-22, Section 3.6.5. This section has no discussion relating to the tables that are presented. What do these results imply? This section needs to have an expanded discussion and interpretation of results.

Response: *For infrequently detected constituents, subsequent comparisons using detected-only data may be considered when detection limits are comparable and frequency of detects are found to be similar. A discussion of the results follows the tables. No further analyses (i.e., multiple sample comparisons) were conducted for the two constituents that met the above conditions because these subsequent analyses were not considered likely to provide results that would affect overall decision-making.*

59. Page 3-22, 2nd item under table. How were RDLs determined to be similar if the range is less than 10-fold? Is there a reference that can be listed here?

Response: *No specific guidance on this issue is known to be available. Consequently, SQLs within a 10-fold range were considered to be similar for the purposes of acting as a trigger to conduct tests of proportion. BRC is unaware of references for this approach.*

60. Page 3-22, Footnote 20. The note about the Wilcoxon Rank Sum test is not necessary here. NDEP suggests that BRC delete this.

Response: *This text and footnote have been removed from the report.*

61. Page 3-24, first sentence. "analyzes" should be changed to "analyses".

Response: *The subject text has been revised on page 3-24 as suggested.*

62. Page 3-24, Section 3.6.6. This Section needs to be expanded. There needs to be discussion and/or interpretation of the results of the correlation analysis.

Response: *The subject text has been revised along the lines of the Supplemental Shallow Background Report..*

63. Page 3-25, 2nd paragraph. The reference to BRC/TIMET (2007) seems inadequate. Presumably the reference itself references another source for this (reasonable) assertion. Please cite the original reference.

Response: *As discussed with Neptune, the reference was retained.*

64. Page 3-25, last full paragraph. Correlations are observed within the uranium chain, but no mention is made of the thorium chain. Presumably this is because the correlations within the thorium chain are not high. This continues to be an issue. Also, have the radionuclides been subjected to the secular equilibrium tests? Many of the datasets associated with the various BMI Companies' projects do not exhibit high correlations for radionuclides in the thorium chain, even though the concentrations seem to be at background levels. An explanation for this phenomenon would be helpful.

Response: *As agreed with Neptune, the lack of a correlation is difficult, if not possible, to explain. Further investigation found no explanation for the lack of correlation for these decay chain radionuclides. The subject text has been revised on page 3-26 along the lines of the Supplemental Shallow Background Report*

65. Page 3-26, Section 3.6.7, 2nd paragraph. Please delete reference to "recommended by NDEP".

Response: *Such references have been deleted from the report.*

66. Page 3-26, Section 3.6.7. This section is also missing adequate description or interpretation of results.

Response: *An interpretation of the results of visual examinations of scatterplots has been added to this section.*

67. Page 4-1. 1st paragraph, last sentence. The purpose of this study needs to reworded along the lines of the need to evaluate the Deep Background data to determine if there are separate subsets that are statistically different, and to compare the Deep Background data to previously collected background datasets, etc.

Response: *The purpose of the study has been reworded as suggested.*

68. Page 4-1, 4th from last line. Please insert "of" between "result" and "reporting".

Response: *The subject text has been revised as suggested on page 4-1.*

69. Page 4-2, 1st paragraph, 1st sentence. Please change "datasets" to "dataset".

Response: *The subject text has been revised as suggested.*

70. Page 4-3, last paragraph, 1st sentence. If the goals are as stated at the beginning of this section, then it is not clear that they are met. Rewording the first paragraph of Section 4 might affect the wording of this paragraph. Please check as edits are made.

Response: *The first paragraph of Section 4 has been revised to clearly present investigation goals to provide basis for discussion that goals are met presented later in this section.*

71. Page 4-3, last paragraph. A previous NDEP comment (general comment #3) was not addressed. Can examples be provided that illustrate case-by-case use of these data or an appropriate subset of these data?

Response: *As agreed to with NDEP and provided in the response to NDEP's previous comment, the conclusions section was expanded to include general recommendations for future uses of the datasets. The summary report referenced in the response to Comment #2 is considered a more appropriate location for detailed discussion of how the various datasets will be used.*

72. Table 1 (headings, 3rd column, and table footnotes). The text refers to UMCf (Upper Muddy Creek Formation) while these figures refer to "TMC". Please address these consistency issues.

Response: *In the revised report, the references in Table 1 to this lithologic unit have been changed to UMCf for consistency with the text.*

73. Appendix G. G-2 through G-4. Please indicate what the various depths correspond to in the footnote section (e.g., subsurface = 10').

Response: *In the revised report, the footnote section has been revised to clarify the specific depths involved.*

74. Appendix H, Table H-9. The previous NDEP comment (#76) was not entirely addressed. This table of correlation matrices does not convey useful information to the reader. There isn't a legend regarding what each color signifies and the scale makes the table unreadable.

Response: *Table H-9 has been revised to include a legend explaining the color coding, and its scale has been decreased for improved readability.*

75. Appendix H, Individual Value Plot Legends and Scatterplot titles. As noted above, the text refers to UMCf (Upper Muddy Creek Formation) while these figures refer to "TMC". Please change to UMCf for consistency.

Response: *In the revised report, the lithologic references in the Appendix H figures have been changed to UMCf for consistency with the main text.*

Response to NDEP Comments Received December 28, 2008 on the 2008 Deep Soil Background Report dated October 2008

General Comments:

1. Four geologic units are identified as follows: the Quaternary Alluvium (Qal) for McCullough, River and Mixed; and the Tertiary Muddy Creek (TMC). Comparisons are made between these four units for this dataset. It is probably appropriate to also compare these data to the data from the 2005 study since those data cover the first three of these geologic units. Because the geologic units are the same in these cases, it is reasonable to believe that their data should be combined (e.g., combine 2005 McCullough data with 2008 McCullough data), especially since some of the Qal data in this study are from shallow depths.

Response: *The purpose of this report was to collect and analyze data for metals and radionuclides in background soils deeper than 20 feet bgs that are comparable to site soils in geologic units and depths not covered by the existing Background Shallow Soil Summary Report (BRC/TIMET 2007) and 2008 Supplemental Shallow Soil Background Report (BRC, in review). All comparisons presented in this report were discussed and agreed upon with NDEP prior to preparation of this report. In fact, this report does include statistical comparisons between the 2005 shallow McCullough and 2008 deep McCullough datasets, as well as comparisons between 2005 shallow Mixed and 2008 deep Mixed datasets, and 2008 shallow River and 2008 deep River datasets. The comparisons are presented and discussed in this report. Further discussions and potential dataset combinations may be considered and will be included in the upcoming Background Soil Summary Report (see response to Comment #2 below).*

2. It seems that a further report is warranted that brings together all of the background datasets, resulting in (probably separate) datasets for the five distinct geologies that have been identified for the site (the four discussed above plus the north River geology from the 2008 supplemental background dataset).

Response: *As has been discussed with NDEP, upon final NDEP concurrence that all the background datasets are appropriate and approved for use, BRC will prepare a summary report that presents each of the individual datasets for the various lithologies and depths.*

3. The conclusions section is lacking major conclusions with respect to how this dataset will be used in the future. These data are both similar to previous background data by geology, and different from them. An understanding how or if different sub-sets of data should be combined across the three background studies would be helpful.

Response: *The conclusions section has been expanded to include general recommendations for future uses of the datasets. The summary report referenced in the response to Comment #2 is considered a more appropriate location for detailed discussion of how the various datasets will be used.*

4. Note also that one of the points of doing this study was to see of arsenic concentrations are different in the TMC. There has been some suspicion that they might be higher and more variable. Since arsenic is usually a risk driver, this is important to understand, and important to discuss in the conclusions.

Response: *The conclusions section on page 4-2 has been expanded to include this issue.*

5. There are detection limit (DL) problems still. NDEP's more recent guidance needs to be followed to try to garner consistency in the approach to DLs. It is for this type of reason that NDEP has requested a more through definition of the Sample Quantitation Limit (SQL) in recent reports. For future use in comparison to site data, these DL issues might cause comparability issues. Some resolution is needed.

Response: *The text has been revised to incorporate the use of the RDL for the statistical analyses and evaluations of data adequacy. The use of this reporting limit is consistent with NDEP guidance.*

6. A choice of 0.05 has been made for the significance level for each statistical test that has been run. This is inappropriate and probably leads to identification of more differences than are reasonable. The large number of tests and the inclusion of multiple comparisons requires a different approach that adjusts for a family-wise significance level of 0.05. That is a smaller target should be used for the individual tests. There are approaches for deciding which adjustment to make, but often the simplest is to divide the family-wise error rate of 0.05 by the number of tests that are considered. Some care should be taken with the Tukey HSD tests, which are often reported with a similar adjustment already made, although that is not clear in the results as presented. NDEP can discuss possible approaches with BRC, if desired. Note also that the p-values are not reported for the multiple comparison tests – this needs to be done to understand the strength of the test results.

Response: *It is ERM's understanding that NDEP is referring to the use of a correction when more than one test in a particular study is applied when a single null hypothesis of no effect is tested. A Bonferroni correction/adjustment is one of the more basic and common procedure used to adjust the alpha level to account for random chance when using multiple tests to test a single null hypothesis. Text has been revised and a discussion of a Bonferroni correction has been included in the report to provide an added perspective to the findings of multiple tests (see Section 3.5.2.2).*

Note that the use of a Bonferroni correction would not have changed the overall conclusions of the study with regard to significant geochemical differences (i) among the four deep lithologies (Table G-1) and (ii) among the 2008 deep, and shallow (0 ft bgs), and deep (10 ft bgs) from previous investigations (Tables G-2 through G-4).

Specific Comments:

7. Page 1-1, Section 1.0, 2nd paragraph, middle sentence. Please include the GES report in the revised report.

Response: *A copy of GES's Deep Background Investigation Report is provided electronically in Appendix B of the revised report.*

8. Page 1-1, Section 1.0, 2nd paragraph, last sentence. This sentence is unclear and should be reworded.

Response: *The subject sentence has been revised to clarify that this report provides a summary of the scope of work and data associated with the Deep Background Investigation (leaving the details to the above-referenced GES report) after which the statistical analyses employed and the associated results are presented.*

9. Page 1-2, Section 1.1, bullets. All the bullets start with the same term ("Soil chemical data…") – this could be cleaned up some.

Response: *As suggested, the bullet list has been revised to remove some of the wording redundancy.*

10. Page 1-3, Section 1.2, 2nd paragraph, last sentence. Please include a reference for the 2004 NRCS SSURGO database.

Response: *The subject text has been revised, and a reference to the 2004 NCRS SSURGO database has been added to the References section as suggested.*

11. Page 2-1, Section 1.2, 3rd Bullet. Please change "impacted" to "potentially contaminated"

Response: *The text in Section 2.1, page 2-1, has been revised as requested.*

12. Page 2-1, Section 2.1, paragraph under 3rd Bullet, last sentence and Footnote #1. Only 20 point locations are shown on Figure 1 as a "Boring Location", but there should be 21 boring locations in total (three soil units times seven locations per unit). Please clarify.

Response: *One of the boring locations was incorrectly color-coded in Figure 1; DBSA4 should be identified as a boring location as opposed to a boring location not used. This has been fixed in the revised report figure.*

13. Page 2-2, Footnote 2. Please provide additional discussion regarding borings that were not completed.

Response: *The footnote has been revised to reference only those boring locations that were actually completed. Reference to the GES field investigation report is also provided..*

14. Page 2-3, Section 2.2, last paragraph. Please provide justification for the treatment of field duplicates as independent samples in light of the new NDEP guidance on this topic. For example, is the variability between duplicates similar to the variability between samples? Even a qualitative argument would be helpful.

Response: *The revised text on page 2-4 has been expanded to include a discussion of the appropriateness of treating field duplicates as independent samples, based on NDEP's November 2008 guidance, which states that NDEP's preferred approach to managing duplicate data is to include field duplicates as independent samples, unless the field duplicates exhibit obvious lower variance than the site data.*

15. Page 2-3, Footnote 3. Why were the 0', 5', and 10' samples removed from the deep background dataset? It appears (from Table 1) that other 5' and 10' samples were retained from other borings and were analyzed for VOCs, OCPs, and SVOCs (see page 2-4, 1st paragraph).

Response: *As noted in the footnote, the focus of the deep background investigation was to establish datasets for metals and radionuclides within depth intervals greater than 10 feet bgs; the text has been revised to clarify that the metals and radionuclide data from the 0', 5', and 10' samples were removed from the deep background dataset. As discussed elsewhere in the report, the VOC, OCP, and SVOC data were intended to be used in assessing the likelihood of potential contamination at those locations, which, if judged to be significant, could have resulted in the metals and radionuclide data associated with those locations being removed from the background dataset (because it would then hypothetically not be possible to dismiss a potential for high bias due to impacts). The text has also be revised to clarify that the term "background dataset" refers to the metals and radionuclide data (excluding the other chemical data collected during the deep background investigation), which will be used in comparisons to metals and radionuclide site data as part of the site closure process.*

16. Page 2-4, Section 2.2; List of metals and below. See general comment about detection limits and related items. It would be helpful if the approach to DLs could be made consistent.

Response: *The revised text has been expanded to specify the metals for which elevated reporting limits appear to have affected their frequencies of detection (i.e., antimony, cadmium, selenium, and silver).*

17. Page 2-5, Section 2.3. If the data validation is limited to a 1-page description with no discussion of issues that arose, then it is requested that the DVSR be made available in the package, at least electronically.

Response: *The DVSR is included electronically in Appendix B in the revised report.*

18. Page 2-5, Section 2.3, last sentence. Please reword – this is not sufficient by itself to say that the "overall objective of the data collection event was met". This only refers to the completeness component of the data usability that is described in the next section.

Response: *The sentence in question was deleted, as a more thorough discussion of data usability review findings is provided in the following section.*

19. Section 2.4, general comments.
    a. NDEP has not been able to find a reference to Appendix D in this section.

Response: *The reference is on page 2-6 (original version, page 2-7 in the revised report) in the last sentence of the paragraph following the bullet list in the introductory section of Section 2.4.*

    b. DU for the organic chemicals does not seem to be available. Please explain.

Response: *Organic chemicals and general chemistry parameters have been added to the data usability tables located in Appendix E.*

20. Section 2.4, the NDEP has the following comments:
    a. Page 2-6, 1st paragraph. The recent NDEP guidance on data usability (DU) should be referenced now, with supporting references as necessary to the USEPA guidance (which is referenced in the NDEP guidance).

Response: *The subject text has been revised to include a reference to the recent NDEP DU guidance on page 2-6.*

    b. Page 2-8, Criterion IV, last paragraph, second sentence. The laboratory reporting limits (RLs) are not the detection limits of concern if SQLs as defined in NDEP's recent guidance are to be used. Please revise to discuss SQLs instead of RLs.

Response: *Reference to SQLs (referred to as RDLs in the report) instead of RLs have been revised throughout the report, and statistical plots and analyses use these values instead of RLs..*

    c. Page 2-8, Criterion IV. In addition, and from the discussion in Section 2.2, there are metals for which detection limits are problematic. It is not clear, therefore, that this criterion has been met adequately.

Response: *As discussed in Section 3.4, there are a few metals for which the RDLs for one or more datasets (i.e., 2005 shallow data, 2008 shallow data, and 2008 deep data) were problematic and there is some question as to whether statistical comparisons between these datasets (or between the background dataset and Site datasets) could reliably be performed. These metals are antimony, cadmium, selenium, and silver). The discussion has been expanded to discuss this potential concern.*

d. Page 2-9, Criterion V. Some discussion is needed about the rejected data for the organic chemicals.

Response: *The subject text has been expanded to discuss the rejected data.*

e. Page 2-9, Criterion V, last sentence. This sentence probably also belongs in the conclusions, or possibly other places in the report.

Response: *A sentence similar in wording to the subject text was originally present in the third paragraph of Section 4 (Summary and Conclusions). However, after further evaluation of the VOC, SVOC and OCP data, this sentence has been reworded here and in the Conclusions section as follows: "Given (1) the relatively low reported organic chemical detections, (2) the fact that they are associated with soil intervals appreciably shallower than those assessed for background metals and radionuclide data, and (3) the lack of historical uses associated with the sampling locations, there do not appear to have been significant impacts from other anthropogenic sources and there is no evidence suggesting that the use of the metals and radionuclide data from this investigation for determining background conditions would not be appropriate"*

f. Page 2-10; Please define the acronyms "LCS" and "LCSD" in the text and include both acronyms in the acronym list on page iv.

Response: *The acronyms have been defined in the text and on the acronym list as requested.*

g. Page 2-10; Each one of the data quality indicators (DQIs) is described, but there is not much in the way of interpretation with respect to the data. This is particularly true in the case of representativeness. Some further discussion or explanation that these DQIs have been satisfied is needed.

Response: *The text has been expanded to include further data interpretation in terms of the DQIs.*

h. Page 2-11; Along those same lines, it is not clear that the comparability DQI has been satisfied for some chemicals. Perhaps this is not an issue for this report, but it will be for site background comparisons that use these data if the DL issues are not resolved and made more consistent across chemicals and projects.

Response: *As discussed in a prior comment, BRC concurs that site background comparisons for antimony, cadmium, selenium, and silver may be problematic due to variable reporting limits. The discussion in this section has been expanded to discuss this potential concern. BRC continues to work with the project laboratories to establish adequately low RDLs across chemicals and projects.*

21. Section 3.0, general comment. Please remove these specific references. At the very least Singh and Singh, and DON do not discuss the statistical methods that are used in this report. The statistical evaluation of these data does not follow what is in these documents, because these documents do not cover ANOVA, multiple comparisons, and inadequately discuss correlation. It would be better to reference the previous background study reports by BRC.

Response: *The subject text has been revised to include more appropriate references.*

22. Page 3-1; Section 3.1.1, 1st paragraph. The total number of soil samples is 222 (including field duplicates), but on page 2-3, 4th paragraph, it is stated that a total of 173 total samples (including field duplicates) were collected. Please clarify.

Response: *The tally of 222 soil samples (including field duplicates) refers to all samples collected during the deep background soil investigation. However, a subset of those were associated with depth intervals shallower than 20 feet bgs and organics analyses, and are not part of the deep background data set for metals and radionuclides. A total of 173 samples (including field duplicates) were collected from soil intervals deeper than 10 feet bgs for the purpose of characterizing deep soil background conditions. In addition, some sample locations/depths were analyzed for hexavalent chromium only, in addition, not all sample locations/depths were analyzed for radionuclides. For this reason the totals from the text and Table 1 do not match the individual metal total sample numbers in Table 2. The subject text has been revised to cite the 173 sample tally, with a footnote explaining the individual metal/radionuclide sample number discrepancies.*

23. Page 3-2, Section 3.1.2. The last bullet seems to imply that organic chemicals were removed from the dataset (although the only example given is for % moisture). Please clarify.

Response: *The text in Section 1 (see footnote on first page) has been revised to clarify the definition of "background dataset" which specifically includes only metals and radionuclides. The subject text has been reworded slightly to allow for this distinction and organic analyses have been added as parenthetical examples.*

24. Page 3-2; Section 3.1.3. The discussion of non-detects for radionuclides does not seem accurate for this dataset. The discussion seems to imply that all radionuclide analyses

generate activity results, even if the results are negative. However, the data includes non-detects. Some clarification is needed. NDEP requires that all reported values are used without censoring for radionuclides.

Response: *As noted in the subject text, all reported radionuclide values are used without censoring. The subject text has been reworded for clarification, and the summary tables have been revised such than non-detections are no longer indicated for radionuclides.*

25. Page 3-2; Section 3.1.3. SQLs are not fully defined. The difficulty is that the term SQL is not used in the raw datasets. Please follow the recent NDEP guidance on this issue.

Response: *The term SQL has been replaced with the term RDL throughout this report.*

26. Page 3-3; Section 3.1.4, 1st sentence and through the text on this page. If there are obvious or extreme outliers, they should be identified by sample location, analyte, and depth.

Response: *Because no outliers were so extreme such that their representativeness was in question, it is BRC's position that providing a list of them would detract from the primary focus of this section. This approach is also consistent with prior NDEP comments on the Supplemental Shallow Soil Background investigation report, in which NDEP noted that the emphasis on outliers was too great.*

27. Page 3-3; Section 3.1.4, 2nd Bullet. This bullet is difficult to follow. Please list the constituents with respect to the Qal sample outliers. Also, please reference the appropriate appendix so the reader can follow the text. The last sentence is also confusing – it indicates that the 130' and 140' samples from DBSA-30 were assigned to the TMC classification based on soil boring logs. Is this the only location where this assignment occurred?

Response: *The subject bullet has been removed. Since the re-assignment of samples from the Qal to the UMCf in DBSA-30 is based on re-interpretation of the boring log, a discussion on this issue is provided in a footnote on page 2-2.*

28. Page 3-4; Section 3.2, 1st paragraph. The second to last sentence of this paragraph indicates that the *majority* of outliers are close to the regression line in the probability plots (Appendix E). Please list the exceptions.

Response: *BRC assumes that the comment applies to Section 3.1.4. This section has been re-written to be consistent with discussion on outliers in the supplemental background report.*

29. Page 3-4, Section 3.2, last bullet. NDEP cannot find the boxplots that show the 2008 deep soil dataset prior to the reassignment of the two data points from Qal to TMC. Also, similar

to a previous comment, were all 130’ and 140’ samples combined into the TMC classification or just location DBSA-30?

Response: *See response to comment #27 above. This subject bullet has been removed.*

30. Page 3-5, Section 3.2. Somewhere in the discussion of plots, it would be helpful if a note was provided that symbols on the plots for detects and non-detects are different.

Response: *The text has been revised to explain that symbols used for the data points in the boxplots distinguish between detections and non-detect values.*

31. Page 3-5, Section 3.2, last paragraph in the “Boxplots” subsection. Please note in the text that the plots also compare the deep background dataset to the 2005 and 2008 shallow background datasets.

Response: *The subject text has been revised as noted.*

32. Page 3-5, Section 3.2, “Scatterplots” subsection. Include a reference to the appropriate appendix (Appendix G).

Response: *The subject text has been revised and moved to Section 3.6.*

33. Page 3-6, Section 3.3. Please make it somewhat clearer that the non-detect data are summarized completely separately from the detect data (e.g., insert the word “separately”).

Response: *The subject text has been revised on page 3-6 as noted.*

34. Page 3-6, Section 3.4. The summary here seems more useful than the summary in Section 2.2. Can these two summaries be made more consistent?

Response: *The summary in Section 2.2 is provided as an initial cursory introduction to the frequency of detection issue. Section 3.4 is intended as a more thorough discussion, more specifically regarding the frequency of detection. No changes have been made to the report in response to this comment..*

35. Page 3-7, Footnote 10. This footnote is difficult to understand and should be reworded.

Response: *The situation addressed by the footnote has been resolved upon changing to the use of the RDL for the evaluations, and has been removed.*

36. Page 3-7, Section 3.4, Chromium (Cr) VI. Looking at the raw data, the "SQL" for Cr VI appears to be the RL. Consistency in definition of SQLs is still needed.

Response: *As previously noted, the revised report uses the RDL as the basis for comparison of reporting limits. In the prior version, the reporting limit used in this section for all the metals was the RL (as surmised in NDEP's comment) as opposed to the RDL.*

37. Pages 3-7 to 3-9, Section 3.4. The NDEP has the following comments:
    a. Several of the % detection values are reported incorrectly when comparing to Table 2. Also, future deliverables should be consistent in reporting with or without decimal places (e.g., compare tungsten and thallium to other analytes). It is also not clear why many of the mean detected concentrations for the analytes listed are less than the mean SQLs for non-detects (e.g., antimony, chromium, silver, etc.). This is probably an issue of separation of detects and non-detects.

Response: *Due to some revisions during the final production of the first draft, including revisions to the rounding approach, Table 2 underwent changes that were not reflected in the text. The text and tables of this revised version have been cross-checked for consistency.*

An effort has been made to employ significant figures consistently for all the metals, based on values reported by the laboratory.

As noted above, in the prior version of the report, the reporting limit used in this section for all the metals was the RL (not the RDL). Upon changing to the use of the RDL for this purpose, the mean detected concentrations are now higher than the mean reporting limits.

   b. It is unclear what is being presented for the 2005 and 2008 shallow background data examples (with the exception of detect frequency). From what tables and stratigraphic units are these values being derived? For example, antimony has a single value reported for the 2008 Supplemental shallow data but the 2005 shallow data is reported as a range. Please clarify.

Response: *As noted in Footnote #16,* "For all summary tables in this section, the value for Percent Detection reflects the full dataset for each event, as taken from Table 2, and the range of values provided for the other parameters was taken from Tables 4 through 14, for each stratigraphic unit." *The 2008 supplemental shallow data were summarized as single values in the summary tables that are the subject of this comment rather than ranges because only one stratigraphic unit was sampled during that event. However, to reduce confusion, in the revised report, ranges representing the mean RDL and mean detection derived from Tables 5 through 8 (2008 Deep Samples), Tables 9 and 10 (2008 Supplemental Shallow Samples), and Tables 11 through 14 (2005 Shallow Samples) are included for each event.*

   c. The sample size should be included in these tables.

***Response:** The summary tables in the text have been expanded to include the number of samples analyzed during each event for the metals listed.*

38. Page 3-10; Introduction to Section 3.5. The paragraph includes an item (2), but not an item (1). Please edit as appropriate.

***Response:** The subject sentence has been revised.*

39. Page 3-11; Section 3.5.1. It would be helpful if the hypotheses were separated into different paragraphs, and some more information was included on the specification of the null and alternative hypotheses. The ANOVA and correlations have different purposes, which need to be explained more clearly. Also, multiple comparisons are not described here – the null and alternative hypotheses for these comparisons should also be introduced and developed here.

***Response:** The text has been revised in this section to include the additional information requested.*

40. Page 3-11; references in Section 3.5.2. The references to Singh and Singh and to DON seem inappropriate. There is a long history of non-parametric statistics, with far better references than these two documents, especially since the purpose of these two documents is not focused on non-parametric statistical analysis. NDEP suggests that BRC delete these references and include alternate references.

***Response:** In addition to Singh & Singh and DON, references from statistical reference books are provided to support the definition.*

41. Page 3-11; Section 3.5.2. Non-parametric tests also usually have an assumption of symmetry, which is why they are often thought of as tests of the medians. The assumptions of the specific tests used here should be fully documented here.

***Response:** Text has been added to the Kruskal-Wallis test indicating that the underlying distributions of datasets being tested are assumed to have approximately the same shape. It is ERM's understanding that symmetry in the data's distribution is not a requirement/assumption for this test.*

42. Page 3-11; footnote 11. This footnote is not necessary and can be deleted.

***Response:** The footnote in question has been deleted.*

43. Page 3-11; footnote 12. Please note that the Gehan ranking could be applied to the data outside of the tests (e.g., in EXCEL), and then those ranks could be used directly in the tests. NDEP assumes that ½ DL was used instead, although clarification is needed. If Gehan

ranking for these tests is desired, NDEP can make sure this capability is added to EnviroGiSdtT or GiSdT. Please advise.

Response: *The footnote was modified to indicate that a substitution of ½ of the RDL was used for non-detects. As discussed with NDEP, modification of GiSdT at this time was not considered necessary to support the preparation of this report.*

44. Page 3-11, Section 3.5.2, last line. Replace "test" with "tests".

Response: *The subject text in the current report has been revised as noted.*

45. Page 3-12; Section 3.5.2.1. In general, the 0.05 significance level used will identify more differences than are probably reasonable. See general comment on family-wise error rates and appropriate adjustments. This is also an issue for footnote 13.

Response: *Please see response to Comment #6.*

46. Page 3-12; Section 3.5.2.1. A reference should be provided for the Tukey HSD tests.

Response: *A reference to these tests has been added to the revised text.*

47. Page 3-12; Section 3.5.2.1. The K-W post hoc comparisons are not defined in the text. The Behrens-Fisher tests are defined in a footnote (15) and they need to be defined in the text.

Response: *The text has been expanded to define these* post-hoc *comparison tests.*

48. Page 3-12; footnote 15. We have provided these tests in R previously, however, we recognize that they have not been updated for new versions of R. These tests could be included in GiSdT or EnviroGiSdT if the need is identified. Please advise.

Response: *As discussed with NDEP, modification of GiSdT at this time was not considered necessary to support the preparation of this report.*

49. Page 3-12, Section 3.5.2.1, Frequency of Detection subsection. It is not entirely clear what has been done here. The proportions tests are appropriate only if the DLs are similar in each dataset. If they are similar, then the proportions tests can be run. Please clarify if this is consistent with the approach taken.

Response: *The Z-test for two proportions was conducted when the RDLs were similar in each dataset.*

50. Page 3-13, Section 3.5.2.1, 1st sentence under item 2. This sentence needs to be reworded (use of similarity and inferred twice each makes the sentence awkward).

Response: *The sentence has been removed in the revised text.*

51. Page 3-13, Section 3.5.2.2, correlation analysis. Please note that for both multiple comparisons and the correlation tests, the p-values should be presented in the Appendix tables.

Response: *The p-values have been provided in Appendices G and H.*

52. Page 3-13, Section 3.5.3. Section 3.5.4 mentions again the use of parametric and non-parametric tests. The introduction to this section should do that as well.

Response: *This section has been expanded to include reference to the parametric and non-parametric tests.*

53. Page 3-14, Section 3.5.3, 4th paragraph, 1st sentence. Shouldn't there be 32 remaining elements? There are 38 metals listed in Table F-1 (Appendix F) and six of those were excluded from statistical tests.

Response: *The tally of 33 "remaining elements" refers to the elements remaining beyond the five listed in the text above as having no significant differences, not the six listed as having a low frequency of detection. The text has been revised for clarification.*

54. Page 3-15, Section 3.5.3. Tests against the TMC concentrations are now introduced, but without a subsection heading. Please insert a new subsection heading.

Response: *A new subsection heading was inserted in the revised text.*

55. Sections 3.5.3 and 3.5.4. Insufficient discussion is provided of the organics analyses that were run to confirm that these are reasonable background locations.

Response: *Section 2.4 has been revised substantially to include discussion of the organics analyses performed to assess whether the sampling locations are representative of background conditions. It is BRC's position that this discussion is more appropriate to that section than sections 3.5.3 and 3.5.4, which focus on statistical analyses performed on the metals and radionuclide background data set. Therefore, no revisions were made to these sections in response to this comment.*

56. Page 3-15, Section 3.5.3, 3rd group of Bullets. Calcium is listed twice. What about silver? It appears that no significant differences were found between the TMC and Qal for this metal as well.

> ***Response:*** *The list of metals for which no significant differences were observed has been revised to correct this error.*

57. Page 3-15, Section 3.5.3 2nd to last paragraph. This paragraph is more or less repeated from the previous page.

> ***Response:*** *While the subject paragraph is similar in wording to the prior paragraph, it is retained in the revised report because it pertains to the Qal/TMC comparisons, whereas the former paragraph pertains specifically to the Qal comparisons.*

58. Page 3-15, Section 3.5.3 last paragraph. Similar to a previous comment, shouldn't there be 53 remaining elements? Also, according to Table F-1 (Appendix F), there were 29 significant differences between the TMC and Qal/McCullough classifications, 13 significant differences for TMC and Qal/Mixed, and 18 significant differences between the TMC and Qal/River datasets.

> ***Response:*** *As noted in the response to the comment #53, the text has been revised for clarification.*

59. Page 3-16, Section 3.5.4, 1st paragraph, 2nd to last sentence. The probability plots and individual value plots are only presented for deep background data, so how can these be used for comparison to the 2005 background data sets?

> ***Response:*** *The subject text has been revised to remove the statement that probability plots and individual value plots were used for comparison to 2005 data sets.*

60. Page 3-16, Section 3.5.4, last paragraph, last sentence. It seems that 21 elements are significantly different between the surface and 10' bgs samples based on the number of green boxes that are present in the table (these are also assumed to indicate significant differences, right? If not, what do these actually indicate?).

> Response: *Counts have been checked and text has been revised.*

61. Page 3-17, Section 3.5.5. Similar to a previous comment, probability plots and individual value plots are only presented for deep background data, so how can these be used for comparison to the 2008 background data sets?

> ***Response:*** *The subject text has been revised to remove the statement that probability plots and individual value plots were used for comparison to 2005 data sets.*

62. Page 3-18, Section 3.5.5, paragraph under the 2nd group of bullets, 1st sentence. Aren't there 29 remaining elements (assuming 38 metals, not counting the duplicate analytes that are presented in Table F-3 of Appendix F)? In the last sentence of the same paragraph, aren't there 12 elements with significant differences when comparing surface to 10' bgs data sets?

Response: *Counts have been checked and text has been revised.*

63. Page 3-19, Section 3.5.7, Table. For tests of proportions, this test applies when DLs are similar. For chromium (IV), the minimum detect is approximately six times less than the minimum non-detect. How can this be considered an additional candidate for the test of proportions analysis? More generally, the tests for proportions should be applied only if the DLs are similar for the two (or more) populations under consideration. Please explain what is of interest is the results of those tests, which do not appear to be discussed directly in this report. Please revise this section.

Response: *Tables and text have been revised to summarize the analyses for infrequently detected constituents.*

64. Page 3-21, Section 3.5.8. Some further interpretation of some of the plots would be helpful. Specific examples would be helpful of the types of correlation effects that are being observed. Some are provided in Section 3.5.9, but more specific examples would help here.

Response: *The revised text has been expanded to include further interpretation of the plots and types of correlation effects observed.*

65. Page 3-23, Section 3.5.9. This section can be expanded a bit to discuss the results in more detail.

Response: *The revised text has been expanded to include further interpretation of the results.*

66. Page 4-1, Section 4.0, 2nd paragraph, 3rd sentence. This sentence indicates that a total of 173 soil samples were collected, however page 3-1 indicates that 222 samples were collected. Please clarify.

Response: *As previously noted, the tally of 222 soil samples (including field duplicates) refers to all samples collected during the deep background soil investigation. However, a subset of those were associated with depth intervals shallower than 20 feet bgs and organics analyses, and are not part of the deep background data set for metals and radionuclides. A total of 173 samples (including field duplicates) were collected from soil intervals deeper than 10 feet bgs for the purpose of characterizing deep soil background conditions. The subject text correctly refers to a total of 173 samples.*

67. Page 4-1, Section 4.0, 4th paragraph, 2nd sentence. This sentence refers to a location. Please clarify which location.

Response: *The sentence has been removed from the revised text.*

68. Page 4-1 to 4-3, Section 4.0. Rather than repeating text from previous sections, this section should draw the major conclusions with respect to the usage of the deep background data set (i.e., what do the significant differences between Qal/McCullough and Qal/River imply? Application of portions of this data set to specific areas of the Site?). Please give examples.

Response: *As noted in response to general comment #2, upon final NDEP concurrence that all the background datasets are appropriate and approved for use, BRC will prepare a summary report that presents each of the individual datasets for the various lithologies and depths.*

69. Table 3. It is not clear why so many of the VOCs have been rejected. The organics chemicals data is used to help justify that these are background locations, therefore, some more detail is necessary. However, as noted in other comments, there is not much discussion of the data for the organic chemicals.

Response: *The revised text has been expanded to include a discussion of the results of the organics analyses, and associated data validation (Section 2.4).*

70. Table 4. Some of the detection limits used (SQLs) appear to be reporting limits, and some appear to be method detection limits or reporting detection limits. As described in more recent NDEP guidance, it would be helpful of the detection limit issues were cleaned up, if common terminology was used, and if common decisions were made for the different chemicals.

Response: *As noted in response to prior comments, the reporting limits used in the revised report are RDL.*

71. Figure 1. The scale in the lower right-hand corner of the figure is distorted and the label near the north arrow is incomplete. Also, the "AOC3 boundary" is different than that shown in Figures 2 and 3 (i.e., the boundary located outside of the main site is not found on Figures 2 and 3).

Response: *The figures have been revised to address the issues noted in NDEP's comment.*

72. Figures 1, 2, and 3. Only 20 "Boring Locations" are shown, but there are 21 locations in total. It appears that boring location DBSA4 is not classified correctly per the bullet list for the McCullough Range Source given on page 2-2.

Response: *The figures have been revised to address the issue noted in NDEP's comment (i.e., reclassification of location DBSA-4 as a sampled location).*

73. Appendix F, Tables F1-F3. Why are certain metals included twice (e.g., Niobium, Palladium, Phosphorous, etc.)? It is unclear why there are duplicates and what the yellow highlighting indicates.

Response: *The tables have been corrected.*

74. Appendix F, Table F-4. Is this table necessary, given the fact that statistical analyses were not performed?

Response: *Table is included for completeness. Results of test were considered of limited use with regard to characterizing differences among Qal/Mixed 2008 Deep, shallow (0 ft bgs), and deeper (10 ft bgs) depth intervals from the 2005 BRC/TIMET dataset.*

75. Appendix F, Tables F5-F7. What does the light blue text indicate?

Response: *The tables have been revised for clarification. Light blue text indicates constituents having sample size less than 4 samples.*

76. Appendix G. What is the point of the "2008 Deep Correlation Matrices for Metals"? Also, what do the various colors indicate? Please clarify and provide at a legible scale.

Response: *This table was simply provided as a visual summary of the correlation analyses.*

REDLINE/STRIKEOUT TEXT

1.0 INTRODUCTION

On behalf of Basic Remediation Company (BRC), ERM-West, Inc. (ERM) has prepared this Deep Soil Background Report applicable to the Basic Management, Inc. (BMI)), Complex and Common Areas in Clark County, Nevada. The deep soil background data were collected in accordance with the *Revised Work Plan for Determination of Deep Quaternary Alluvium and Upper Muddy Creek Formation Background Soil Chemistry and Upgradient AlluvialAllivial Aquifer Conditions – BMI Common Areas and Complex Vicinity* (Daniel B Stevens & Associates [DBSA] 2007), and approved by the Nevada Division of Environmental Protection (NDEP) on June 12, 2007 (hereinafter, "Work Plan").

This revision of the report, Revision 32, incorporates (1) the redline/strikeout version of the text received from NDEP on September 16, 2009, and text revisions based on subsequent discussions between BRC and NDEP; (2) comments received from the NDEP, dated May 11, 2009, on Revision 1 of the report, dated March 2009; and (32) comments received from the NDEP, dated December 28, 2008, on Revision 0 of the report, dated October 2008; as well as comment resolutions between BRC and NDEP on the *2008 Supplemental Shallow Soil Background Report* (BRC and ERM 2009a [in review]). The NDEP comments and BRC's response to these comments are included in Appendix A. Also included in Appendix A is a redline/strikeout version of the text showing the revisions from the JuneMarch 2009 version of the report. An electronic version of the entire report, as well as original format files (MS Word and MS Excel) of all text and tables are included in Appendix B; as is the 2008 Deep Soil Background dataset.[1]

The general scope of work included the collection of soil samples from background areas upgradient of the BMI Common Areas and Complex industrial areas and analysis of these samples for Site-related metals and radionuclides for determining background concentrations. In addition, selected samples were analyzed for general chemistry/soil parameters, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and organochloride pesticides (OCPs). The report entitled *Deep Background Investigation Report* (GES 2007), an electronic copy of which is provided in Appendix B, describes the drilling and sampling procedures, including detailed boring logs for each drilling location. Deep soil background sample locations

[1] The data presented in Appendix B includes all data collected during the 2008 Deep Soil Background Investigation, including chemical data other than metals and radionuclides. Here and elsewhere in the report, the term "background dataset" refers to the metals and radionuclide data (excluding the other chemical data collected during the deep background investigation), which will be used in comparisons to metals and radionuclide Site data as part of the Site closure process.

are shown on Figure 1. This report provides a summary of the scope of work and data associated with the Deep Background Investigation (leaving the details to the above-referenced 2007 GES report), after which the statistical analyses employed and the associated results are presented.

1.1 OBJECTIVES AND PURPOSE

The primary purpose of this investigation was to collect and analyze data for metals and radionuclides in background deep soils that are comparable to Site soils in geologic units and depths not covered by the existing *Background Shallow Soil Summary Report* (BRC/TIMET 2007) and *2008 Supplemental Shallow Soil Background Report* (BRC and ERM 2009a [in review]) datasets, which address shallower (0 to 10 feet below ground surface [bgs]) stratigraphic intervals. To support this data collection effort, soils collected from the background borings were analyzed for VOCs, SVOCs, and OCPs to evaluate potential soil impacts at the background drilling locations. The underlying assumption was that if potential chemical impacts were observed at a given boring location, the designation of that boring as representing background conditions would be suspect. In addition, general chemistry/soil parameters were also collected to better characterize the nature of the deeper soils, because limited data are currently available. General descriptive summary statistics and comparative statistical analyses for each stratigraphic unit were calculated only for the constituents being evaluated as background (*i.e.*, metals and radionuclides).

This deep background study was primarily undertaken because 1) insufficient background chemical data exist to evaluate whether concentrations of certain Site-related chemicals in deeper Site samples statistically exceed concentrations of these chemicals in background soils, and 2) insufficient background chemical data exist for the Upper Muddy Creek formation (UMCf), which outcrops to the northeast of the Site. The UMCf, but although it is near the ground surface in certain areas of the Common Areas (*i.e.*, within the Western Hook sub-areas), but does not appear to outcrop within the Site. As presented in the two shallow soil background summary reports identified above (BRC/TIMET 2007; BRC and ERM 2009a [in review]), the existing datasets focused on shallow Quaternary alluvium (Qal) soils (*i.e.*, surface to 10 feet bgs) and did not include data for the UMCf. One of the specific points of this study was to determine whether arsenic concentrations are different in the UCMf than in the Qal; this is particularly important because arsenic is usually a risk driver at the Site.

The field activities were specifically designed to collect the following soil chemical data needed for Site-to-background comparisons:

- Data for various depth intervals, in both the Qal and UMCf units;
- Data for a representative range of soil map units applicable to the Site (*i.e.*, Natural Resources Conservation Service [NRCS] mapped soil units 117, 182, and 184);
- Data to form an adequate statistical sample population to support future statistical comparisons of Site and background sample datasets; and
- Data to form an adequate statistical sample to compare more than one background dataset, if required, based on statistical comparisons of data from different background soil map units or geologic units within the deep background data and between the deep background, supplemental background and shallow background datamaterials.

1.2 SITE LOCATION AND GEOLOGIC SETTING

The Site is located in Clark County, Nevada, and is situated approximately two miles west of the River Mountains and one mile north of the McCullough Range (Figure 2). For reference, it is noted that the Upper Ponds occupy the southern portion of the BMI Common Areas, and the Lower Ponds occupy the northern part of the BMI Common Areas. The McCullough Range is the primary source of materials upslope of the BMI Complex, the Lower Ponds, and the western and central portions of the Upper Ponds. Both the River Mountains and the McCullough Range are primary sources of materials upslope of the eastern portion of the Upper Ponds. According to the Nevada Bureau of Mines and Geology (NBMG) *Las Vegas SE Folio Geologic Map (1977) and the Geologic Map of the Henderson Quadrangle, Nevada* (NBMG 1980), the River Mountains and McCullough Range consist of volcanic rocks: dacite in the River Mountains and andesite in the McCullough Range. The land surface slopes in a westerly to northwesterly direction from the River Mountains and in a northerly to northeasterly direction from the McCullough Range. Near the Site, the surface topography slopes in a northerly direction towards the Las Vegas Wash.

Soils in the Site vicinity have been identified and mapped by the NRCS in Soils Survey of Las Vegas Valley Area, Nevada (USDA, 1985; hereinafter referred to as "NRCS Soils Survey"). The soils map from the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (USDA 2009) shows that the soil type classification for the Upper and Lower Ponds area proper is map unit 600, "slickens," a non-native soil type (artificial fill). This term is presumed to reflect the non-native material observed in those Ponds that were used for waste disposal. The soil type classification for the BMI Complex is map unit 615, "urban land." Native soils underlying the slickens and urban land are assumed to be consistent with the surrounding map units (*i.e.*, primarily map unit 184, and, to a lesser extent, map units 112, 117, 182, 187 and 326). In Figure 3, the sampling locations associated with this deep background soil investigation are superimposed over a digitized soils map reproduced from the NRCS SSURGO database, which represents the most recent available information pertaining to the mapped, naturally-occurring soils in the Site vicinity.

2.0 SUMMARY OF THE INVESTIGATION

This section identifies the sampling locations, presents the sampling and analytical methods, and summarizes the results of data validation.

2.1 SAMPLING LOCATIONS

As described in the Work Plan, a total of 33 potential sampling locations were originally identified within map units 117, 182, and 184. These potential sampling locations were selected because they exhibited the following characteristics:

- They are off-Site locations within the same soil map units as soils located immediately adjacent to the Site, and in relatively close proximity to the Common Areas and BMI Complex; however, they are upgradient and sufficiently distant from the Site such that impacts from Site or other industrial operations are not likely.
- Because the focus of the investigation is on deeper soils, the locations of these potential deeper background locations should not be affected by wind relationships such as might affect a shallow surface sampling program. Nonetheless, assuming a predominant wind direction from the south and southwest, the potential locations are upwind or crosswind of the Site.
- The sampling locations are upgradient of the Site and are thus unlikely to have been affected by overland transport of potentially contaminated sediments in surface water.

The *Background Shallow Soil Summary Report* (BRC/TIMET 2007) and *2008 Supplemental Shallow Soil Background Report* (BRC and ERM 2009a [in review]) support the assumption that deep native soils collected from within map units 117, 182, and 184 should reflect background conditions at the Site. As specified in the Work Plan, based on then-current accessibility, site hazards, and land use compatibility, of the 33 candidate drilling locations, seven locations within each soil unit were selected for drilling (*i.e.*, a total of 21 locations[2]).

Based on geologic mapping data (NBMG 1980), ERM classified each sampling location as representing Qal sediments derived from either 1) the McCullough Range, 2) the River

[2] Each of the original potential drilling locations identified in the Work Plan are depicted in Figure 1, with color coding to differentiate the locations that were ultimately drilled from those that were omitted. Because the boring-specific nomenclature assigned in the Work Plan was retained, the associated dataset has gaps in the boring locations numbering system reflecting the omitted borings.

Mountains, or 3) mixed River and McCullough sources,[3] as follows, and the resultant data was accordingly segregated:

McCullough Range Source

- DBSA-01
- DBSA-02
- DBSA-03
- DBSA-04
- DBSA-08
- DBSA-09
- DBSA-10
- DBSA-11
- DBSA-13
- DBSA-14
- DBSA-15

River Mountain Source

- DBSA-23
- DBSA-26
- DBSA-27
- DBSA-29
- DBSA-30[4]
- DBSA-32
- DBSA-33

Mixed Source

- DBSA-17
- DBSA-20
- DBSA-21

The underlying UMCf was assumed to be the same unit across the study area, and all data collected from the UMCf were compiled into a single dataset.

Soil samples were collected at 10-foot intervals at 21 sampling locations, from surface soil (0 to 0.5 feet bgs), to a maximum of 160 feet bgs. Of these samples, as discussed in the following section, a subset was submitted for laboratory analysis. As noted in the *Deep Background Investigation Report* (GES 2007), no odors or stains indicating impacts to the soils in the deep background borings were observed. Likewise, field screening for VOCs using photoionization detectors (PIDs; 10.6 eV and 11.7 eV) revealed no elevated VOC measurements (see boring logs in Appendix C, which have been replicated from the *Deep Background Investigation Report* [GES 2007]).

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3 Map Unit #117, which contains sampling locations DBSA-17, DBSA-20, and DBSA-21 as seen in Figure 3, is classified as modern wash deposits. Its location is coincident with 1) a sharp topographic break and 2) the apparent contact of the alluvium from the River Mountains with that of the McCullough Ranges, which suggests that it could be derived from reworking of both underlying sediments. Discussions on the field investigation and boring locations are provided in the 2007 GES report (Appendix B).

4 Original interpretation of the boring log for DBSA-30 indicated that the UMCf contact was originally identified based on the presence of clay at 148 feet bgs—accordingly, the 130 and 140 ft bgs samples were assigned to Qal/River. However, further scrutiny of the boring log reveals that soils overlying the clay UMCf are clayey sands with distinct clay beds, and may represent transitional UMCf. Based on this and the observed similarity in metal concentrations in the 130 ft bgs, 140 ft bgs, 150 ft bgs, and 160 ft bgs samples, data associated with the 130 ft bgs and 140 ft bgs samples were re-assigned to the UMCf dataset.

2.2 SUMMARY OF SAMPLING PROCEDURES AND ANALYSES

Soil samples were collected from a single boring at each location, drilled using either a hollow-stem auger or sonic drill rig. The first five borings drilled (DBSA-1, -2, -3, -27, and -32) were advanced using hollow-stem auger drilling techniques. When the depth to the UMCf contact was determined to be greater than 100 feet bgs in portions of the Site, the project team revised the drilling approach to include the use of rotary sonic drilling, which could readily achieve greater depths. Samples collected from each boring using either drilling technique are considered independent samples, each representing a sample interval of 2.5 feet.

At the locations where hollow stem auger drilling was used, samples were obtained using a split-spoon sampler fitted with 2.5-inch by 6-inch stainless steel sleeves. Five sleeves were collected for each sampling interval, except where duplicate or matrix spike/matrix spike duplicate (MS/MSD) samples were needed, and were submitted directly to the laboratory without compositing. The sonic drill rig used a 6-inch diameter, 5-foot long core-sampler, which was advanced in 5-foot runs. The resulting “cores” were divided into two 2.5-foot sections, each of which was composited (separately) within a clean stainless steel bowl; a representative portion of each composited 2.5-foot sample was then placed into glass sample jars provided by the laboratory. In most cases, the jars containing the shallower 2.5-foot section of a given run were the only samples analyzed for that run; however, at intervals where duplicate samples were analyzed, the deeper samples from that interval were submitted for duplicate analysis.

Sampling and sample handling procedures were consistent with the standard operating procedures (SOP) developed for the BMI Common Areas as provided in the Field Sampling and Standard Operating Procedures (FSSOP; BRC, ERM and MWH 2008). Subsurface soil samples were collected from each 10-foot depth interval bgs. At locations where the UMCf contact was observed, an effort was made to collect soil samples from 10 and 20 feet below that contact. A subset of the samples (173 samples,[5] Table 1) was subjected to laboratory analysis for Site-related metals and radionuclides. Data for OCPs, VOCs, and SVOCs were also collected to evaluate whether the background soil locations are impacted by other anthropogenic sources.

[5] Note: Samples were inadvertently collected from the first soil boring, DBSA-1, at 0, 5, and 10 feet bgs. Since the purpose of the deep soil background study was to collect data for metals and radionuclides in deep background soils (that is, depths greater than 10 feet bgs), metals and radionuclide data for these shallow soil samples were removed from the deep background dataset and are not included in any of the statistical discussions, plots, or analyses in this report.

Twenty-five (25) field duplicate samples were collected and analyzed for metals and radionuclides during the deep soil background investigation. Because these samples are considered field duplicates, and not split samples, each is considered an independent sample for the purposes of this report. This approach is consistent with NDEP's November 14, 2008, guidance *Statistical Analysis Recommendations for Field Duplicates and Field Splits* (NDEP 2008a), which states that NDEP's preferred approach to managing duplicate data is to include field duplicates as independent samples, unless the field duplicates show lower variance than site samples, which is not the case for this dataset. Therefore, there were a total of 173 soil samples collected and analyzed for metals and radionuclides as part of this investigation.

The soil samples were submitted for analysis to TestAmerica in St. Louis, Missouri. Analyses were conducted at four TestAmerica laboratory locations: St. Louis, Missouri (most analyses); Burlington, Vermont (physical parameters); Irvine, California (Chromium [VI]) and Richland, Washington (radionuclides). At the time of analysis, all laboratories were NDEP-certified laboratories for the analyses conducted. Sample analyses consisted of a full suite of metals, eight radionuclides (radium-226, radium-228, thorium-228, thorium-230, thorium-232, uranium-233/234, uranium-235/236, and uranium-238), VOCs (5' and 10' bgs samples only), SVOCs (selected 5' and 10' bgs samples only), OCPs (selected surface soil samples only), and general soil characteristics.

Table 1 presents a sample-specific summary of the sampling and analysis program; a more detailed sample analysis summary, including the sample-specific laboratory information, the Lab Sample ID and Sample Delivery Group, sampling date and time is provided in Appendix D. The individual analytes, analytical methods, sample quantitation limits (SQLs; for metals and organics), and minimum detectable activities (MDAs; for radionuclides) are consistent with the methods specified in the Work Plan. These analytes and methods are consistent with the BRC Site-related chemicals list and analytical program previously established in the BRC Quality Assurance Project Plan (QAPP; BRC and ERM 2009b). All radionuclide analyses underwent full dissolution preparatory methods. All preparatory methods and analyses are consistent with the 2005 BRC/TIMET and 2008 Supplemental background datasets.

The detection frequency for metals and radionuclides evaluated during this deep soil background study is presented in Table 2. Detection frequencies observed for these analytes during the shallow background studies are also provided on that table for comparison. As seen in Table 2, most of the metals and radionuclides that are the subject of the deep soil background investigation were detected routinely in the deep soil samples. Exceptions are:

- Boron
- Chromium (VI)
- Mercury
- Niobium
- Platinum
- Selenium
- Thallium
- Tungsten

These eight constituents were detected in fewer than forty percent of the samples in which they were analyzed during the deep soil background investigation. This observation is generally consistent with the shallow soil background investigation findings, in which these same compounds (with the exception of mercury) were also not detected routinely. Certain constituents were detected at noticeably higher frequencies in the deep background samples than in those from the shallow background investigations (*e.g.*, antimony, cadmium, chromium (VI), silver, and tungsten). In addition, mercury, selenium and thallium were detected at noticeably lower frequencies in the 2008 deep samples than in the shallow background studies. However, as discussed in Section 3.54, for many of these metals (*i.e.*, antimony, cadmium, chromium (VI), selenium, and silver) variations in detection frequencies are suspected as having been affected by variations in SQLsreporting limits, and may not reflect trends in actual concentrations.

2.3 DATA VALIDATION SUMMARY

All of the data were subjected to a Level 3 review. In addition to the Level 3 review, 20 percent of all data collected during the course of the investigation were subjected to full Level 4 data validation. Level 3 and 4 reviews are provided in the *Data Validation Summary Report (DVSR)— Deep Background Soil Investigation – August-October 2007 (Dataset 34c) – BMI Common Areas (Eastside), Clark County, Nevada* (BRC and ERM 2008;[6] approved by NDEP in June 25, 2008), which is provided electronically in Appendix B. Stable chemistry sample results (metals) and organic data for deep soil background samples were validated in accordance with the following U.S. Environmental Protection Agency (USEPA) guidance documents: *U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2004); and *USEPA Contract Laboratory Program National Functional Guidelines for*

[6] Note: in addition to the deep soil background data that are the subject of this report, the DVSR also includes other data not addressed in this report, such as incidental grab groundwater samples collected during the deep background drilling.

Organic Data Review (USEPA 1999),[7] respectively. USEPA has not standardized the validation of radionuclide data. Radionuclide results for deep soil background samples were validated in accordance with SOP-40 (BRC, ERM and MWH 2008) and the project QAPP (BRC and ERM 2009b).

Based on data validation and review, data qualifiers were placed in the electronic deep soil background database to classify whether the data were acceptable, acceptable with qualification, or rejected. Where applicable, an indication of result bias is presented. In addition, for every data validation qualifier, a secondary comment code was entered to indicate the reason for qualification. The DVSR (BRC and ERM 2008) provides the definitions for the data validation qualifiers and comment codes used in the deep soil background database. Validation qualifiers and definitions are based on those used by USEPA in the current validation guidelines (USEPA 1999 and USEPA 2004) and summarized in the SOP-40 (BRC, ERM, and MWH 2008).

Results that are qualified as estimated may generally be usable for the purposes of establishing background and for comparison to Site-specific sample data. Based on the evaluation of the dataset, approximately 98 percent of the data obtained during the field investigation are valid (that is, not rejected) and acceptable for their intended use.

2.4 DATA USABILITY EVALUATION

The analytical data were reviewed for applicability and usability following procedures in the *Guidance for Data Usability in Risk Assessment (Part A)* (USEPA 1992) and *Supplemental Guidance for Assessing Data Usability for Environmental Investigations at the BMI Complex and Common Area in Henderson, Nevada* (NDEP 2008b). A quality assurance/quality control (QA/QC) review of the analytical results was conducted during the sampling events. According to both NDEP's and USEPA's Data Usability Guidance, there are six principal evaluation criteria by which data are judged for usability. The six criteria are:

[7] Revised validation procedures have been specified in NDEP's guidance document Revisions to Data Validation of Organic Data based on June 2008 National Functional Guidelines for Superfund Organic Methods Data Review – USEPA-540-R-08-01 (NDEP 2009a). Because these data were collected and validated prior to March 2009, these revised procedures were not employed. The primary changes relative to the 1999 USEPA guidance and SOP-40 (BRC, ERM and MWH 2008) are associated with the manner in which blanks are evaluated and where data are rejected due to very low internal standards. A review of the data indicates that for this dataset three VOC qualifiers would not have been applied under the new validation guidelines. In particular, dichloromethane in three soil samples (DBSA-27-Q-5, DBSA-3-Q-5, and DBSA-3-Q-10) would not have been qualified as non-detect; however, detections of dichloromethane are not likely to change the findings regarding the usability of the background metals and radionuclide data.

- availability of information associated with site data;
- documentation;
- data sources;
- analytical methods and detection limits;
- data review; and
- data quality indicators (DQIs), including precision, accuracy, representativeness, comparability, and completeness.

In addition to the six principal evaluation criteria, NDEP's Data Usability Guidance includes a step for data analysis. A summary of these six criteria for determining data usability is provided below. Data usability evaluation tables are provided electronically in Appendix E.

Criterion I – Availability of Information Associated with Deep Soil Background Data

The usability analysis of the deep soil background data requires the availability of sufficient data for review. The required information is available from documentation associated with the data collection efforts. Data have been validated per the NDEP-approved DVSR (BRC and ERM 2008). The following lists the information sources and the availability of such information for the data usability process:

- Background description and objectives provided in the NDEP-approved Work Plan (DBSA 2007) and in Section 1.
- A Site map with sample locations is provided in Figure 1.
- Sampling design and procedures were provided in the NDEP-approved Work Plan (DBSA 2007) and discussed in Sections 2.1 and 2.2.
- Analytical methods and detection limits are provided in the Work Plan.
- A complete dataset is provided in Appendix B.[8]

[8] The data presented in Appendix B includes all data collected during the 2008 Deep Soil Background Investigation, including chemical data other than metals and radionuclides.

- Field conditions and physical parameter data as applicable to the background dataset are provided in Appendix B.
- The laboratory provides a narrative with each analytical data package outlining any problems encountered in the laboratory, control limit exceedance, and rationale for any deviations from protocol. These narratives are included as part of the DVSR (BRC and ERM 2008).
- QC results are provided by the laboratory, including blanks, replicates, and spikes. The laboratory QC results are included as part of the DVSR (BRC and ERM 2008).
- Data flags used by the laboratory were defined adequately
- Electronic files containing the raw data made available by the laboratory are included as part of the DVSR (BRC and ERM 2008).

Criterion II – Documentation Review

The objective of the documentation review is to confirm that the analytical results provided are associated with a specific sample location and collection procedure, using available documentation. For the purposes of this data usability analysis, the chain-of-custody forms prepared in the field were reviewed and compared to the analytical data results provided by the laboratory to ensure completeness of the dataset as discussed in the DVSR (BRC and ERM 2008). Based on the documentation review, all samples analyzed by the laboratory correspond to their respective geographic locations as discussed in Section 2 and shown in Figure 1. The samples were collected in accordance with the NDEP-approved Work Plan (DBSA 2007) and SOPs developed for the BMI Common Areas as provided in the FSSOP (BRC, ERM and MWH 2008). Field procedures included documentation of sample times, dates and locations, and other sample-specific information (*e.g.*, sample depth). Information from field forms generated during sample collection activities was imported into the project database.

The analytical data were reported in a format that provides adequate information for evaluation, including appropriate quality control measures and acceptance criteria. Each laboratory report describes the analytical method used, provides results and detection limits on a sample-by-sample basis, and provides the results of appropriate quality control samples (*e.g.*, laboratory control spike samples, sample surrogates and internal standards [organic analyses only], and MS samples). All laboratory reports provided the documentation required by USEPA's Contract Laboratory Program (USEPA 1999 and 2004) which includes chain of custody records, calibration data, QC results for blanks, duplicates, and spike samples from the field and laboratory, and all supporting raw data generated during sample analysis. Reported sample analysis results were imported into the project database.

Criterion III –Data Sources

The review of data sources is performed to determine whether the analytical techniques used in the site characterization process are appropriate. The data collection activities were primarily developed to characterize a broad spectrum of background metals and radionuclides. The State of Nevada is in the process of certifying the laboratories used to generate the analytical data. As such, standards of practice in these laboratories follow the quality program developed by the Nevada Revised Statutes (NRS) and are within the guidelines of the analytical methodologies established by the USEPA.

Given previous issues with analysis of radionuclides at the BMI Complex (NDEP 2009b), note that all radionuclide analyses underwent full dissolution preparatory methods. These preparatory methods and analyses are consistent with those used for the 2005 BRC/TIMET background data and the 2008 Supplemental background data.

Based on the review of the available information, the data sources for chemical and physical parameter measurements are adequate for use.

Criterion IV – Analytical Methods and Detection Limits

In addition to the appropriateness of the analytical techniques evaluated as part of Criterion III, it is necessary to evaluate whether the detection limits are low enough to allow adequate characterization of the data. At a minimum, this data usability criterion can be met through the determination that routine USEPA reference analytical methods were used in analyzing the samples. The Work Plan identifies the USEPA methods that were used in conducting the laboratory analysis of soil samples. Each of the identified USEPA methods is considered the most appropriate method for the respective constituent class and each was approved by NDEP as part of the Work Plan (DBSA 2007).

Laboratory SQLs for metals ~~and MDAs (the smallest amount of activity that can be quantified) for radionuclides~~ were based on those outlined in the reference method, the Work Plan, and the project QAPP (BRC and ERM 2009b). In accordance with respective laboratory SOPs, the analytical processes included instrument calibration, laboratory method blanks, and other verification standards used to ensure quality control during the analyses of collected samples.

Even though the same analytical methods were used for the samples collected as part of this background study and the prior background sampling events, the SQLs for several metals vary between those events. Datasets with multiple sample-specific detection limits are not uncommon in analytical chemistry data. This has minimal effect on datasets for analytes with high frequencies of detection. However, it is of concern for datasets with numerous non-detections, for which variable SQLs can result in difficulties in differentiating whether datasets are actually different or merely an artifact of detection limits. As evidence of this potential problem, as discussed in Sections 2.2 and 3.54, in a few instances (*i.e.*, for antimony, cadmium, chromium (VI), selenium, and silver, thallium, and tungsten) the variations in SQLs for the background data have potentially caused differences in frequency of detection (FOD).

Therefore, it should be recognized that having differences in SQLs for a given analyte may compromise statistical analyses in this report and future background comparisons. As discussed in Section 2.2, eight constituents were detected in fewer than fifty percent of the samples--differences in detection limits are anticipated to have the greatest effect on calculations of descriptive statistics and statistical analyses for these constituents. For datasets with relatively low frequencies of detection and variable SQLs, particularly when SQLs for non-detectsdetection limits are among the largest reported values in the datasets, then, conclusions from the statistical test results should be treated with caution, because the assumptions underlying the statistical tests, such as background comparison tests, might not be adequately satisfied. In these cases where either the background or site dataset has low frequencies of detection, greater emphasis should be given to the summary statistics (*e.g.*, mean, median, maximum detect, maximum non-detect, frequency of detection)ions, means, and plotsmedians as well as a review of the data.

Radionuclides represent a different situationSQLs rather than metals. Radionuclide detection frequencies are considered usingsimply the minimum detectable activity (MDA) as the reported value below which measured results are considered "non-detections." As discussed in Section 3.1.3, when radionuclides are not detected at activities greater than the MDA, the laboratory reports the measured activity, including those lower than the MDA. Therefore, all reported results for radionuclides are used in the statistical evaluations, regardless of where they fall relative to the MDA. The MDA and radionuclide detection frequencies relative to the MDA have no effect on statistical comparisons of the radionuclide data.statistical tests.

Criterion V – Data Review

The data review portion of the data usability process focuses primarily of the quality of the analytical data received from the laboratory. However for this study, the data review also included evaluation of the organics data to identify any evidence of impacts that might indicate that these locations are not suitable for consideration as background. Both elements are discussed below.

Data Quality Review. Soil sample data were subject to data validation. The DVSR was prepared as a separate deliverable (BRC and ERM 2008). The analytical data were validated according to the internal procedures using the principles of USEPA National Functional Guidelines (USEPA 1999 and 2004) and were designed to ensure completeness and adequacy of the dataset. Any analytical errors and/or limitations in the data have been addressed and an explanation for data qualification provided in the respective data tables. The results of ERM's data review for these issues are presented in the DVSR (BRC and ERM 2008) and are summarized as qualifiers in the data tables in Appendix E.

For some analytical results, quality criteria were not met and various data qualifiers were added to indicate limitations and/or bias in the data. The definitions for the data qualifiers, or data validation flags, used during validation are those defined in SOP-40 (BRC, ERM and MWH 2008) and the project QAPP (BRC and ERM 2009b). Sample results are rejected based on findings of serious deficiencies in the ability to properly collect or analyze the sample and meet QC criteria. Only rejected data are considered unusable for decision-making purposes. A small subset of organic chemical data collected during the 2008 deep soil background investigation were rejected (approximately two percent). Non-detect VOC data in two samples were rejected due to high temperatures of the storage coolers. In addition, 12 mercury results, 13 total cyanide results, one chloride result and one chlorine result were rejected due to very low MS recoveries. Sample results qualified as estimated indicate an elevated uncertainty in the value. A bias flag may have been applied to indicate a direction of the bias. Estimated analytical results are included in the deep soil background dataset.

Evaluation for Evidence of Impacts/Background Unsuitability. In addition, under this criterion, the OCP, SVOC and VOC data were evaluated to identify any evidence of impacts that might indicate that these locations are not suitable for consideration as background. The following analyses were conducted for this purpose:

- Surface soil samples collected from five locations (DBSA-01, DBSA-26, DBSA-27, BDSA-32, and DBSA-33) were analyzed for OCPs. As summarized in Table 3, OCPs were only detected in one sample (DBSA-01). These detections (2,4-DDE, 4,4-DDD, 4,4-DDE, 4,4-DDT, and beta-BHC) were relatively low; the maximum reported detection was 0.016 mg/kg of 4,4-DDE.

- Subsurface samples collected from 5 and 10 feet bgs from locations DBSA-01 and DBSA-02 were analyzed for SVOCs. As summarized in Table 3, no SVOCs were reported as detections in these four samples.

- Subsurface samples collected from 5 and 10 feet bgs from all 21 background sampling locations were analyzed for VOCs. As summarized in Table 3, the following VOCs were reported as detections[9]: 1,2,4-trimethylbenzene, acetone, dichloromethane, and toluene. These detections, which are relatively low, are as follows:

Constituent	Locations where Detected	Maximum Detection (mg/kg)
1,2,4-Trimethylbenzene	DBSA-01 (5 ft bgs) DBSA-04 (5 and 10 ft bgs) DBSA-11 (10 ft bgs) DBSA-13 (5 and 10 ft bgs) DBSA-23 (10 ft bgs) DBSA-27 (10 ft bgs) DBSA-32 (5 and 10 ft bgs)	0.00075 mg/kg (DBSA-11)
Acetone	DBSA-01 (5 ft bgs) DBSA-02 (10 ft bgs) DBSA-03 (10 ft bgs) DBSA-04 (5 ft bgs) DBSA-11 (5 and 10 ft bgs) DBSA-14 (5 and 10 ft bgs) DBSA-27 (5 and 10 ft bgs) DBSA-33 (5 and 10 ft bgs)	0.036 mg/kg (DBSA-04)

[9] It should be noted that the non-detect VOC results for DBSA-01 (5 ft and 10 ft bgs depths) were rejected due to cooler temperature exceedancesexceedences, as noted above.

Constituent	Locations where Detected	Maximum Detection (mg/kg)
Dichloromethane	DBSA-01 (5 ft bgs) DBSA-02 (5 ft bgs)	0.0049 mg/kg (DBSA-01)
Toluene	DBSA-27 (10 ft bgs) DBSA-29 (10 ft bgs)	0.00027 mg/kg (DBSA-27)

Analytical results for VOC, SVOC, and OCP analyses performed on samples collected from shallow soil intervals at the 21 presumed background soil locations were used to assess whether the sampling locations had been impacted by other anthropogenic sources. Given (1) the relatively low reported organic chemical detections, (2) the fact that they are associated with soil intervals appreciably shallower than those assessed for background metals and radionuclide data, and (3) the lack of historical uses associated with the sampling locations, there do not appear to have been significant impacts from other anthropogenic sources and there is no evidence suggesting that the use of the metals and radionuclide data from this investigation for determining background conditions would not be appropriate.

Criterion VI – Data Quality Indicators

DQIs are used to verify that sampling and analytical systems used in support of project activities are in control and the quality of the data generated for this project is appropriate for making decisions affecting future activities. The DQIs address the field and analytical data quality aspects as they affect uncertainties in the data collected. The DQIs include precision, accuracy, representativeness, comparability, and completeness (PARCC). The project QAPP provides the definitions and specific criteria for assessing DQIs using field and laboratory QC samples and is the basis for determining the overall quality of the dataset. Data validation activities included the evaluation of PARCC parameters, and all data not meeting the established PARCC criteria were qualified during the validation process using the guidelines presented in the National Functional Guidelines (USEPA 1999 and 2004).

Precision is a measure of the degree of agreement between replicate measurements of the same source or sample. Precision is expressed by relative percent difference (RPD) between replicate measurements. Replicate measurements can be made on the same sample or on two samples from the same source. Precision is generally assessed using a subset of the measurements made. The precision of the data was evaluated using several laboratory QA/QC procedures such as ~~field duplicates,~~ laboratory duplicates, laboratory control sample (LCS) and laboratory control sample duplicate (LCSD), and MS and MSD results. The review of the results of these procedures showed that field duplicate and laboratory duplicate imprecision does occurwas noted, but the imprecision is sporadic and not specific to any one analyte or sample, as demonstrated in the data usability tables where all of the qualified data are presented (Appendix E). Field duplicate imprecision affects one pair each of barium, bromide, bromine, chromium (VI), cobalt, fluoride, manganese, silicon, sodium, strontium, total kjeldahl nitrogen, and tungsten, two pairs each of lead, and palladium, and three pairs for nitrate (as N), sulfate, and total organic carbon. One result for uranium-238 was qualified based on laboratory duplicate imprecision. Therefore, there do not appear to be any wide-spread data usability issues associated with precision. Note that field duplicates are treated as independent samples in the statistical analysis of the deep background data. Review of the data indicated that the variability of the field duplicates was similar to the variability across background samples.

Accuracy measures the level of bias that an analytical method or measurement exhibits. To measure accuracy, a standard or reference material containing a known concentration is analyzed or measured and the result is compared to the known value. Several QC parameters are used to evaluate the accuracy of reported analytical results:

- Holding times and sample temperatures;
- LCS percent recovery;
- MS/MSD percent recovery;
- Spike sample recovery (inorganics)
- Surrogate spike recovery; and
- Blank sample results.

As mentioned in the Criterion V discussion, several data points were rejected based on accuracy issues due to sample temperature (VOCs only) and low MS recoveries for total cyanide, chlorine and chloride. The rejection of these data points is not anticipated to affect the quality of the metals and radionuclide deep background data. There is a potential that high temperatures contributed to loss of VOCs and an impacted area could have been missed. However, data requiring rejection due to sample temperature were limited to two samples (DBSA-1-Q-5 and DBSA-1-Q-10). There were a number of other VOC samples with usable data to provide that determination as discussed under Criterion V.

One sample (DBSA-1-Q-50) for chlorine and chloride was rejected due to low MS recoveries. Thirteen results for total cyanide (DBSA-27-Q-60, DBSA-27-Q-70, DBSA-27-Q-80, DBSA-27-Q-90, DBSA-T-100, DBSA-32-Q-20, DBSA-32-Q-30, DBSA-32-Q-40, DBSA-32-Q-50, DBSA-32-Q-60, DBSA-32-Q-70, DBSA-32-T-80, and DBSA-32-T-95) were rejected due to low MS recoveries. While eight percent of total cyanide results were rejected, its effect on the usability of the dataset is likely minimal due to the usability of other total cyanide results as well as the broad spectrum of chemical classes which underwent analysis. Detailed discussions of and tables with specific exceedances, with respect to precision and accuracy, are provided in the data usability tables (Appendix E) and in the NDEP-approved DVSR (BRC and ERM 2008) (Appendix B).

Representativeness is the degree to which data accurately and precisely represent a characteristic of the population at a sampling point or an environmental condition (USEPA 2002). There is no standard method or formula for evaluating representativeness, which is a qualitative term. Representativeness is achieved through selection of sampling locations that are appropriate relative to the objective of the specific sampling task, and by collection of an adequate number of samples from the relevant types of locations. The sample data collected are representative of background conditions for the lithologies identified. The deep background data were collected in accordance with the SOPs developed for the BMI Common Areas as provided in the FSSOP (BRC, ERM and MWH 2008). Therefore, the sampling protocols are representative of the protocols being used to collect the data to which the deep background data will be compared. There were preservation issues in regards to high temperatures of the storage coolers; however, this will have little to no effect on the quality of the metals and radionuclide data. The organic data was collected only to determine if there were anthropogenic sources and only two VOC samples were severely affected enough to require rejection. This is not likely to have affected the determination regarding anthropogenic sources.

Completeness is commonly expressed as a percentage of measurements that are valid and usable relative to the total number of measurements made. Analytical completeness is a measure of the number of overall accepted analytical results, including estimated values, compared to the total number of analytical results requested on samples submitted for analysis after review of the analytical data. A small subset of the data was eliminated due to data usability concerns. The percent completeness for the dataset is 98 percent.

Comparability is a qualitative characteristic expressing the confidence with which one dataset can be compared with another. The desire for comparability is the basis for specifying the analytical methods; these methods are consistent with those used in the 2005 BRC/TIMET shallow background soil and the 2008 supplemental shallow background soil datasets. The comparability goal is achieved through using standard techniques to collect and analyze representative samples and reporting analytical results in appropriate units. As mentioned before, the data were collected in accordance with the SOPs developed for the BMI Common Areas as provided in the FSSOP (BRC, ERM and MWH 2008) and samples were analyzed in accordance with the project QAPP (BRC and ERM 2009b). Therefore, the sampling techniques and analytical procedures for the deep background are comparable to other data collected for the BMI Common Areas. Despite this, as discussed in more detail in Sections 2.2 and Section 3.54, the 2008 deep background datasets have variable SQLs for certain metals. In the case of antimony, cadmium, chromium (VI), selenium, and silver, thallium, and tungsten, all of which have relatively low frequencies of detection, the variable SQLs result in difficulties in differentiating whether the background datasets are actually different or merely an artifact of detection limits. Similar problems could arise during comparisons of background datasets to Site samples.

3.0 STATISTICAL METHODS

The exploratory data analysis and statistical evaluation of data for deep background soils generally followed industry-standard guidance documents (USEPA 2006a,b; Navy 1999, 2002) and standards agreed upon with NDEP, including the *Guidance on the Development of Summary Statistics Tables* (NDEP 2008c). These guidance documents discuss the use of statistical plots, calculation of summary statistics ~~(such as the arithmetic mean)~~, treatment of non-detect data, and selection of statistical tests. In addition, the statistical approaches employed are consistent with those used in prior background data evaluations performed for the BMI Common Areas and vicinity (BRC/TIMET 2007; BRC and ERM 2009a ~~[in review]~~). The following sections discuss data preparation, statistical plots, summary statistics and statistical tests, and the types of comparisons conducted.

3.1 DATA PREPARATION

3.1.1 Spatial Independence Assumptions

There are 21 soil boring locations that were sampled for the deep soil background dataset, for a total of 173 samples from various depth intervals,[10] including field duplicates. The 21 soil boring locations/173 samples are treated as spatially independent in this background soil study. The concentrations of each analyte at each sample location and depth is dependent on the origin of the sediment and the composition of the parent material (with the exception of anthropogenic deposition of analytes such as lead).

Naturally occurring variability is associated with the deposition of sediments, and these variations may never be fully characterized and result in unexplainable data clusters. The naturally occurring variability may be impacted by sediment transport, leaching, weathering, and other geochemical processes within the alluvium; therefore, when statistical tests are performed, it is expected that some spatial correlation may be seen, but the impact of this on the background evaluation is assumed to be negligible. All background data~~, and all sampling locations~~ were ~~therefore~~ treated as independent in the statistical tests and calculations performed for this study. Treating the data points as independent is more conservative since the larger number of samples will result in narrower confidence intervals when comparing the background data to Site data.

[10] This tally includes only those samples that are associated with intervals deeper than 10 feet bgs, and were analyzed for metals and/or radionuclides. Some sample locations/depths were analyzed for hexavalent chromium only; in addition, not all sample locations/depths were analyzed for radionuclides. For this reason the totals from the text and Table 1 do not match the metal/radionuclide-specific total sample numbers in Table 2.

Note also that the sample results from the 25 field duplicates were also treated as independent. There is no obvious indication in the data that the variance between duplicate results is very different than the variance between other sample results.

3.1.2 Data Filtering Rules

As discussed in Section 2.3, results generated during the deep soil background investigation were validated. In order to prepare the metals and radionuclide datasets for statistical evaluation, the following results were removed from the dataset:

- All laboratory QC samples;
- All rejected (R-qualified) data; and
- Non-metals/non-radionuclides (*e.g.*, organic analyses, percent moisture).

Split samples, which are typically not included in datasets subjected to statistical analysis, were not collected during the deep soil background investigation; field duplicates were collected separately from their original sample and are thus considered independent samples that can appropriately be included in the statistical analyses.

3.1.3 Treatment of Data Qualified as Non-Detections

When radionuclides were not detected at activities greater than the MDA, the laboratory reported the measured activity. Treatment of radionuclide data qualified as non-detections followed U.S. Department of Energy (DOE) guidance (DOE 1997), which states that, for radionuclide activity data:

> "All of the actual values, including those that are negative, should be included in the statistical analysis. Practices such as assigning a zero, a detect limit value, or some in-between value to the below-detectable data point, or discarding those data points can severely bias the resulting parameter estimates and should be avoided."

Therefore, for radionuclides, the actual reported activities (in pico Curies per gram [pCi/g]) were used without censoring to calculate all descriptive statistics (Tables 4 through 14), prepare plots (*e.g.*, boxplots), and conduct statistical analyses presented in this report.

For metals, a value of one-half the SQL was used as a replacement value for non-detected data for parametric and nonparametric analysis of variance (ANOVA, Kruskal-Wallis tests), and calculation of parametric and nonparametric correlation coefficients. The summary statistics (Tables 4 through 14) and plots (boxplots, individual value plots, and probability plots in Appendix F) incorporate the full SQL for non-detects.

It should be noted that the method detection limit (MDL) is established by the laboratories and represents the minimum concentration of a substance that can be measured and reported with 99 percent probability that the analyte concentration is greater than zero. MDLs are established using matrices with little or no interfering species using reagent matrices and are considered the lowest possible reporting limit. Often, the MDL is represented as the instrument detection limit.

The SQL is defined as the MDL adjusted to reflect sample-specific actions, such as dilution or use of smaller aliquot sizes, and takes into account sample characteristics, sample preparation, and analytical adjustments. It represents the sample-specific detection limit and all non-detected results are reported to this level. BecauseTherefore, because the SQL is a sample-specific detection limit, for the dataset as a whole there may be instances where the maximum non-detect value may be higher than the lowest detected concentration, the median SQL for a chemical in a dataset is greater than the median detected concentration, or median SQL for non-detects are different acrossfor different datasets. It is recognized that these limitations may compromise statistical analyses in this report and potential future background comparisons.

3.1.4Identification and Treatment of Outliers

The data collected for this study are intended to represent background conditions for the deeper soils of the BMI Common Areas. Several lines of evidence are used to verify that these data are representative of these background conditions. For example, background soil samples were collected from known/suspected unimpacted areas upgradient of the Site industrial areas, and the organic chemical data did not provide compelling evidence suggesting that data were inappropriate for characterizing background conditions (Criterion V of Section 2.4). A further line of evidence involves an evaluation of outliers in this background dataset. Statistical outliers are data points that are extremely large or small relative to the rest of the data, and may not, therefore, be representative of the population sampled (USEPA 2000a).

For this investigation, boxplots[11], individual value plots, and probability plots were used to identify statistical outliers that would undergo further examination (see Appendix F). If an outlier was identified, the next step was to confirm that the datum was not a result of a transcription or other verifiable error. If confirmed not to be an error, correlation analyses were conducted and used to identify those constituent pairs that should be visually examined in scatterplots to ascertain whether high-concentration outliers were consistent with the background dataset (see Section 3.7.4).[12]

Based on the overall findings of the outlier analysis, statistical outliers represented only a small proportion of the entire dataset[13] and no consistent pattern was observed among outliers. This supports the premise that these data are representative of naturally occurring background conditions. Given the lack of scientifically defensible reasons to consider these statistical outliers to be incongruous with background conditions (*i.e.*, "true" outliers), these data were considered representative of background and retained in the deep background soil dataset.

3.2 STATISTICAL PLOTS

Statistical plots are used in exploratory data analysis to show characteristics and relationships of the data, to evaluate fit to a normal distribution, to identify anomalous data points or outliers, and to provide a general overview of the data. Probability plots, boxplots, and individual value plots were constructed as part of the data evaluation for this investigation. Preliminary evaluation of the data included an assessment of data characteristics through graphical and quantitative analysis. The deep soil background data were summarized overall and by stratigraphic classification (*i.e.*, Qal/McCullough source, Qal/River source, Qal/Mixed source, and UMCf), with data plotted for the various groupings. The graphical analysis of the deep soil background analytical data is described in the following sections, and Appendix F contains the following statistical plots for the datasets, grouping data for each dataset by chemical:

- A series of boxplots for the 2008 deep soil dataset, along with the 2005 BRC/TIMET and 2008 Supplemental shallow soil datasets;

[11] Statistical outliers within the 2008 deep dataset were defined as those points corresponding to detected metal concentrations or radionuclide activities (*i.e.*, ignoring non-detection report limit artifacts) that were greater than 1.5 times the interquartile range for the (i) combined depth plots and (ii) individual depth plots, and are shown as an asterisk (*) on the boxplots (see Section 3.2).
[12] Scatterplots and correlation analyses were performed with the statistical outlier included in the dataset.
[13] It is not unusual for a dataset of this size to have some outliers.

- A series of probability plots for the 2008 deep soil dataset;
- A series of individual value plots for the 2008 deep soil dataset; and
- A series of boxplots for the Qal/McCullough, Qal/Mixed, and Qal/River units for each of the depths evaluated (0 ft bgs, 10 ft bgs, and deep samples).

Probability Plots. The distribution plots for each chemical include a probability plot that shows how well the dataset for the chemical fits a normal or lognormal distribution. Probability plots are also useful to visually identify outliers and to evaluate the possible presence of multiple populations within a dataset. For this study, probability plots are also useful for comparing datasets for the various lithologies evaluated. Potential multiple populations may be identified by inflection points on the probability plot when initially exploring the data. However, inflection points are not defined statistically, have been found to be unreliable, and should be used with considerable caution (DON 2002).

The probability plots are graphs of values, ordered from lowest to highest and plotted against a standard normal or lognormal distribution function. The vertical axis is scaled in units of concentration (or activity, in the case of radionuclides), and the horizontal axis is scaled in units of the normal/lognormal distribution function. The vertical scale is plotted as a linear scale (concentration versus normal/lognormal quantile) and populations of data that plot approximately as a straight line in a linear scale are referred to as normally distributed (or lognormally distributed).

Boxplots. Boxplots provide a method for comparing data groupings or datasets side by side. The boxplots simultaneously display the full range of data, as well as key summary statistics, such as the median, 25th and 75th percentiles, and minimum and maximum values. A boxplot is a box (a rectangle) with lines. The length of the box is the interquartile range; therefore, the box represents the middle 50 percent of the data. The top and bottom of the box are the 25th and 75th percentiles of the distribution. The width of the box is arbitrary. The line in the middle of the box depicts the median value (the 50th percentile) of the population. The upper (lower) whisker extends to the highest (lowest) data value within the upper (lower) limit. Where the upper (lower) limit = third (first) quantile + (-) 1.5 * [third quantile-first quantile]. These plots show the symmetry of the dataset, the range of data, and a measure of central tendency (median). Symbols used for the data points distinguish between detections (filled circle) and non-detect (open circle) results.

As noted in the previous section, probability and boxplots were used for identifying anomalous data points (outliers) and data clusters in the deep soil background dataset. All anomalous data points and clusters were investigated further. As indicated above, outliers shown on the boxplots are indicated with a * symbol.

The plots in Appendix F are presented to provide a comprehensive overview of the deep soil background dataset for soils and to compare the different stratigraphic units. The plots also compare the deep background dataset to the 2005 and 2008 shallow soil background datasets.

Scatterplots. A scatterplot uses a Cartesian coordinate system to display values for two variables for a set of data. The data are displayed as a collection of points, each having the value of one variable determining the position on the horizontal axis and the value of the other variable determining the position on the vertical axis.

Scatterplots were constructed for those constituent pairs with significant correlation coefficients (Appendix H). Scatterplots were visually examined and best professional judgment was used to ascertain whether high concentration outliers occur "near" the least-square linear trend line. Where high-concentration outliers occur "near" the trend line, one may infer that these concentrations are consistent with background concentrations.

3.3 DESCRIPTIVE SUMMARY STATISTICS

Descriptive summary statistics for metals and radionuclides were calculated for the deep soil background dataset (Table 4 for all deep units combined, and Tables 5 through 8 for deep units Qal/McCullough, Qal/River, Qal/Mixed, and UMCf, respectively). The descriptive summary statistics calculated for each analyte include the sample size, number of detections, the minimum and maximum concentration, the median, the mean, and the 25th and 75th percentiles (quantiles); separately for both censored and detected data. Note that frequency of detection is calculated for radionuclides in terms of the proportion of sample results that are greater than the sample specific MDA. However, for all other radionuclide data summaries and statistical analyses the uncensored data are used (see Section 2.4).

For comparison purposes, Tables 9 through 14 present descriptive summary statistics for the Qal/River data collected during the 2008 Supplemental shallow soil investigation,[14] and the Qal/McCullough and Qal/Mixed data collected during the 2005 shallow soil investigation, respectively.

3.4 IDENTIFICATION AND TREATMENT OF OUTLIERS

The data collected for this study are intended to represent background conditions for the deeper soils of the BMI Common Areas. Several lines of evidence are used to verify that these data are representative of these background conditions. For example, background soil samples were collected from known/suspected unimpacted areas upgradient of the Site industrial areas, and the organic chemical data did not provide compelling evidence suggesting that data were inappropriate for characterizing background conditions (Criterion V of Section 2.4). A further line of evidence involves an evaluation of outliers in this background dataset. Statistical outliers are data points that are extremely large or small relative to the rest of the data, and may not, therefore, be representative of the population sampled (USEPA 2000a).

For this investigation, boxplots[15], individual value plots, and probability plots were used to identify statistical outliers that would undergo further examination (see Appendix F). If an outlier was identified, the next step was to confirm that the datum was not a result of a transcription or other verifiable error. If confirmed not to be an error, correlation analyses were conducted and used to identify those constituent pairs that should be visually examined in scatterplots to ascertain whether high-concentration outliers were consistent with the background dataset (see Section 3.7.4).[16]

Based on the overall findings of the outlier analysis, statistical outliers represented only a small proportion of the entire dataset[17] and no consistent pattern was observed among outliers. This

[14] Qal/River data from the 2005 BRC/TIMET background dataset were not used in this report. The 2005 BRC/TIMET Qal/River data are considered more representative of the southern part of the River Mountains; while the site is closer to the northern part of the River Mountains range. The Qal/River data from the 2008 Supplemental shallow soil background investigation are considered more representative of northern part of the River Mountains and therefore more applicable for use for the Site. Additional discussion on this issue is provided in the *2008 Supplemental Shallow Soil Background Report* (BRC and ERM 2009a).~~2009 [in review]).~~

[15] Statistical outliers within the 2008 deep dataset were defined as those points corresponding to detected metal concentrations or radionuclide activities (*i.e.*, ignoring non-detection report limit artifacts) that were greater than 1.5 times the interquartile range for the (i) combined depth plots and (ii) individual depth plots, and are shown as an asterisk (*) on the boxplots (see Section 3.2).

[16] Scatterplots and correlation analyses were performed with the statistical outliers included in the dataset.

[17] It is not unusual for a dataset of this size to have some outliers.

supports the premise that these data are representative of naturally occurring background conditions. Given the lack of scientifically defensible reasons to consider these statistical outliers to be incongruous with background conditions (*i.e.*, "true" outliers), these data were considered representative of background and retained in the deep background soil dataset.

~~3.4~~3.5 FREQUENCY OF DETECTION

As noted in Section 2.2, antimony, cadmium, chromium (VI), tungsten, and silver were detected at noticeably higher frequencies in the deep background samples than in those from the shallow background investigations, and mercury, selenium and thallium were detected at noticeably lower frequencies in the 2008 deep samples than in the shallow background studies. The statistical summaries in Tables 4 through 14 were evaluated to assess the likely influence of SQLs on these observed detection frequencies. This evaluation determined that variations in SQLs are likely to have had effects on detection frequencies for certain constituents (*i.e.*, antimony, cadmium, selenium, and silver), as summarized below.

Antimony	**2008 Deep Data**	**2008 Supplemental Shallow Data**	**2005 Shallow Data**
Number of Samples	163	33	120
Percent Detection[18]	95.1%	39.4%	40.8%
Mean SQLs for Non-Detects (mg/kg)	0.105	0.126	0.0394 to 0.33
Mean Detected Concentration (mg/kg)	0.148 to 0.222	0.318 to 0.378	0.19 to 0.287
Assessment of SQL Effects on FOD	The 2005 and 2008 shallow soil FOD for antimony are comparable, at less than half the FOD of the 2008 deep data. For the 2008 shallow data, the mean SQLs are lower than the mean detections, and it is assumed~~assumed~~ that SQLs~~reporting limits~~ are not affecting the FOD. However~~However~~, the upper range of mean SQLs for the 2005 shallow data is higher than the ranges of mean detections, and SQLs~~reporting limits~~ are suspected~~suspected~~ as being potential contributors to the lower FOD for that event.		

[18] For all summary tables in this section, the number of samples and value for Percent Detection entries reflect the full dataset for each event, as taken from Table 2. The range of values provided for the mean SQL and mean detection were derived from Tables 5 through 8 (2008 Deep Data), Tables 9 and 10 (2008 Supplemental Shallow Data), and Tables 11 through 14 (2005 Shallow Data). In cases where there was no variation between the mean values a single value is provided herein.

Cadmium	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Number of Samples	163	33	120
Percent Detection	85.3%	63.6%	13.3%
Mean SQLs for Non-Detects (mg/kg)	0.01	0.04	0.129
Mean Detected Concentration (mg/kg)	0.0871 to 0.109	0.108 to 0.144	0.11 to 0.133
Assessment of SQL Effects on FOD	The cadmium detections are comparable across the sampling events, primarily estimated results. The mean non-detect SQLs for the 2005 data are substantially higher than for the other events, and are higher than the majority of the detections during the three events. Based on this, it is likely that the higher SQLs of the 2005 event are one cause of differences in FODs between the 2008 and 2005 sampling events.		

Chromium (VI)	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Number of Samples	158	33	104
Percent Detection	24.1%	0%	0%
Mean SQLs for Non-Detects (mg/kg)	0.1617 to 0.2118	0.4143 to 0.5645	0.25 to 0.32261
Mean Detected Concentration (mg/kg)	0.19 to 0.41	- -	- -
Assessment of SQL Effects on FOD	The deep soil detections are primarily estimated results. The SQLs for the 2008 deep data are lower than those associated with the 2008 shallow and 2005 event. The upper range of detections in the 2008 deep data are higher than the 2005 SQLs, however, many of the reported detections for the 2008 deep data are lower than the SQLs for the 2005 data, and the 2008 deep detections are generally lower than the SQLs for the 2008 shallow data. Based on this, it is possible that the higher SQLs of the shallow events are one cause of differences in FODs between the deep and shallow sampling events. However, because many of the detections in the 2008 deep data are higher than SQLs for the 2005 shallow data (and therefore should have been detected if present), lithologic differences may also contribute to the differences in FOD between the 2005 shallow and 2008 deep data.		

Mercury	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Number of Samples	151	33	120
Percent Detection	36.4%	0%	77.5%
Mean SQLs for Non-Detects (mg/kg)	0.00668	0.00668	0.0072
Mean Detected Concentration (mg/kg)	0.00832 to 0.0126	- -	0.0145 to 0.0247

Mercury	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Assessment of SQL Effects on FOD	The 2005 mercury detections are higher than those associated with the 2008 event. Both the 2005 and 2008 detections are primarily estimated results. The non-detect SQLs for all three events are comparable, and are an order of magnitude lower than most of the reported detections. Therefore, it does not appear that variations in SQLs~~reporting limits~~ are the causes of variations in the FODs, and the FOD variations are more likely due to lithologic differences.		

Selenium	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Number of Samples	163	33	120
Percent Detection	0%	0%	43.3%
Mean SQLs for Non-Detects (mg/kg)	0.32 to 0.323	0.32	0.158
Mean Detected Concentration (mg/kg)	- -	- -	0.13 to 0.34
Assessment of SQL Effects on FOD	The 2008 selenium SQLs for non-detections are higher than those associated with the 2005 event, and are higher than the 2005 detections. Therefore, it is likely that the higher SQLs of the 2008 events are one cause of differences in FODs between the 2008 and 2005 sampling events.		

Silver	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Number of Samples	163	33	120
Percent Detection	100%	42.4%	13.3%
Mean SQLs for Non-Detects (mg/kg)	- -	0.11	0.261
Mean Detected Concentration (mg/kg)	0.135 to 0.251	0.0743 to 0.126	0.056 to 0.0613
Assessment of SQL Effects on FOD	The 2005 SQLs for non-detects are higher than the majority of the detections during the other two events. Therefore, it is likely that the higher SQLs of the 2005 event are one cause of differences in FODs between the 2008 and 2005 sampling events. However, the 2008 shallow soil SQLs are adequately low such that detections in the ranges observed in the deep soil samples would be reported. Based on this, differences in the lithologic units (shallow vs. deep) also appear to account in part for the FOD differences.		

Thallium	2008 Deep Data	2008 Supplemental Shallow Data	2005 Shallow Data
Number of Samples	163	33	120
Percent Detection	2.5%	18.2%	35%
Mean SQLs for Non-Detects (mg/kg)	0.2 to 0.202	0.3	0.543

Mean Detected Concentration (mg/kg)	0.228	0.758	0.853 to 1.33
Assessment of SQL Effects on FOD	The 2005 dataset has a higher FOD than the 2008 datasets, despite the fact that the 2005 SQLs are higher than those associated with the 2008 events. The 2005 detections are higher than the range of the 2008 SQLs. Therefore, it is likely that the differences in SQLs are one cause of differences in FODs between the 2008 and 2005 sampling events.~~Based on this, it does not appear that variations in reporting limits are the causes of variations in the FODs, and the FOD variations are more likely due to lithologic differences.~~		

Tungsten	**2008 Deep Data**	**2008 Supplemental Shallow Data**	**2005 Shallow Data**
Number of Samples	163	33	104
Percent Detection	33.1%	6.1%	0%
Mean SQLs for Non-Detects (mg/kg)	0.2 to 0.203	0.5	0.0175
Mean Detected Concentration (mg/kg)	0.38 to 0.454	0.96 to 1.0	- -
Assessment of SQL Effects on FOD	The 2005 SQLs for non-detects are an order of magnitude lower than those for the 2008 data, which had a much higher FOD. The 2008 detections are higher than the 2005 SQLs. Therefore, it is likely that the differences in SQLs are one cause of differences in FODs between the 2008 and 2005 sampling events.~~Based on this, it does not appear that variations in reporting limits are the causes of variations in the FODs, and the FOD variations are more likely due to lithologic differences.~~		

As noted above in Section 3.~~1.~~4, review of the statistical plots identified several outliers in the dataset. As discussed in Section 3.~~1.~~4, several outliers were associated with constituents with large percentages of non-detections (*i.e.*, boron, chromium (VI), mercury, niobium, platinum, selenium, thallium, and tungsten). With the exception of these samples, there were no other samples that exhibited consistent outliers (high or low biased) in the datasets, and there is no consistent pattern to the data that would suggest that the data are not indicative of naturally occurring background conditions.

~~3.5~~3.6 STATISTICAL METHODS

The main statistical problem is~~was~~ to determine if the background data are from more than one background population based on statistical comparisons of data from (1) different geological settings, including 2008 Deep Soil investigation, 2008 Supplemental Shallow investigation and 2005 BRC/TIMET investigation sample locations; and (2) sampling depth intervals (0 to 0.5 feet, 9 to 11 feet and Deep soils [≥ 20 ft bgs]). To answer these questions, several groups of data were compared using statistical tests and statistical plots (Section 3.2). These included comparison of the following datasets:

- Comparison of the 2008 deep soil dataset among stratigraphic units (Qal/McCullough, Qal/River, Qal/Mixed, and UMCf);
- The Qal/McCullough unit datasets - deep data from the 2008 Deep Soil Background investigation, and surface soil and 10 ft bgs data from the 2005 BRC/TIMET dataset;
- The Qal/River unit datasets - deep data from the 2008 Deep Soil Background investigation, and surface soil and 10 ft bgs data from the 2008 Supplemental Shallow dataset; and
- The Qal/Mixed unit datasets - deep data from the 2008 Deep Soil Background investigation, and surface soil and 10 ft bgs data from the 2005 BRC/TIMET dataset.

In addition, prior to conducting these analyses, comparison of the data associated with the Qal units (McCullough, River, and Mixed) was performed to determine whether data categorized as Mixed was statistically different from the other two units. If no significant differences were observed between the Qal/Mixed data and one or both of the other Qal units, the Qal/Mixed data would have been moved into one of the other Qal datasets as appropriate. However, as discussed below, the Qal/Mixed data were found to exhibit significant differences from the other two Qal units; thus it was retained as a separate Qal unit.

~~3.5.1~~3.6.1 Hypothesis Testing

A common application of statistics is to test a scientific hypothesis. A statistical test examines a set of sample data and, based on the underlying distribution of the data, leads to a decision whether to (i) accept[19] the hypothesis or (ii) reject the hypothesis in favor of accepting an alternative complementary one (Sokal and Rohlf 1981). Accordingly, statistical hypotheses are framed in terms of a null hypothesis (H_o) and an alternative hypothesis (H_a).

In this study, ANOVA/Kruskal-Wallis tests were used to evaluate the null hypothesis that mean/median concentrations are the same among several background populations for a specific

[19] Note that according to classical statistics, the null hypothesis is never proven, as the absence of evidence against the null hypothesis does not establish it. In other words, strictly speaking, one may either "reject" or "fail to reject" the null hypothesis. However, for this study and as commonly used in practice, the term "accept" is used instead of "fail to reject" the null hypothesis (Sokal and Rohlf 1981~~19981~~).

constituent; conversely, the rejection of the null hypothesis results in the acceptance of the alternative hypothesis that the mean/median concentrations are different.

Correlation testsanalysis were used to characterize the relationship (or lack thereof) between concentrations of two constituents. The null hypothesis is that there is no correlation between two constituents (*i.e.*, ., no inter-element correlation); conversely, should this null hypothesis be rejected, one would accept the alternative hypothesis and infer that there exists a relationship (positive or negative) in concentrations between the two constituents.[20]. These hypotheses were also discussed in the BRC/TIMET (2007) report.

3.5.23.6.2 Statistical Tests

Statistical analyses were conducted to infer whether background datasets are comparable and whether there exist relationships between concentrations of some of the metalselements. A key characteristic of statistical analyses is whether a parametric or nonparametric statistical test is used. Parametric statistical tests used in this evaluation of deep background concentrations assume the following:

- Samples are independent and drawn randomly from the population.
- Data are normally distributed for each population.

Nonparametric methods/tests are not dependent on a specific distribution (*e.g.*, normal distribution) (Singh and Singh 2007; Gilbert 1987; Sokal and Rohlf 1981; Zar 1984).[21] These methods do not require estimates of the population variance or mean. Nonparametric statistical tests assume that samples are independent and drawn randomly from the population.

Methods used to evaluate and compare the data groups for this deep background dataset are summarized below. The parametric and nonparametric multiple population comparisons and correlation analyses were performed using SPSS v. 15.[22] Given this study examined potential differences among deep background datasets, two-tailed tests were performed. Consistent with

[20] See Section 3.6.2.4 (Correlation Analysis).
[21] Accordingly, nonparametric tests are also known as distribution-free tests.
[22] The substitution of one-half of the SQL was used for non-detects for Kruskal-Wallis (Section 3.6.2.1) and Kendall tau (Section 3.6.2.4) analyses.

previous studies of background concentrations at BRC (e.g., (BRC/TIMET 2007)), a level of significance (α) equal to 0.05 was used to evaluate the tests (BRC/TIMET 2007).[23]

3.5.2.13.6.2.1 *Multiple Independent Sample Tests*[24]

One-Way Analysis of Variance (ANOVA). The parametric one-way ANOVA tests the hypothesis that multiple (*k*) population means are equal (Sokal and Rohlf 1981; Gilbert 1987; Zar 1984). Where one-way ANOVAs indicated the existence of significant differences among soil strata, the Tukey Honestly Significant Difference (HSD) test (Tukey 1953) was used to conduct pair-wise *post-hoc* comparisons.[25]

Kruskal-Wallis Test. The Kruskal-Wallis test is a nonparametric analog for the one-way ANOVA that is based on ranks and is used to test the equality of medians among multiple (*k*) populations. The underlying distributions of datasets being tested are assumed to have approximately the same shape. The Kruskal-Wallis tests the null hypothesis that several populations have the same continuous distribution. If the null hypothesis is rejected, one may infer that measurements tend to be higher in one or more of the populations. Fundamentally, this test is analogous to a parametric one-way ANOVA with the exception that the measured/observed values are replaced by their ranks. Accordingly, it is an extension of the Wilcoxon-Mann-Whitney test for three or more groups. Where Kruskal-Wallis tests indicated the existence of significant differences among soil strata, examinations of boxplots were used to evaluateconduct pair-wise *post-hoc* comparisons.[26]

3.6.2.2 *Adjustment for Use of Multiple Tests*

An adjustment may be applied when multiple hypotheses a single hypothesis of no effect areis tested using more than one statistical test. Note that by random chance alone, approximately 1 out of every 20 hypothesis tests on the same dataset is expected to be statistically significant at a level of 0.05 if the tests are independent (α = 0.05; Sokal and Rohlf 1981). Accordingly, an adjustment may be applied to safeguard against falsely giving the appearance of statistically significant results when a single hypothesis is tested using multiple statistical tests.

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[23] Where appropriate, a confidence level (1-α) of 95 percent confidence was used.
[24] Results of both the parametric ANOVA and the nonparametric Kruskal-Wallis tests are provided.
[25] Note that only *post-hoc* (= *a posteriori*) comparisons were conducted.
[26] One-half the SQL was substituted for non-detected concentrations. Visual examinations of boxplots were used to conduct *post-hoc* pairwise comparisons.

In this background study, adjustment for the use of multiple tests was performed for the two applications listed below. Note that the conservatism of using the family-wise significance level for individual tests was recognized and marginally significant"close" results were identified.

Differences Among Background Populations Based on Tests For Multiple Constituents. Differences among lithologies or depth intervals were evaluated based on the findings of ANOVA/Kruskal-Wallis tests for each of 46 metals and radionuclides. As noted earlier, due to random chance alone, 1 out of every 20 hypothesis test on the same data is expected to be statistically significant at a significance level of 0.05 ($\alpha = 0.05$). For ANOVA/Kruskal-Wallis tests, a qualitative adjustment was applied when evaluating whether lithologies or depth intervals were different based on comparisons for multiple constituents. For this study, a nominal family-wise significance level of 0.05 was desired; thus, lithologies and depth intervals were considered different when more than five percent of all the ANOVA/Kruskal-Wallis tests were found to be significantly different.[27]

Multiple Post-Hoc Pairwise Comparisons. When ANOVA identified a statistically significant difference among lithologies or among depth intervals, the Tukey's HSD was used to identify which pairs of lithologies or which pairs of depth intervals were different. Tukey's HSD uses the Studentized range statistic to make all pairwise comparisons between groups and adjusts the investigation-wise error rate to the error rate for the collection offor all pairwise comparisons (SPSS 2006).

3.5.2.33.6.2.3 Examination of Constituents with Less than 50 Percent Frequency of Detection.

When frequency of detections is less than 50 percent, even the nonparametric tests have little power to detect differences in central values (Smeti *et al*. 2007). For those constituents where the frequency of detection was less than 50 percent, multiple independent sample tests were not conducted. The following approach was conducted:

[27] Application of a Bonferroni adjustment of 1/n of the significance level for each individual test was considered to afford an overly conservative assurance of making a Type I error (*i.e.*, rejecting a true null hypothesis).

1. For individual constituent datasets in which SQLs are similar, a Z-test for two proportions was conducted[28] to identify similarities in datasets based on the proportion of detected concentrations.

2. For individual constituent datasets in which SQLs are similar and SQLs are higher than detections, where the proportion of detected concentrations is found to be similar and the number of detected concentrations is greater than four (4), multiple independent sample tests were conducted on detected data only.

Note that for constituents with frequency of detections less than 50 percent and SQLs meeting analytical data quality objectives (DQOs), one may only conclude that these constituents are present in background soils.

3.5.2.43.6.2.4 Correlation Analysis

Correlations or "measures of association" are of interest because they offer another line of evidence to confirm that data are consistent with a background dataset. Inter-element correlation analyses were conducted for exploratory purposes and used to identify those constituent pairs that should be further examined (*i.e.*, visualvisually examination of scatterplots) to ascertain whether high-concentration outliers were congruous with the background dataset.

Pearson's Product-Moment Correlation Coefficient. The Pearson product-moment correlation coefficient (r) is a parametric measure of the correlation between two variables (Sokal and Rohlf 1981; Gilbert 1987; Zar 1984). Pearson's correlation reflects the degree of linear relationship between two variables and ranges from +1 to -1. A correlation of +1 means that there is a perfect positive linear relationship between variables. A correlation of -1 means that there is a perfect negative linear relationship between variables. A correlation of 0 means there is no linear relationship between the two variables. The statistical significance of the correlations was also tested.[29]

[28] In this investigation, the Z-test for two of proportions (http://www.dimensionresearch.com/resources/calculators/ztest.html) was used to test the null hypothesis that the proportion of detected concentrations is the same among two datasets. If the null hypothesis is rejected, one may accept the alternative hypothesis and infer that the two populations are different with respect to the proportion of detected data.

[29] For sample size (n), the significance of the Pearson product-moment correlation coefficient (r) is tested using a *t*-test with n–2 degrees of freedom (Sokal and Rohlf 1981):

$$t_s = r \times [(n-2)/(1-r^2)]^{1/2}$$ …compare with $t_{\alpha[n-2]}$

Kendall Tau Correlation Coefficient. The Kendall tau rank correlation coefficient (or Kendall tau coefficient) is a non-parametric statistic used to measure the degree of correspondence between the ranks of two populations. As with the Pearson's correlation coefficient, Kendall tau ranges from +1 to -1. A value of +1 means that there is 100 percent positive association between the two variables—*i.e.*, rankings for both variables are identical. A value of -1 means that there is 100 percent negative association between the two variables—*i.e.*, the ranking of one variable is the reverse of the other variable. A value of zero indicates the absence of an association between the two variables—*i.e.*, rankings are independent. The statistical significance of the correlations was also tested.[30]

~~3.6~~3.7 RESULTS OF STATISTICAL ANALYSES

Key objectives of this investigation are to evaluate whether (1) the 2008 deep soil background dataset is statistically similar to or different across the various lithologies at the Site, and (2) the lithology-specific deep soil background datasets are statistically similar to or different from their counterparts in the 2005 BRC/TIMET background data and the 2008 supplemental shallow soil background data. The results of the following statistical analyses are provided with the intention of supporting a weight-of-evidence evaluation as part of this investigation.

~~3.6.1~~3.7.1 Comparison of All Deep Soil Units (2008 Data)

In this section, the findings of statistical comparisons of the three Qal datasets are presented, followed by a summary of comparison findings between the Qal datasets and the UMCf dataset.

~~3.6.1.1~~3.7.1.1 Comparison of Separate Qal Datasets

The Qal/McCullough, Qal/River, and Qal/Mixed datasets from the 2008 Deep Soil Background investigation were evaluated to determine if the Qal/Mixed dataset should be combined into one or the other datasets for future consideration, including the potential use of the background data (or subsets thereof) for future comparison to Site samples. The results of the statistical analyses are included in Table G-1 of Appendix G. Probability plots, boxplots, and individual value plots

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30 For sample sizes observed in this investigation (n > 40), a normal approximation is used to test the significance of Kendal's tau (τ) (Sokal and Rohlf 1981):

$$t_s = \frac{\tau}{[2(2n+5)/9n(n-1)]^{1/2}}$$ …compare with $t_{\alpha[\infty]}$

were used to semi-quantitatively compare the three datasets. These plots are included in Appendix F.

Overall, statistical comparisons indicated that ~~a number of~~ significant differences existed for 34 of the 46 constituents among the three constituent populations: Qal/McCullough, Qal/River, and Qal/Mixed (Table G-1 ~~may be inferred from the statistical tests~~ of Appendix G). ~~constituent concentrations.~~ The five elements for which no significant differences may be inferred are as follows:

- Aluminum
- Cadmium
- Calcium
- Palladium
- Silver

Statistical tests were not conducted for metals that had fewer than four detections in one or more of the unit-specific datasets ~~(BRC/TIMET 2007)~~. Accordingly, statistical tests were not performed for boron, chromium (VI), niobium, platinum, selenium, thallium, and tungsten and it was not possible to determine whether significant differences were associated with the Qal/McCullough, Qal/River, and Qal/Mixed datasets for these metals.

As seen in Table G-1, the datasets for the remaining 34 elements (metals and radionuclides) had significant differences noted between the 2008 Qal/McCullough, Qal/River, and/or Qal/Mixed datasets for deep background soils. More significant differences were noted between the Qal/McCullough and Qal/River datasets (29 elements) than between the Qal/Mixed and Qal/River datasets (18 elements with significant differences) or the Qal/Mixed and Qal/McCullough datasets (22 elements with significant differences). This is consistent with the geological interpretation that the Qal/Mixed unit is derived from a mixed source with contributions from both the Qal/McCullough and Qal/River units.

In general, for radionuclides, more significant differences in activities may be inferred between the Qal/McCullough and the other two units than between the Qal/Mixed and Qal/River units; the radionuclide detections tended to be higher in the McCullough unit than in the other two units (Table G-1). Neither the Qal/River nor Qal/McCullough datasets had consistently higher metal detections, and Qal/Mixed metal datasets were usually 1) statistically indistinguishable from one or the other units; or 2) mid-range values between the two. Limited exceptions to this rule were observed: barium and chromium detections were higher in the Qal/Mixed dataset than in either the Qal/McCullough or Qal/River datasets, and silicon and sodium detections were lower in the Qal/Mixed dataset than in either the Qal/McCullough or Qal/River datasets.

Based on *post-hoc* comparison tests (Table G-1), the following metals were considered to be present at significantly higher concentrations in the Qal/McCullough dataset than the Qal/River dataset:

- Beryllium
- Cobalt
- Copper
- Iron
- Magnesium
- Manganese
- Molybdenum
- Nickel
- Phosphorus
- Titanium
- Uranium
- Vanadium
- Zirconium

Similarly, the following metals were considered to be present at significantly higher concentrations in the Qal/River dataset than the Qal/McCullough dataset (Table G-1):

- Antimony
- Arsenic
- Barium
- Lead
- Lithium
- Potassium
- Sodium
- Zinc

Given that considerably more than five percent of all the ANOVA/Kruskal-Wallis tests were found to be significantly different, the three deep units were considered to be different. Given significant differences observed among Qal/McCullough, Qal/River, and Qal/Mixed units, data for each of these three units should be retained and used independently for future statistical evaluations to determine if there exists elevated Site concentrations of metals or radionuclides as compared to background. Specific unit- and depth-appropriate use of these data is discussed in Chapter 4 and will be discussed in a subsequent background summary report.

~~3.6.1.2~~3.7.1.2 Comparison of Qal and UMCf Datasets

As discussed above, ~~a number of~~ significant differences in constituent concentrations may be inferred among the three Qal populations (Table G-1). In addition, the analysis determined that no significant differences may be inferred between the UMCf and Qal units for the following metals:

- Aluminum
- Cadmium
- Calcium
- Palladium
- Silver

Statistical tests were not conducted for metals with fewer than four detections in one or more of the unit-specific datasets ~~(BRC/TIMET 2007)~~. Accordingly, statistical tests were not performed for boron, chromium (VI), niobium, platinum, selenium, thallium, and tungsten and it was not possible to determine whether significant differences were associated with the deep unit datasets for these metals.

The datasets for the remaining 34 elements had significant differences noted between the 2008 datasets for deep background soils (Table G-1). More significant differences were noted between the UMCf and Qal/McCullough datasets (28 elements with significant differences) than between the UMCf and Qal/Mixed datasets (12 elements with significant differences) or the UMCf and Qal/River datasets (17 elements with significant differences).

For radionuclides, there were more significant differences between the UMCf and Qal/McCullough than between the UMCf and the Qal/Mixed and/or Qal/River units; the radionuclide detections were higher in the Qal/McCullough unit than in the UMCf (Table G-1). In contrast, the UMCf metal datasets were usually 1) statistically indistinguishable from one or more of the other units; or 2) mid-range values between the three. Limited exceptions to this rule were observed: lithium and magnesium detections were higher in the UMCf dataset than in the other three deep datasets.

3.6.23.7.2 Comparison of Qal/McCullough Unit by Depth (2005 and 2008 Data)

The Qal/McCullough datasets from the 2008 Deep Soil Background and 2005 Shallow Soil Background investigations were evaluated to determine if there were significant differences between them. The specific datasets selected were surface data (2005 investigation), 10 ft bgs data (2005 investigation) and all Qal/McCullough data from depths 20 ft bgs or greater collected during the 2008 Deep Soil background investigation. The results of the statistical analyses are included in Table G-2 of Appendix G. Probability plots, boxplots and individual value plots of the 2008 datasets are included in Appendix F; the boxplots include the 2005 datasets for comparison.

Overall, a number of significant differences in constituent concentrations among the three populations may be inferred from the ANOVAs/Kruskal-Wallis tests. Arsenic, barium, lithium, and molybdenum were the only elements for which no significant differences may be inferred.

No statistical tests were performed for the following metals that had fewer than four detections in one or more of the unit-specific datasets:

- Cadmium
- Chromium (VI)
- Selenium
- Silver

- Niobium
- Platinum
- Thallium
- Tungsten

Because these metals were not subjected to statistical comparisons, it was not possible to determine whether significant differences were associated with the various Qal/McCullough depth intervals for these metals.

The datasets for the remaining 34 elements had significant differences noted between the shallow and deep Qal/McCullough datasets (Table G-2). More significant differences were noted between the surface and deep datasets (29 elements with significant differences) than between the surface and 10 ft bgs datasets (22 elements with significant differences) or the deep and 10 ft bgs datasets (21 elements with significant differences). Metal and radionuclide trends were inconsistent between the units; none of the datasets had consistently higher metal detections, but surface or deep results were more commonly identified as being statistically higher than the other datasets. The 10 ft bgs datasets were usually 1) statistically indistinguishable from one or the other units; or 2) mid-range values between the two. Limited exceptions to this rule were observed: calcium detections were higher in the 10 ft bgs dataset than in either the surface or deep datasets, and five elements (chromium, iron, lead, tin, and thorium-228) were lower in the 10 ft bgs dataset than in either the surface or deep datasets.

Based on *post-hoc* comparison tests, the following 13 elements were considered to be present at significantly higher concentrations in the surface soil dataset than the other two datasets (Table G-2 of Appendix G):

- Aluminum
- Barium
- Boron
- Copper
- Lead
- Manganese
- Nickel
- Phosphorus
- Potassium
- Silicon
- Zinc
- Thorium-232
- Uranium-233/234

The following eight elements were observed to be present at significantly higher concentrations in the deep soil dataset than the other two datasets (Table G-2 of Appendix G):

- Molybdenum
- Sodium
- Titanium
- Uranium
- Vanadium
- Radium-226
- Thorium-230

Given that considerably more than five percent of all the ANOVA/Kruskal-Wallis tests were found to be significantly different, depth intervals within Qal/McCullough unit were considered to be different. Given significant differences observed among depths within the Qal/McCullough unit, data for each of these three background depth intervals (0 ft bgs, 10 ft bgs, and 20+ ft bgs) should be retained and used independently for future statistical evaluations to determine if there exists elevated concentrations of metals or radionuclides as compared to background. Specific unit- and depth-appropriate use of these data is discussed in Chapter 4 and will be discussed in a subsequent background summary report.

~~3.6.3~~3.7.3 Comparison of Qal/River Units by Depth (2008 Data)

The Qal/River datasets from the 2008 Deep Soil Background and 2008 Shallow Soil Supplemental Background investigations were evaluated to determine if there were significant differences between them. The specific datasets selected were surface data (Supplemental investigation), 10 ft bgs data (Supplemental investigation) and all Qal/River data from depths 20 ft bgs or greater collected during the 2008 Deep Soil background investigation. The results of the statistical analyses are included in Table G-3 of Appendix G. Probability plots, boxplots, and individual value plots of the 2008 datasets are included in Appendix F; the boxplots include the 2005 datasets for comparison.

Overall, fewer significant differences in constituent concentrations among the three populations may be inferred from statistical tests as compared to population comparisons described in the previous sub-sections. No significant differences in concentrations may be inferred from statistical tests for the following constituents (Table G-3 of Appendix G):

- Antimony
- Barium
- Beryllium
- Cadmium
- Chromium
- Iron
- Lead
- Magnesium
- Nickel
- Phosphorus
- Silver
- Vanadium
- Zinc
- Radium-228

No statistical tests were performed for the following metals that had fewer than four detections in one or more of the unit-specific datasets:

- Chromium (VI)
- Lithium
- Mercury
- Niobium
- Platinum
- Selenium
- Thallium
- Tungsten

Accordingly, it was not possible to determine whether significant differences were associated with the various Qal/River depth intervals for these metals.

The datasets for the remaining 24 elements had significant differences noted between the datasets for shallow and deep background Qal/River soils (Table G-3 of Appendix G). More significant differences were noted between the deep and shallow datasets ~~(18 elements with significant differences~~[31]~~)~~ than between the surface and 10 ft bgs datasets. As seen in Table G-3, eighteen elements had significant differences in the comparisons between Deep and Surface datasets and/or Deep and Subsurface datasets. Thirteen ~~(11~~ elements had~~with~~ significant differences in the comparisons between Deep and Surface datasets, and fifteen elements (many the same as in the former comparison) had significant differences in the comparisons between Deep and Subsurface datasets~~)~~.

Metal and radionuclide trends were inconsistent between the units; none of the datasets had consistently higher metal detections, but surface or 10 ft bgs results were more commonly identified as being statistically higher than the deep dataset (Table G-3 of Appendix G). Titanium was the only element found at statistically higher concentrations in the deep dataset than in the surface and 10 ft bgs datasets.

The following metals were observed to be present at significantly higher concentrations in the surface soil dataset than the other datasets:

- Aluminum
- Cobalt
- Copper
- Manganese
- Potassium
- Silicon

The following metals were observed to be present at significantly higher concentrations in the 10 ft bgs dataset than the other two datasets:

- Calcium
- Palladium
- Sodium
- Strontium
- Uranium
- Radium-226
- Thorium-230
- Uranium-233/234
- Uranium-238

~~[31] As seen in Table G-3, eighteen elements had significant differences in the comparisons between Deep and Surface datasets and/or Deep and Subsurface datasets. Thirteen elements had significant differences in the comparisons between Deep and Surface datasets, and fifteen elements (many the same as in the former comparison) had significant differences in the comparisons between Deep and Subsurface datasets.~~

Given that considerably more than five percent of all the ANOVA/Kruskal-Wallis tests were found to be significantly different, depth intervals within Qal/River unit were considered to be different. Given significant differences observed among depths within the Qal/River unit, data for each of these three background depth intervals (0 ft bgs, 10 ft bgs, and 20+ ft bgs) should be retained and used independently for future statistical evaluations to determine if there exists elevated concentrations of metals or radionuclides as compared to background. Specific unit- and depth-appropriate use of these data is discussed in Chapter 4 and will be discussed in a subsequent background summary report.

3.6.43.7.4 Comparison of Qal/Mixed Units by Depth (2005 and 2008 Data)

The Qal/Mixed datasets from the 2008 Deep Soil Background and 2005 Shallow Soil Background investigations were evaluated to determine if there were significant differences between them. The specific datasets selected were surface data (2005 investigation), 10 ft bgs data (2005 investigation) and all Qal/Mixed data from depths 20 ft bgs or greater collected during the 2008 Deep Soil background investigation. The results of the statistical analyses are included in Table G-4 of Appendix G. Probability plots, boxplots, and individual value plots of the 2008 datasets are included in Appendix F; the boxplots include the 2005 datasets for comparison.

As seen in the descriptive summary statistics tables (Tables 13 and 14 for the shallow Qal/Mixed datasets), the surface dataset contained results for fewer than four samples for several of the elements being evaluated, and the 10 ft bgs dataset contained results for fewer than four samples for all of the elements. Therefore, because statistical comparisons would be of limited value, these datasets were not subjected to multiple-sample statistical comparisons and it was not possible to determine whether significant differences were associated with the various Qal/Mixed depth intervals for these metals.

Given that considerably more than five percent of all the ANOVA/Kruskal-Wallis tests were found to be significantly different, depth intervals within Qal/Mixed unit were considered to be different. Given significant differences observed among depths within the Qal/Mixed unit, data for each of these two background depth intervals (0 ft bgs and 20+ ft bgs) should be retained and used independently for future statistical evaluations to determine if there exists elevated concentrations of metals or radionuclides as compared to background. Specific unit- and depth-appropriate use of these data is discussed in Chapter 4 and will be discussed in a subsequent background summary report. Specific unit- and depth-appropriate use of these data will be discussed in a subsequent background summary report.

3.6.53.7.5 Constituents with Less Than 50 Percent Frequency of Detection

When FODs are less than 50 percent, even the nonparametric tests have little power to detect differences in central values (Smeti *et al*. 2007). Tests of proportions were performed for infrequently detected constituents (*i.e.*, constituents with FODs less than 50 percent) to identify potential similarities among datasets. For constituents with frequency of detects less than 50 percent and similar detection limits, a binomial proportions test was conducted to determine if frequency of detects between background datasets were comparable. Where frequency of detects were found to be similar, subsequent comparisons using detected-only data may be considered for infrequently detected constituents to identify potential similarities among background datasets.[32]

For comparisons among Qal/McCullough, Qal/River, Qal/Mixed, and UMCf, infrequently detected constituents are presented in Table G-5 of Appendix G and summarized as follows:

Constituent	Sample Size* (n > 4)	Similar SQLs**	Z-Test for Two Proportions	Additional Analysis Candidate
Boron	Yes	Yes	Similar FOD	Yes
Chromium (VI)	No	Yes	Dissimilar FOD	No
Niobium	No	Yes	Similar FOD	No
Platinum	No	Yes	Similar FOD	No
Selenium	No	Yes	—	No
Thallium	No	Yes	—	No
Tungsten	Yes	Yes	Dissimilar FOD	No

* for three or more lithological units

** SQLs are considered similar when range is less than 10-fold[33]

[32] Only when datasets have comparable detection limits can this analysis be performed as a line of evidence to infer differences between datasets; otherwise, the test will only reflect differences in detection limits.
[33] SQLs were usually different by more than an order of magnitude. Therefore an actual cut-off established does not affect the data analysis.

For comparisons among 2008 Deep McCullough, 2005 Surface McCullough, and 2005 10-ft McCullough, infrequently detected constituents are presented in Table G-6 of Appendix G and summarized as follows:

Constituent	Sample Size* (n > 4)	Similar SQLs**	Z-Test for Two Proportions	Additional Analysis Candidate
Antimony	Yes	No	Dissimilar FOD	No
Boron	Yes	Yes	Dissimilar FOD	No
Chromium (VI)	No	Yes	Dissimilar FOD	No
Niobium	No	Yes	Similar FOD	No
Platinum	No	Yes	Similar FOD	No
Selenium	Yes	No	Dissimilar FOD	No
Silver	No	No	Similar FOD	No
Thallium	Yes	No	Dissimilar FOD	No
Tungsten	No	No	Dissimilar FOD	No

* for two or more Qal/McCullough groups

** SQLs are considered similar when range is less than 10-fold

For comparisons among 2008 Deep River, 2008 Supplemental Surface River, and 2008 Supplemental 10-ft River, infrequently detected constituents are presented in Table G-7 of Appendix G and summarized as follows:

Constituent	Sample Size* (n > 4)	Similar SQLs**	Z-Test for Two Proportions	Additional Analysis Candidate
Antimony	Yes	Yes	Dissimilar FOD	No
Boron	Yes	Yes	Dissimilar FOD	No
Cadmium	Yes	No	Similar FOD	No
Chromium (VI)	No	Yes	Dissimilar FOD	No
Lithium	Yes	Yes	Dissimilar FOD	No
Mercury	No	Yes	Similar FOD	No
Niobium	No	Yes	Similar FOD	No
Platinum	No	Yes	Similar FOD	No
Selenium	No	Yes	—	No

Constituent	Sample Size* (n > 4)	Similar SQLs**	Z-Test for Two Proportions	Additional Analysis Candidate
Thallium	No	No	Dissimilar FOD	No
Tin	Yes	Yes	Similar FOD	Yes
Tungsten	No	Yes	Similar FOD	No
Zirconium	Yes	Yes	Dissimilar FOD	No

* for two or more Qal/River groups

** SQLs are considered similar when range is less than 10-fold

No further analyses were conducted for infrequently detected constituents because one of the following conditions existed:

- Sample size was less than four for the majority of the datasets under consideration
- SQLs were dissimilar
- Z-test for proportions found that FODs were dissimilar

The exception to the above conditions included boron (QAL McCullough vs. other lithologies) and tin (QAL River surface vs. other depths). No further analyses (*i.e.*, multiple sample comparisons) were conducted for these two constituents because these subsequent analyses were not considered likely to provide results that would affect overall decision-making.

Note that for constituents with FODs less than 50 percent (and SQLs meeting analytical DQOs), one may conclude that these constituents are present in background soils. Moreover, it is both reasonable and defensible that characterizations of similarities/dissimilarities among background datasets be largely ascertained based on the more robust statistical analyses of constituents with greater FODs. Accordingly, given that only one or two constituents were identified as candidates for potential additional analysis, it was presumed that these few constituents would be unlikely to alter conclusions of differences among datasets that were based on constituents with more robust FODs (*i.e.*, FODs greater than 50 percent for all groups) and no further analyses were performed on detected-only concentrations.

3.6.63.7.6 Inter-Element Correlation Analysis and ScatterplotsCorrelations

In addition to statistical comparisons and plots, the deep background data were evaluated with respect to inter-element correlations. Correlations or "measures of association" are of interest because they were considered to offer another line of evidence to confirm that data are consistent with a background dataset. Correlation analyses were conducted and used to identify those constituent pairs that should be visually examined in scatterplots to ascertain whether high-concentration outliers should be considered within the background dataset. Both parametric (Pearson's product-moment) and nonparametric (Kendall tau) correlation coefficients are presented in correlation matrices (Tables H-1 through H-8 of Appendix H). Note that statistically significant correlation coefficients (at a significance level of 0.05)[34] are indicated by bold font and are color-coded for parametric and nonparametric coefficients in each table. Scatterplots for constituents with significant correlation coefficients and high-concentration outliers are also presented in Appendix H.

Statistically significant associations were observed for several elements. Certain inter-element relationships are expected on the basis of geochemical behavior and expected mineralogical associations. For example, alkaline metals (such as lithium, sodium, and potassium) and alkaline-earth metals (such as barium, calcium, and magnesium) can be expected to behave similarly in solution and may therefore be expected to show an association in certain environmental media. Other metals are found in association in common minerals and show correlations in soils containing these minerals (such as feldspars; metal oxides such as hematite, goethite and pyrolusite; and carbonate minerals such as calcite). These associations are useful in distinguishing soils derived from different source materials and in distinguishing site-related contamination from natural background (BRC/TIMET 2007).

Correlation among activities for radionuclides within the decay chain (parents and daughters) is anticipated, unless there are differences in geochemical behavior and mechanisms to separate the species (BRC/TIMET 2007). Statistically significant associations among radionuclides in the uranium-238 decay chain were observed for Qal/McCullough, Qal/River, and UMCf (Appendix H). However, statistically significant associations among thorium-232 decay chain radionuclides were not observed.[35] Both the thorium-232 and uranium-238 chains were determined to be in approximate secular equilibrium following equivalence testing outlined in NDEP's *Guidance for Evaluating Secular Equilibrium at the BMI Complex and Common Areas February* (NDEP 2009c). There continues to be an issue for the thorium-232 chain, in which it

[34] An adjustment for multiple comparisons was not applied to the correlation analyses because these analyses were used to identify constituents requiring further analysis and not for distinguishing between datasets using multiple tests.

[35] Further investigation produced no explanation for the lack of correlation among thorium-232 decay chain radionuclides.

is common for BRC site and background data to observe approximate secular equilibrium, but a lack of correlation between isotopes in the decay chain. To date, the issue is unresolved. The results of the equivalence testing for secular equilibrium are as follows:

Chain	Equivalence Test		Secular Equilibrium?	Mean Proportion			
	Delta	p-value		Ra-226	Th-230	U-233/234	U-238
U-238	0.1	0.00	Yes	0.2430	0.2562	0.2569	0.2438
				Ra-228	Th-228	Th-232	
Th-232	0.1	0.00	Yes	0.3117	0.3586	0.3297	

Finally, a visual side-by-side presentation of correlation matrices for Qal/McCullough, Qal/River, Qal/Mixed, and UMCf is provided in Appendix H. This side-by-side presentation is intended to provide an overall visualization of significant inter-element correlations and may be used as an additional, though subjective, qualitative line-of-evidence for distinguishing among lithological units. A visual examination of the side-by-side presentation of correlation matrices suggests that the UMCf has a pattern of significant correlations that appears to be different than those for Qal/McCullough, Qal/River, and Qal/Mixed.

~~3.6.7Scatterplots~~

~~A scatterplot uses a Cartesian coordinate system to display values for two variables for a set of data. The data are displayed as a collection of points, each having the value of one variable determining the position on the horizontal axis and the value of the other variable determining the position on the vertical axis.~~

~~Scatterplots were constructed for those constituent pairs with significant correlation coefficients (Appendix H). Scatterplots were visually examined and best professional judgment was used to ascertain whether high concentration outliers occur "near" the least-square linear trend line. Where high-concentration outliers occur "near" the trend line, one may infer that these concentrations are consistent with background concentrations.~~

Scatterplots were generated to support the correlation analysis conducted to further justify that the supplemental data collected are representative of background conditions. Statistically significant associations and high-concentration outliers were identified for several elements in each lithological unit (Appendix H):

Qal/McCullough

- Aluminum
- Arsenic
- Barium
- Copper
- Lithium
- Nickel
- Palladium
- Silver
- Strontium

Qal/River

- Barium
- Chromium
- Lead
- Potassium

UMCf

- Arsenic
- Lithium
- Magnesium
- Nickel
- Uranium

However, visual examinations of scatterplots for these constituents found no consistent or and conspicuous deviations from least-square trend lines but were observed for high concentration outliers. Accordingly, there was no compelling evidence obtained from examinations of scatterplots to suggest that data are not consistent with a background dataset.

The association of aluminum with trace metals was also evaluated. Trace metals such as chromium, cobalt, copper, nickel, and vanadium may occur as impurities in the common alumino-silicate family of minerals known as feldspars. Clays and other secondary aluminum minerals in soils may host sorption sites for trace metals, thereby associating these metals. In general, these associations are evident.

Scatterplots were also constructed for radionuclides within the thorium-232 and uranium-238 decay chains and are included in Appendix H. Often, species within the decay chains (parents and daughters) show correlations unless there are great differences in geochemical behavior and sufficient mechanisms to separate the species. In general, most of the radionuclides in the uranium-238 decay chain (radium-226, thorium-230, and uranium-233/234) did show significant associations. Radionuclides in the thorium-232 decay chain (radium-228 and thorium-228) did not show significant associations, confirming the correlation results discussed above.

4.0 SUMMARY AND CONCLUSIONS

The purpose of the deep soil background study was to collect data for metals, radionuclides, and general chemistry/soil parameters in deep background soils that are representative of soils in geologic units and depths not covered by the existing shallow soil background datasets (BRC/TIMET 2007; BRC and ERM 2009a [in review]). The key objectives of this study were to determine whether (1) the deep soil background dataset is statistically similar to or different across the various lithologies at the Site, and (2) the lithology-specific deep soil background datasets are statistically similar to or different from their counterparts in the 2005 BRC/TIMET background data and the 2008 supplemental shallow soil background data. One of the specific points of this study was to determine whether arsenic concentrations are different in the various units; this is particularly important because arsenic is usually a risk driver at the Site.

Soil sampling was conducted from August to October 2008. Samples were collected from 21 soil boring locations that represent the specific lithologies targeted by this deep soil background sampling study and that extend the representative range of soils found in the vicinity of the Site. A total of 148 field and 25 duplicate soil samples were collected from the 21 borings for analysis. Validation for the data collected during the 2008 deep background investigation included 20 percent full validation and 100 percent partial validation. Results qualified as estimated based on the data validation are usable for the purposes of establishing background concentrations and for comparison to Site-specific sample data. A small subset of soil sample results were rejected (approximately two percent). With 98 percent of the dataset validated as usable, the overall data collection objectives for the study were met.

Deep background samples were collected in areas presumed to be unimpacted by Site-related activities based on published documentation and Site inspections. In addition, analytical results for VOC, SVOC, and OCP analyses performed on samples collected from shallow soil intervals at the 21 presumed background soil locations were used to assess whether the sampling locations had been impacted by other anthropogenic sources. Given (1) the relatively low reported organic chemical detections, (2) the fact that they are associated with soil intervals appreciably shallower than those assessed for background metals and radionuclide data, and (3) the lack of historical uses associated with the sampling locations, there do not appear to have been significant impacts from other anthropogenic sources and there is no evidence suggesting that the use of the metals and radionuclide data from this investigation for determining background conditions would not be appropriate. Several sporadic outliers were found in the dataset, which is not unusual for a dataset of this size. However, a review of these sporadic outliers confirmed that they were not the result of reporting errors. A combined examination of correlation coefficients and scatterplots found no conspicuous anomalies, further supporting that this dataset is appropriate for use as a representative deep background soil dataset. All told, these lines of evidence support the contention that the dataset reflects background conditions for Site soils.

The statistical analyses performed as part of this study determined that a number of statistically significant differences exist between subsets of the 2008 Deep background dataset, suggesting that these subsets may be retained separately for comparison to applicable, geologically-similar portions of the BMI Common Areas as part of the closure process. The differences between the datasets are summarized as follows:

- ***Comparison of Deep Qal Units***. More significant differences were noted between the Qal/McCullough and Qal/River datasets than between the Qal/Mixed and Qal/River datasets or the Qal/Mixed and Qal/McCullough datasets. This is consistent with the geological interpretation that the Qal/Mixed unit is derived from a mixed source with contributions from both the Qal/McCullough and Qal/River units. In general, the radionuclide detections tended to be higher in the McCullough unit than in the other two units. In contrast, trends were inconsistent between the units for metals. Neither the Qal/River nor Qal/McCullough datasets had consistently higher metal detections, and Qal/Mixed metal datasets were usually 1) statistically indistinguishable from one or the other units; or 2) mid-range values between the two. Limited exceptions to this rule were observed: barium and chromium detections were higher in the Qal/Mixed dataset than in either the Qal/McCullough or Qal/River datasets, and silicon and sodium detections were lower in the Qal/Mixed dataset than in either the Qal/McCullough or Qal/River datasets. Arsenic concentrations in the Qal/Mixed or Qal/River were inferred as being statistically higher than those in the Qal/McCullough.

- ***Comparison of Deep Qal to UMCf Units***. More significant differences were noted between the UMCf and Qal/McCullough datasets than between the UMCf and Qal/Mixed datasets or the UMCf and Qal/River datasets. For radionuclides, the radionuclide detections were higher in the Qal/McCullough unit than in the UMCf. In contrast, the UMCf metal datasets were usually 1) statistically indistinguishable from one or more of the other units; or 2) mid-range values between the three. Limited exceptions to this rule were observed: lithium and magnesium detections were higher in the UMCf dataset than in the other three deep datasets. It is also notable that arsenic concentrations in the UMCf were generally higher than in the Qal, with the exception of arsenic concentrations in the Qal/River. Arsenic concentrations in the UMCf were inferred as being statistically higher than those in the Qal/McCullough, but the UMCf arsenic concentrations were statistically indistinguishable from those in the Qal/Mixed and Qal/River.

- ***Comparison of Qal/McCullough Depth Intervals***. More significant differences were noted between the surface and deep datasets than between the surface and 10 ft bgs datasets or the deep and 10 ft bgs datasets. Metal and radionuclide trends were inconsistent between the units; none of the datasets had consistently higher metal detections, but surface or deep results were more commonly identified as being statistically higher than the other datasets. The 10 ft bgs datasets were usually 1) statistically indistinguishable from one or the other units; or 2) mid-range values between the two. Limited exceptions to this rule were observed: calcium detections were higher in the 10 ft bgs dataset than in either the surface or deep datasets, and five elements (chromium, iron, lead, tin, and thorium-228) were lower in the 10 ft bgs dataset than in either the surface or deep datasets. Arsenic concentrations were statistically indistinguishable between the three Qal/McCullough depth intervals considered.

- ***Comparison of Qal/River Depth Intervals.*** More significant differences were noted between the deep and shallow datasets than between the surface and 10 ft bgs datasets. Metal and radionuclide trends were inconsistent between the units; none of the datasets had consistently higher metal detections, but surface or 10 ft bgs results were more commonly identified as being statistically higher than the deep dataset. Titanium was the only element found at statistically higher concentrations in the deep dataset than in the surface and 10 ft bgs datasets. Arsenic concentrations were statistically indistinguishable between the three Qal/River depth intervals considered.

- ***Comparison of Qal/Mixed Depth Intervals***. The Qal/Mixed surface dataset were comprised of fewer than four samples for several of the constituents being evaluated. Similarly, the Qal/Mixed 10 ft bgs dataset were comprised of fewer than four samples for all of the constituents. Given the low sample size, statistical analyses were not performed and it was not possible to determine whether significant differences were associated with the various Qal/Mixed depth intervals for these constituents.

The goals of the deep soil background study were met, and a valid background dataset has been generated. Given the distinct differences between the populations associated with soils derived from different geologic units, it is therefore appropriate to perform comparisons of background to Site data using the subset of background data that most closely matches the geologic conditions in the relevant area of interest:

Portion of Site	Applicable Background Dataset
Eastern portion (*e.g.*, Mohawk, eastern part of 4B)	2008 Deep River subset
Northwestern portion (*e.g.*, Western Hook)[36]	2008 Deep McCullough subset
Central or remaining portion	2008 Deep McCullough and Mixed subsets

The data should be used as subsets of several datasets as identified in this report. Combining the background dataset by depth and/or lithology for subsequent comparison with Site data will be influenced by potential exposures at varying depth intervals and the location of a particular receptor – in other words, based on data usability and conceptual site model considerations. As discussed above, for arsenic, statistical differences were inferred between the Qal/McCullough and the other three datasets evaluated (Qal/Mixed, Qal/River, and UMCf); however, no statistical differences were inferred when comparing arsenic results for different depth intervals of a given lithologic unit (*i.e.*, Qal/McCullough and Qal/River).

These findings of this investigation of deep soils suggest that these data are appropriate for supporting future assessments and decision-making with respect to deep soils at sites within the BMI Complex and Common Areas.– Specific decisions regarding how best to use the background soils data for future Site-to-background comparisons will be discussed in a future background summary document and specific use for the BMI Common Areas will be made on a case-by-case basis in consultation with NDEP.

[36] Note that portions of surface and/or near surface soils in the northwestern portion of the Site may also be associated with the Upper Muddy Creek formation (UMCf).

APPENDIX B

ELECTRONIC REPORT FILES AND DATASET (ON CD)

APPENDIX C

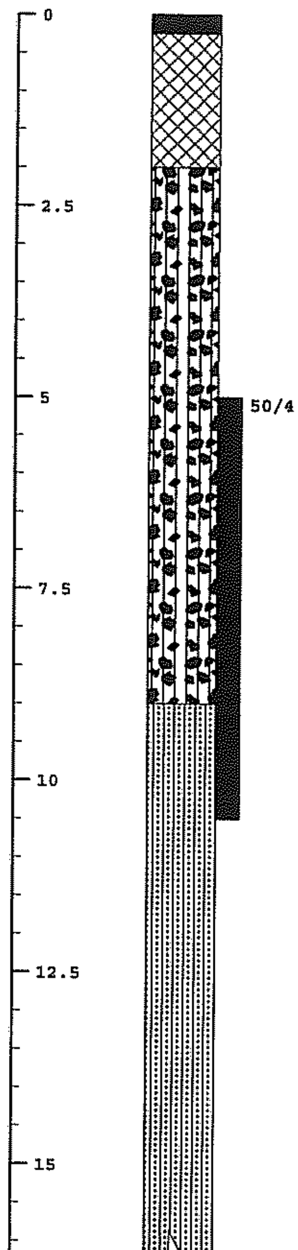
SOIL BORING LOGS

EXPLORATION LOG
DBSA-1

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/6/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH — SOIL & SAMPLE SYMBOLS



USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
PAVE	Dark gray ASPHALT 3" thick.						
FILL	Reddish brown (5 YR 5/4) silty GRAVEL with sand, moist. Gravel is well-graded angular, and consisits of 100% andesite. Sand is well-graded, subangular, with 80% felsics, 20% mafics. Approximately 55% gravel, 20% silt, 25% sand.						
GM	Reddish brown (5 YR 5/4) silty GRAVEL with sand, moist and dense. ...boring cleared with air knife to 5.0'; switch to 4' coring sleeves due to hard soils. ...same soil as above, sample DBSA-1-Q-05, Pid's: 10.6 eV = 0.5 ppmv, 11.7 eV = 1.6 ppmv.						
SM	Reddish yellow (5 YR 6/6) silty SAND with gravel, moist and very dense. Sand is subangular to subrounded, well-graded, 10% mafics, 90% felsics. Gravel is subangular, poorly graded, consists of 100% latite. Approximately 20% gravel, 20% silt, 60% sand. Sample DBSA-1-Q-10, Pid's: 10.6 eV = 0.5 ppmv, 11.7 eV = 0.0 ppmv.						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

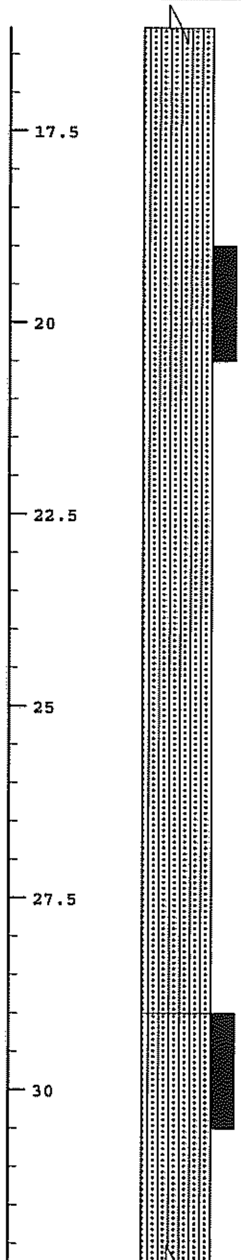
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 4

EXPLORATION LOG
DBSA-1

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/6/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...sample DBSA-1-Q-20, Pid's: 10.6 eV = 0.5 ppmv, 11.7 eV = 0.0 ppmv. Strong iron oxide staining.						
		SM	Reddish brown (5 YR 5/4) silty SAND, few gravel, moist and very dense. Sand is subangular, well-graded, 30% mafics, 70% felsics. Gravel is angular, poorly graded, with 20% rhyolite, 40% latite, 40% basalt/andesite. Approximately 10% gravel, 30% silt, 60% sand. Sample DBSA-1-Q-30, Pid's: 10.6 eV = 0.8 ppmv,						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 4

EXPLORATION LOG
DBSA-1

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/6/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5			11.7 eV = 0. 0 ppmv.						
35									
37.5									
40			...same soil as above, sample DBSA-1-Q-40, Pid's: 10.6 eV = 0.3 ppmv, 11.7 eV = 0.0 ppmv.						
42.5									
45									
47.5									

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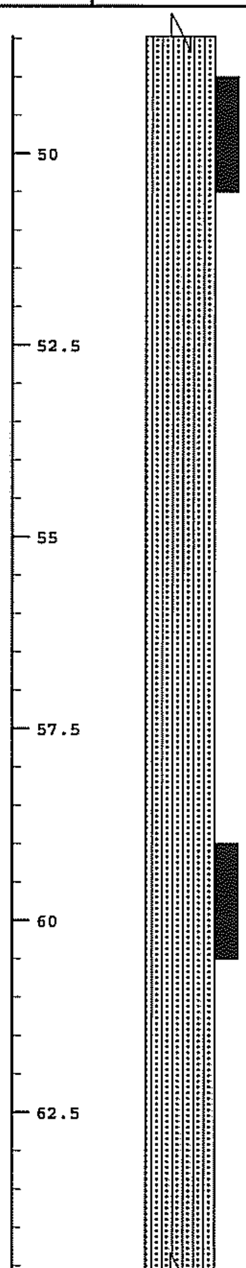
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA-1

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/6/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50			...same soil as above, sample DBSA-1-Q-50, Pid's: 10.6 eV = 0.4 ppmv, 11.7 eV = 0.0 ppmv.						
60			...same soil as above, sample DBSA-1-Q-60, Pid's: 10.6 eV = 0.3 ppmv, 11.7 eV = 0.0 ppmv.						



The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

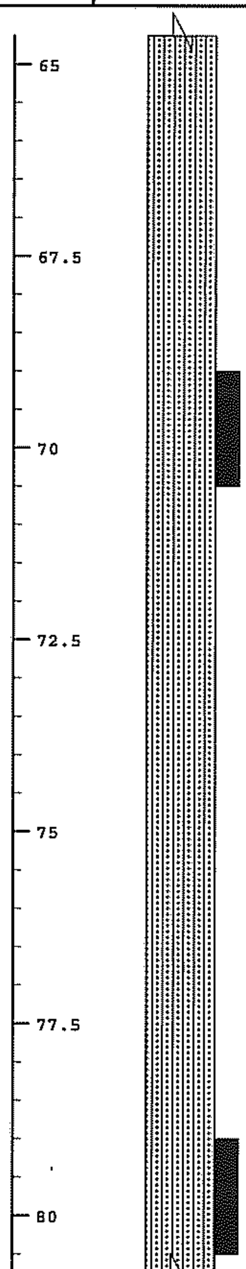
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 4

EXPLORATION LOG
DBSA-1

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/6/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
70			...same soil as above, sample DBSA-1-Q-70, Pid's: 10.6 eV = 0.4 ppmv, 11.7 eV = 0.0 ppmv.						
80			...same soil as above, sample DBSA-1-Q-80, Pid's: 10.6 eV = 0.1 ppmv, 11.7 eV = 0.0 ppmv.						

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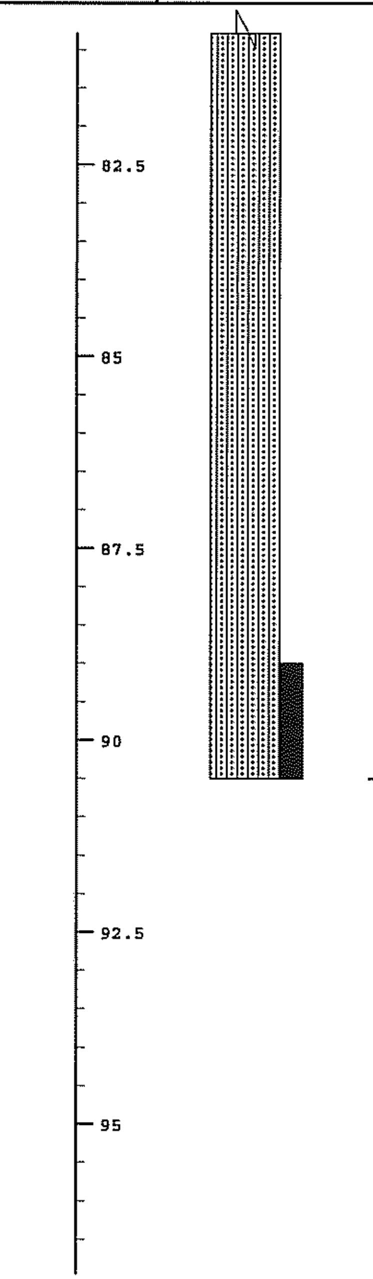
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA-1

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/6/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...same soil as above, sample DBSA-1-Q-90, Pid's: 10.6 eV = 0.4 ppmv, 11.7 eV = 0.0 ppmv.						
			END OF BORING AT 90.5 FEET						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

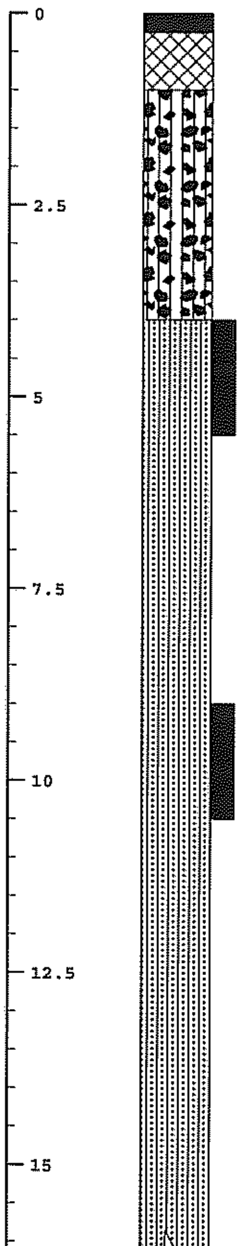
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 4

EXPLORATION LOG
DBSA-2

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/7/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
		PAVE	Dark gray ASPHALT 2.5" thick.						
		FILL	Light brown (7.5 YR 6/3) silty GRAVEL with sand, moist.						
		GM	Reddish brown (5 YR 5/4) silty GRAVEL with sand, moist and very dense. ...boring cleared with air knife to 5'. ...cobble.						
		SM	Reddish brown (5 YR 5/4) silty SAND with gravel, moist and very dense. Sand is subangular, well graded with 20% mafics (basalt/andesite), 80% felsics. Gravel is angular, 80% rhyolite, 20% andesite and basalt. Approximately 15% silt, 20% gravel, 65% sand. Sample DBSA-2-Q-5. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...same soil as above, sample DBSA-2-Q 10. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 5

EXPLORATION LOG
DBSA-2

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/7/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
17.5									
20			...same soil as above, sample DBSA-2-Q 20 and DBSA-2-Q-20-FD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
22.5			...alternating hard and soft layers.						
25		SM	Reddish brown (5 YR 5/4) silty SAND, moist, moderately cemented and very dense. Sand is subangular to subrounded, well-sorted with 40% mafics (andesite and basalt), 60% felsics. Gravel is angular, poorly graded, has 40% andesite, 30% rhyolite, 30% latite. Approximately 20% silt, 10% gravel, 70% sand.						
27.5									
30			...moderately to strongly cemented with alternating layers of 4"-6" thick of cemented and uncemented soils, sample DBSA-2-Q-30. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 5

EXPLORATION LOG
DBSA-2

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/7/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5									
35									
37.5									
40		SM	Reddish brown (% YR 5/4) silty SAND with gravel, moist, weakly cemented (in layers) and very dense. Sand is subangular to subrounded, well-graded, consists of 40% mafics (basalt and andesite), 60% felsics. Gravel is angular, poorly graded with 20% basalt (with epidote crystals), 20% andesite, 30% rhyolite, 30% latite. Approximately 20% silt, 20% gravel, 60% sand. ...same soil as above, sample DBSA-2-Q 40. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
42.5									
45									
47.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA-2

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 8/7/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER **EQUIPMENT:** DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50			...same soil as above except: interbeds of silty SAND and silty SAND with PIDs: 10.6, 11.7 eV = 0.0 ppmV.gravel, moderately cemented in 0.5" to 1.0" thick layers. Sample DBSA-2-Q-50.						
52.5									
55									
57.5									
60			PIDs: 10.6, 11.7 eV = 0.0 ppmV....same soil as above, moderately to strongly cemented to 65', strong iron oxide staining. Sample DBSA-2-Q-60.						
62.5									

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

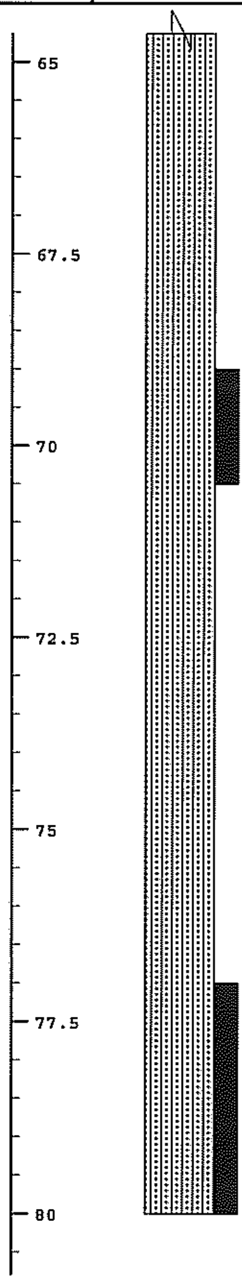
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 5

EXPLORATION LOG
DBSA-2

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/7/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
69–70.5			...same soil as above, basalt cobble in sampler shoe. Sample DBSA-2-Q-70. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
77–80			...consists of alternating zones of cemented and uncemented soils, gravel clasts consist of latite, andesite, and basalt. Samples DBSA-2-Q-80 and DBSA-2 -Q-80 MS/MSD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
80			**END OF BORING AT 80.0 FEET**						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 5

EXPLORATION LOG
DBSA-3

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 8/8/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER **EQUIPMENT:** DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0		PAVE	Dark gray ASPHALT 3" thick.						
		FILL	Light brown (7.5 YR 6/3) silty GRAVEL with sand, moist.						
2.5		SM	Reddish brown (5 YR 5/4) silty SAND, moist and very dense. Sand is subrounded, well-graded, 30% mafics, 40% felsics, 30% quartz. Gravel is subangular with 90% basalt, 10% latite/andesite. Approximately 20% silt, 10% gravel, 70% sand.						
5			...boring cleared with air knife to 5', sample DBSA-3-Q-5. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
7.5									
10			...same as above, sample DBSA-3-Q-10. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
12.5									
15									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 6

EXPLORATION LOG
DBSA-3

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/8/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
17.5									
20		SM	Reddish brown (5 YR 5/4) silty SAND with gravel, few cobbles, moist and very dense. Sand is subrounded, well-graded with 60% felsics, 40% mafics. Gravel is subrounded to subangular, well graded, consists of 30% basalt, 70% latite. Approximately 20% silt, 20% gravel, 60% sand. Sample DBSA-3-Q-20 and DBSA-3-Q-20-FD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
22.5									
25									
27.5									
30			...same soil as above, sample DBSA-3-Q 30. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 6

EXPLORATION LOG
DBSA-3

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/8/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5									
35									
37.5									
40			...approximate percentages of soil types estimated using ASTM D2488 X4.1"Jar Method": 15% silt, 20% gravel, 65% sand, sample DBSA-3-Q-40. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
42.5									
45									
47.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 6

EXPLORATION LOG
DBSA-3

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/8/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50		SM	Reddish brown (5 YR 5/4) silty SAND, moist, weakly cemented and very dense. Sand is subrounded, well-graded, with 60% felsics, 40% mafics. Gravel is subangular, well-graded, consists of 100% basalt. Approximately 20% silt, 10% gravel, 70% sand. Sample DBSA-3-Q-50. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
52.5			...weakly to moderately cemented (based upon drilling behavior and drilling rates).						
55									
57.5									
60			...same as above, except for trace gravel, sample DBSA-3-Q-60. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
62.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA-3

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/8/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
65									
67.5									
70		SM	Light reddish brown (5 YR 6/3) silty SAND with gravel, moist, weakly cemented and very dense. Sand is subrounded, well-graded, with 60% felsics, 40% mafics. Gravel is subangular, well-graded, consists of 100% dacite. Approximately 20% silt, 25% gravel, 55% sand. Sample DBSA-3-Q-70.						
72.5									
75									
77.5									
80			...yellowish brown (10 YR 5/4), caliche coats on gravel clasts, sample DBSA-3-Q-80.						

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EXPLORATION LOG
DBSA-3

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/8/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			END OF BORING AT 80.5 FEET						
82.5									
85									
87.5									
90									
92.5									
95									

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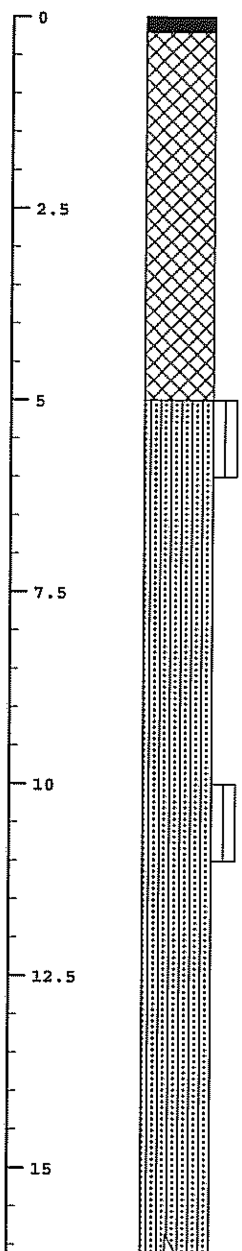
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 6

EXPLORATION LOG
DBSA 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0		PAVE	Dark gray ASPHALT 2.25 inches thick.						
		FILL	Very pale brown (10 YR 7/4) silty GRAVEL with sand, moist. ...boring cleared with air knife to 5'.						
5		SM	...collect DBSA-4-Q-5. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Light brown (7.5 YR 6/4), silty SAND with gravel (approxiately 40% gravel, well graded, angular to subangular (approximately 10% course gravel, 40% medium gravel, 50% fine gravel), approximately 15% silt, 45% sand (well graded, subrounded, approximately 20% course sand, 20% medium sand, 60% fine sand), moist. Sand: approximately 5% mafics, 95% felsics. Gravel: approximately 60% basalt (subangular), 40% andesite (angular), caliche coats on gravel clasts. ...collect DBSA-4-Q-10. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Light brown (7.5 YR 6/4), silty SAND (approximately 15% gravel (poorly graded, subangular, 100% fine gravel), approximately 20% silt, 65% sand (poorly graded "skip" graded, subrounded, approximately 30% course sand, 10% medium sand, 60% fine sand), moist. Sand and gravel have same composition as 5.0'-7.5' interval; at 12.5' has: 0.5" silty gravel (GM) bed with 100% angular andesite gravel (well graded).						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 7

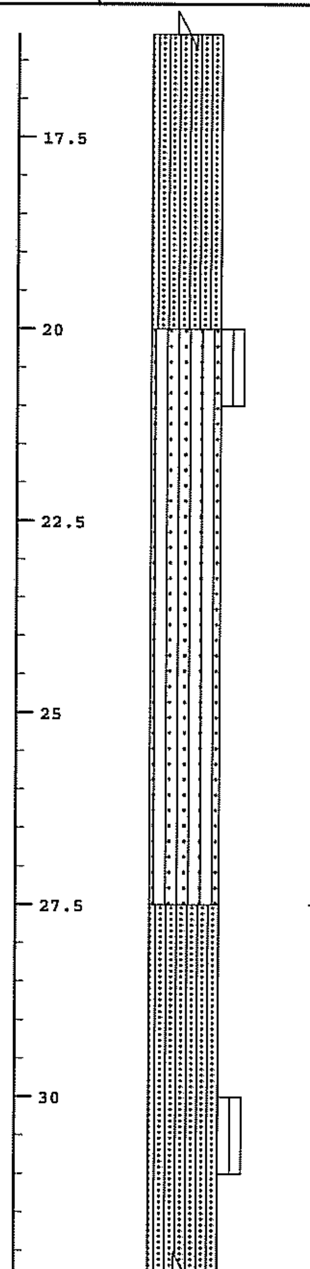
EXPLORATION LOG
DBSA 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
BORING LOCATION: SEE FIGURE 2
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
ELEVATION: EXISTING GROUND SURFACE

PROJECT NO.: 20072226V1
EXPLORATION DATE: 10-19-07
EQUIPMENT: SONIC DRILL RIG
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
FINAL DEPTH TO WATER: NOT ENCOUNTERED

DATE MEASURED: N/A
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...contact gradational over 2' with the unit described below.						
		SP-SM	...collect DBSA-4-Q-20. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Light brown (7.5 YR 6/4), poorly graded SAND with silt and gravel (approximately 50% sand, (subrounded, approximately 45% course sand, 15% medium sand, 35% fine sand), 10% silt, 40% gravel (well graded, subangular to angular, approximately 30% course gravel, 30% medium gravel, 40% fine gravel), moist. Sand: 20% mafics (as basalt), 80% felsics. Gravel: 40% basalt (subangular), 40% andesite, 20% rhyolite. Caliche coats on gravel clasts. ...very pale brown (10 YR 7/3) carbonaceous layer, approximatley 1' thick. ...andesite cobble (5" diameter).						
		SM	Brown (7.5 YR 5/4), silty SAND with gravel, same characteristics as last interval besides approximately 25% silt, moist. ...collect DBSA-4-Q-30. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...same as above; has alternating inter beds of sand and gravel.						

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EXPLORATION LOG
DBSA 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
BORING LOCATION: SEE FIGURE 2
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
ELEVATION: EXISTING GROUND SURFACE

PROJECT NO.: 20072226V1
EXPLORATION DATE: 10-19-07
EQUIPMENT: SONIC DRILL RIG
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
FINAL DEPTH TO WATER: NOT ENCOUNTERED

DATE MEASURED: N/A
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5									
35									
37.5			Very pale brown (10 YR 7/3), silty SAND (approximately 15% gravel (poorly graded, subangular, approximately 20% medium gravel, 80% fine gravel), 20% silt, 65% sand ("skip" graded, subrounded, approximately 40% course sand, 10% medium sand, 50% fine sand), moist. Sand: approximately 5% mafics (as basalt), 95% felsics. Gravel: 80% basalt, 20% andesite. Caliche coats on gravel clasts.						
40			...collect DBSA-4-Q-40. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
42.5									
45			...gradational transition into the next sequence at 46'.						
47.5			Brownish yellow (10 YR 6/6), silty SAND with gravel (approximately 30% gravel (well graded, subangular, approximately 30% course gravel, 20% medium gravel, 50% fine gravel), approximately 20% silt, 50% sand (poorly graded, subrounded,						

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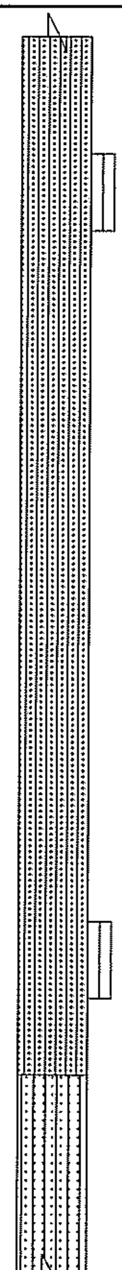
EXPLORATION LOG
DBSA 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50 52.5 55 57.5 60			approximately 40% course sand, 10% medium sand, 50% fine sand), moist. Sand: approximately 5% mafics, 95% felsics. Gravel: 40% basalt, 30% andesite, 30% rhyolite. ...gravel becomes poorly graded, approximately 80% fine gravel. Reddish yellow (7.5 YR 6/6), silty SAND (approximately 10% gravel (poorly graded, subangular, approximately 100% fine gravel), approximately 15% silt, 75% sand (well graded, subrounded, approximately 40% course sand, 20% medium sand, 40% fine sand), moist. Sand and gravel composition similar to 46' bgs. ...collect DBSA-4-Q-50. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...reddish yellow (7.5 YR 6/6), gravel clasts (basalt) show minor clay and iron oxide alteration. Traces of chloritic andesite, cementation occurs as thin randomly distributed layers. ...collect DBSA-4-Q-60. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Very pale brown (10 YR 7/4), silty SAND with gravel (approximately 35% gravel (well graded, angular to subangular,						
62.5		SW-SM	approximately 20% course gravel, 30% medium gravel, 50% fine gravel), 20% silt, 45% sand (40% course sand, 20% medium sand, 40% fine sand), moist. Very pale brown (10 YR 7/4), well graded SAND with silt (approximately 10% gravel						

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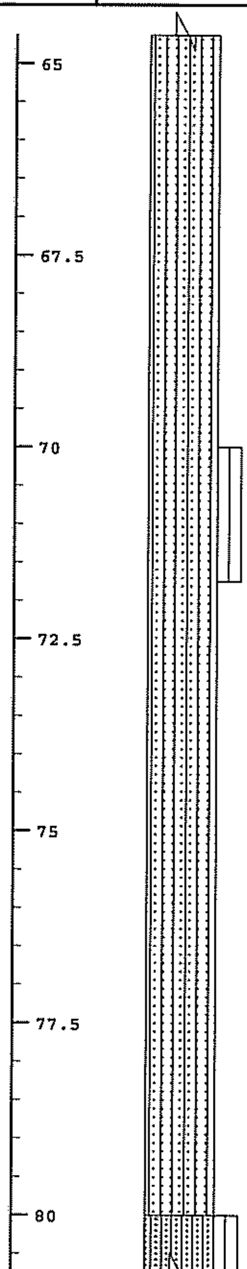
EXPLORATION LOG
DBSA 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			(poorly graded, subrounded, approximately 5% medium gravel, 95% fine gravel), 10% silt, 80% sand (subrounded, approximately 40% course sand, 10% medium sand, 50% fine sand). Sand: approximately 5% mafics, 95% felsics. Gravel: approximately 20% rhyolite, 30% basalt, 50% andesite.						
			...collect DBSA-4-Q-70. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			...traces of iron oxide stained and clayey weathered basalt.						
			...1' thick layer of angular to subangular gravel.						
		SM	...collect DBSA-4-Q-80. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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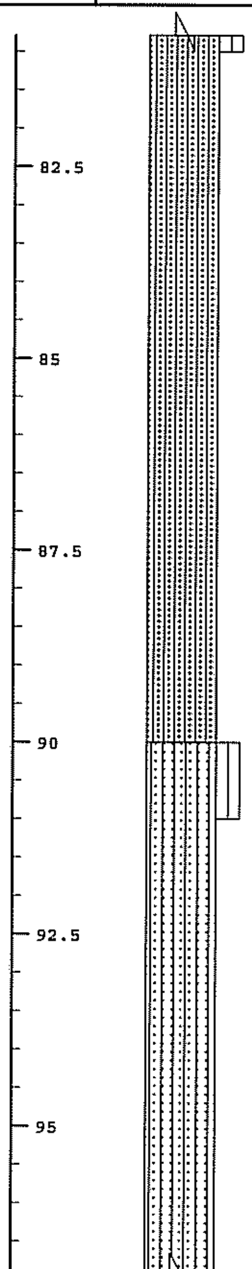
EXPLORATION LOG
DBSA 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			Very pale brown (10 YR 7/4), silty SAND with gravel (approximately 35% gravel (poorly graded, subangular, approximately 20% course gravel, 10% medium gravel, 70% fine gravel), 15% silt, 50% sand ("skip" graded poorly graded, subrounded, approximately 40% course sand, 15% medium sand, 45% fine sand), moist. Sand: 5% mafics, 95% felsics. Gravel: approximately 60% basalt, 30% andesite, 10% rhyolite.						
		SW-SM	1' wide bed of light brown (7.5 YR 6/4), well graded SAND with silt (90% sand (subangular to subrounded, approximately 50% course sand, 40% medium sand, 10% fine sand), 10% silt, moist. Sand: 20% mafics (as basalt and andesite), 80% felsics (as rhyolite and feldspar).						
			...collect DBSA-4-Q-90. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			Light brown well graded SAND with silt and gravel (approximately 40% gravel (well graded, subangular to angular, approximately 30% course gravel, 40% medium gravel, 30% fine gravel), 10% silt, 50% sand (subangular to subrounded, approximately 40% course sand, 30% medium sand, 30% fine sand), moist. Gravel: approximaely 40% andesite, 50% basalt, 20% rhyolite. Sand: 20% mafics (as basalt and andesite), 80% felsics (as						

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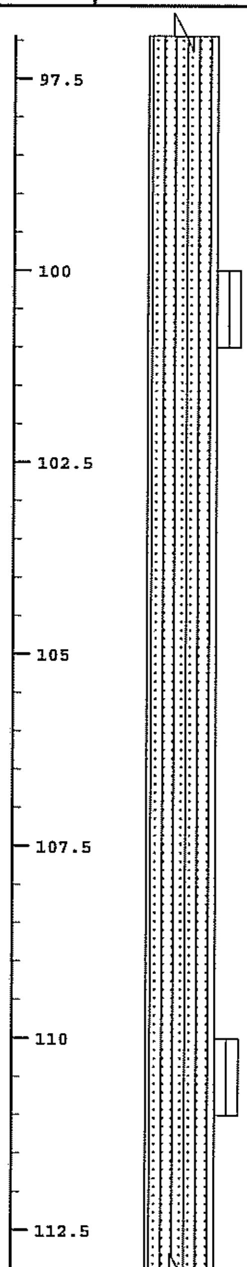
EXPLORATION LOG
DBSA 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			rhyolite and feldspar). 6" basalt cobble.						
97.5			...shows white encrustations (salts) from possible groundwater leaching.						
100			...collect DBSA-4-Q-100. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...1' wide basalt clast.						
102.5									
105			...has 0.5' to 1.0' wide layers of well graded, angular gravel, consisting of approximately 40% basalt, 40% andesite, 20% dacite.						
107.5									
110			...collect DBSA-4-Q-110. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
112.5									

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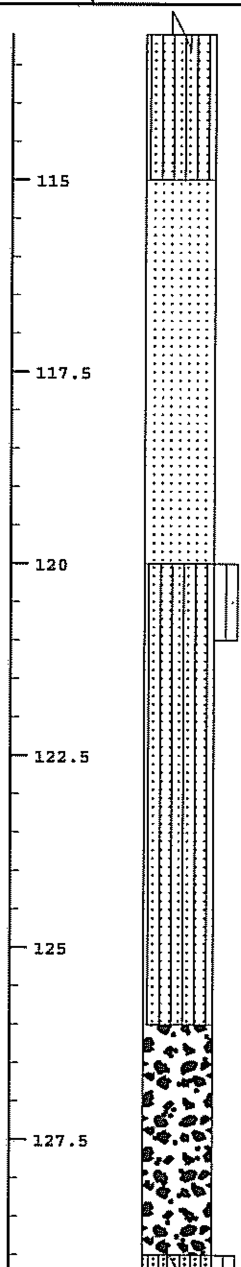
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
115		SW	Brown (7.5 YR 5/4), well graded SAND with gravel (approximately 40% gravel (well graded, subangular to angular, approximately 40% course gravel (as cobbles and boulders), 30% medium gravel, 30% fine gravel), approximately 5% silt, 55% sand (subrounded, approximately 40% course sand, 35% medium sand, 25% fine sand), moist. Sand: approximately 10% mafics (as basalt), 90% felsics. Gravel: approximately 40% basalt, 30% andesite, 30% dacite. Minor chloritic material.						
120		SW-SM	...collect DBSA-4-Q-120 and DBSA-4-Q-120-FD. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Reddish yellow (7.5 YR 6/6), well graded SAND with silt and gravel (approximately 40% gravel (well graded, angular, approximately 40% course gravel, 30% medium gravel, 30% fine gravel), 10% silt, 50% sand (subangular to subrounded, approximately 50% course sand, 15% medium sand, 35% fine sand), moist. Sand: approximately 15% mafics (as basalt), 85% felsics (as feldspar and dacite), trace mica. Gravel: approximately 50% basalt, 40% andesite, 10% dacite, trace green andesite. Caliche coats on gravel clasts.						
		GW	Reddish yellow (7.5 YR 6/6), well graded GRAVEL with sand (approximately 30% sand subangular to subrounded, approximately 50% course sand, 15% medium sand, 35% fine sand), 5% silt, 65% gravel (subangular to angular, approximately 40% course gravel (as						

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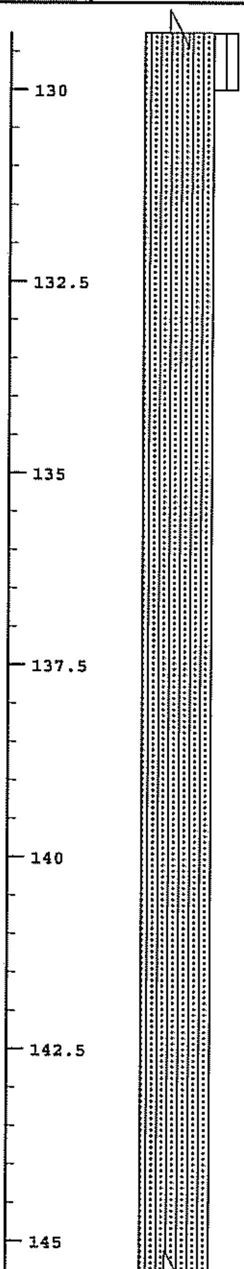
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
		SM	boulders and cobbles, 20% medium gravel, 40% fine gravel), moist. ...collect DBSA-4-Q-130. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Strong brown (7.5 YR 5/6) silty SAND with gravel (approximately 30% gravel, poorly graded, subangular to angular, approximately 20% course gravel, 30% medium gravel, 50% fine gravel, approximately 20% silt, approximately 50% sand (well graded), subrounded, approximately 40% course sand, 20% medium sand, 40% fine sand), moist. Sand: approximately 20% matics (basalt, trace chlorite), 80% felsics. Gravel: approximately 40% andesite, 40% basalt, 20% dacite. ...Sample DBSA 4-Q-140 ...caliche coats gravel clasts, occurs as 0.5" nodules. 140'-142.5': mostly gravel, basaltic and angular. ...very moist zone (approximatley 2.0" thick).						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 4

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
147.5–150			...Sample DBSA 4-150. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
150–160		SW-SM	Strong brown (7.5 YR 5/6) well-graded Sand with silt and gravel (approximately 40% gravel (well-graded, subangular to angular with tabular clasts, approximately 40% course gravel, 30% medium gravel, 30% fine gravel), aproximately 10% silt, 40% sand (subrounded, 40% course sand, 30% medium sand, 30% fine sand), moist. Sand and gravel have same composition as above; traces of chloritic andesite. Caliche coats gravel clasts. ...Approximately 30% cobbles. ...Sample DBSA 4-Q-160. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
160			**END OF BORING AT 160.0 FEET**						

Depth scale marks: 147.5, 150, 152.5, 155, 157.5, 160

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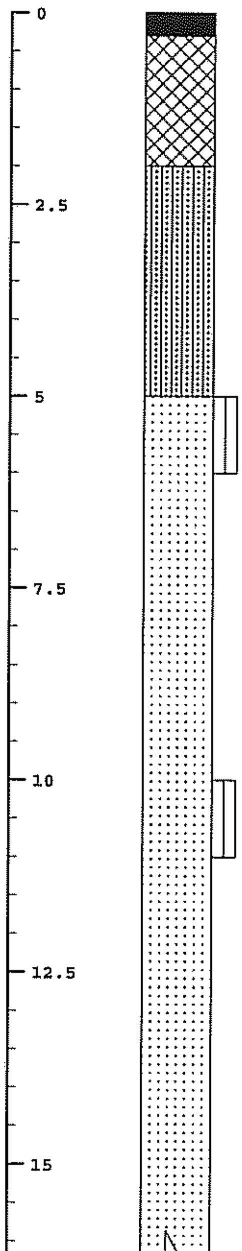
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 8

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-17-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
		PAVE	Dark gray ASPHALT 3.5 inches thick.						
		FILL	Brown (7.5 YR 5/4), silty SAND with gravel, dry.						
		SM	Brown (7.5 YR 5/4), silty SAND with gravel, dry and dense. ...boring cleared with air knife to 5'.						
		SW	...collect DBSA-8-Q-5. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Brown (7.5 YR 5/2), well graded SAND, few gravel, dry and dense. ...light brown (7.5 YR 6/3), 10% gravel (angular andesite and basalt), 85% sand (poorly sorted), 50-60% medium sand, 1-5% fines. ...collect DBSA-8-Q-10. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...course sub angular basalt cobble and gravel at 10'. ...5" subangular to sub-rounded basalt cobble. ...brown (7.5 YR 3/2).						

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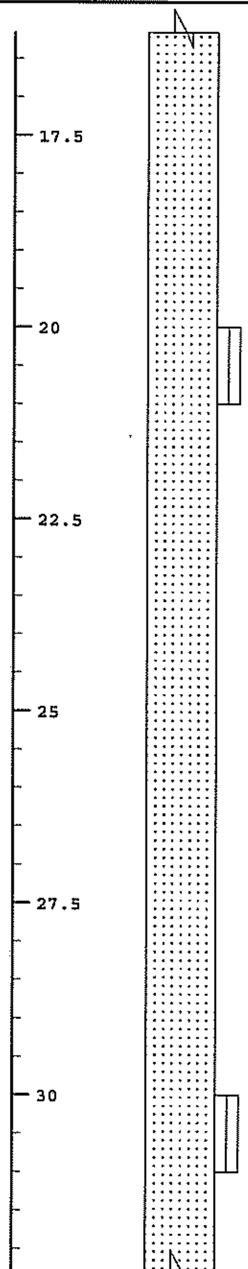
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 8

EXPLORATION LOG
DBSA 8

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-17-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...fines (silt) increase to 10%.						
17.5									
20			...brown (7.5 YR 5/3). Collect DBSA-8 Q-20 and DBSA-8-Q-20-FD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			...4" subangular basalt cobble.						
22.5									
25			...15-20% gravel, 70-75% sand, 5-10% fines.						
			...3" subangular basalt cobble.						
27.5									
30			...collect DBSA-8-Q-30. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...brown (7.5 YR 4/4), 4" su b angularbasalt cobble, course basalt and andesite gravel to 2" diameter.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 8

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-17-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5									
35									
37.5									
40			...collect DBSA-8-Q-40. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
42.5									
45		GW	Brown (7.5 YR 4/4), well graded GRAVEL with sand, dry and very dense.						
		SW	Brown (7.5 YR 4/4), well graded SAND with gravel, dry and very dense.						
47.5									

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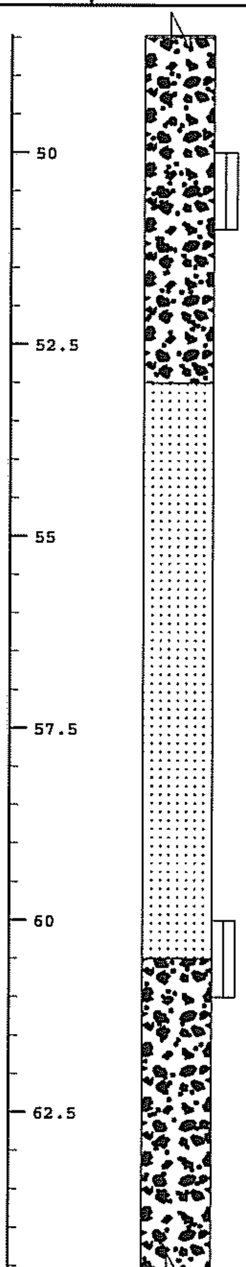
EXPLORATION LOG
DBSA 8

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-17-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
		GW	Brown (7.5 YR 4/4), well graded GRAVEL with sand, little to some cobbles, dry and very dense. ...collect DBSA-8-Q-50, DBSA-8-Q-50-FD, and DBSA-8-Q-50-MS/MSD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
		SW	Brown (7.5 YR 4/4), well graded SAND with gravel, dry and very dense. ...5% gravel, 90% course sand, 1- 5% fines. ...collect DBSA-8-Q-60. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...borderline SP at 60'.						
		GW	Brown (7.5 YR 4/4), well graded GRAVEL with sand, dry and very dense. Few cobbles of andesite and basalt to 70'.						



The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 8

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-17-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
65									
67.5									
70		SW	Brown (7.5 YR 4/4), well graded SAND with gravel, dry and very dense. ...collect DBSA-8-Q-70. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
72.5			...4" subangular basalt cobble.						
75									
77.5									
80			...reddish brown (5 YR 4/4). ...collect DBSA-8-Q-80.						

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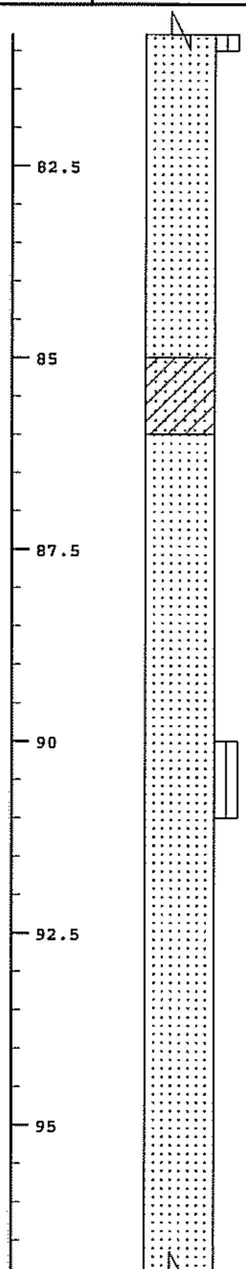
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 8

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-17-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
85		SC	Reddish brown (5 YR 4/4), well graded SAND with gravel, dry and very dense.						
		SW	Reddish brown (5 YR 4/4), well graded SAND with gravel, dry and very dense.						
90			...collect DBSA-8-Q-90. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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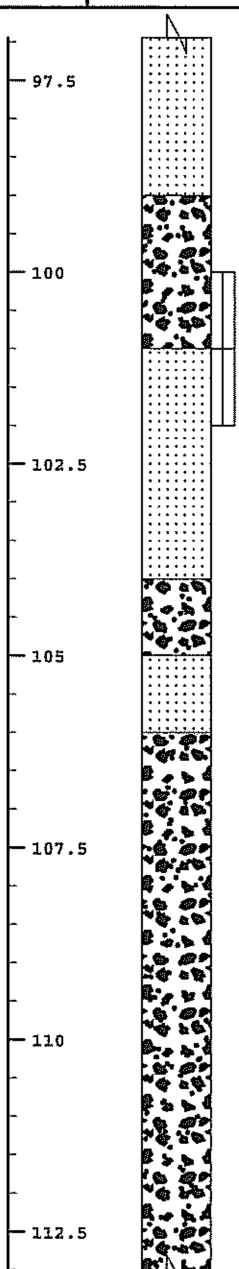
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 8

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-17-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH; SOIL & SAMPLE SYMBOLS



USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
GW	Reddish brown (5 YR 4/4), well graded GRAVEL with SAND, dry and very dense. ...collect DBSA-8-Q-100. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
SW	Reddish brown (5 YR 4/4), well graded SAND with gravel, dry and very dense.						
GW	Reddish brown (5 YR 4/4), well graded GRAVEL with sand, dry and very dense.						
SW	Reddish brown (5 YR 4/4), well graded SAND with gravel, dry and very dense.						
GW	Brown (7.5 YR 4/4), well graded GRAVEL with sand, dry and very dense. ...50% gravel (angular volcanics), 45-50% sand (poorly sorted), 1-5% fines (silt). ...collect DBSA-8-Q-110. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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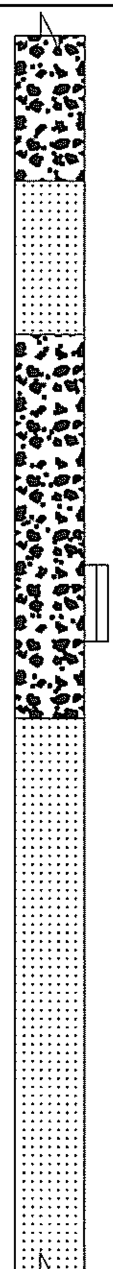
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 8

EXPLORATION LOG
DBSA 8

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-17-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
115		SW	Strong brown (7.5 YR 4/6), well graded SAND with gravel, dry and very dense.						
117.5		GW	Strong brown (7.5 YR 4/6), well graded GRAVEL with sand, dry and very dense.						
120			...collect DBSA-8-Q-120 and DBSA-8-Q-120-FD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
122.5		SW	Brown (7.5 YR 4/4), well graded SAND with gravel, dry, very dense. 15-20 % gravel, gravel consists of angular volcanics. 80% sand, poorly sorted. 1-5% fines (silt).						
125									
127.5									

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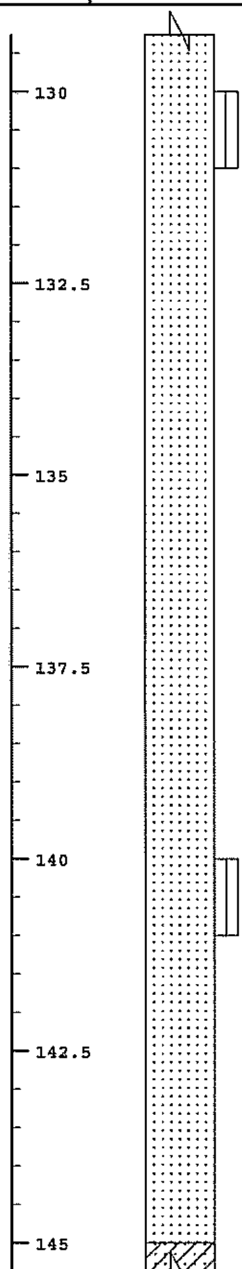
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 8

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-17-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
130			...collect DBSA-8-Q-130. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			...20% gravel (angular volcanics), 75-80% sand (poorly sorted), 1-5% fines (silt).						
140			...collect DBSA-8-Q-140. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
145		SC	Reddish brown (5 YR 4/4), clayey SAND						

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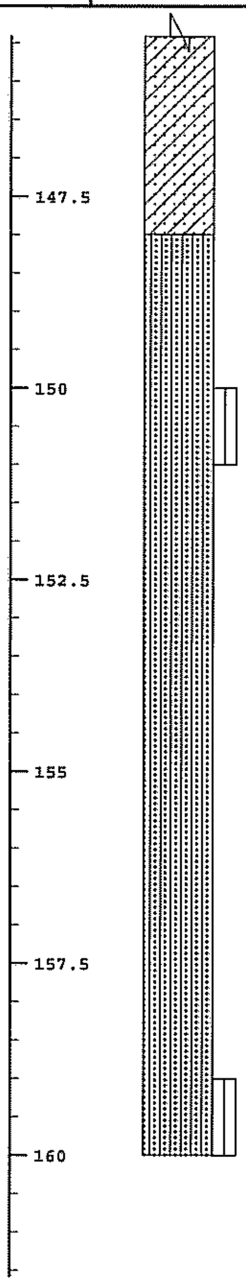
EXPLORATION LOG
DBSA 8

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-17-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			with gravel, dry and very dense.						
		SM	Reddish brown (5 YR 5/3), silty SAND with gravel, dry and very dense. ...collect DBSA-8-Q-150. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...10% gravel, 75-80% sand, 10-15% fines. ...collect DBSA-8-Q-160.						
			END OF BORING AT 160.0 FEET						

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EXPLORATION LOG
DBSA-9

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-15-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0		PAVE	Dark gray ASPHALT 2.25 inches thick.						
		FILL	Strong brown (7.5 YR 5/4) silty SAND with gravel, dry.						
2.5		SM	Strong brown (7.5 YR 5/4) silty SAND with gravel, dry and dense. ...boring cleared with air knife to 5'.						
5 7.5 10 12.5		SW	Brown (7.5 YR 5/4) well graded SAND with gravel, little cobbles (5" diameter angular andesite), dry and dense. Collect DBSA 9-Q-5. PIDs: 10.6, 11.7 eV = 0.0 ppmV. 20% gravel (angular basalt and andesite), 75% sand (poorly sorted), 1-5% fines. ...collect DBSA-9-Q-10 PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
15		GW	Brown (7.5 YR 5/4) well graded GRAVEL with sand, little cobbles (up to 7" diameter angular andesite), dry and dense. 60% gravel (80% of gravel is angular andesite, 20% of gravel is basalt, dacite, and						

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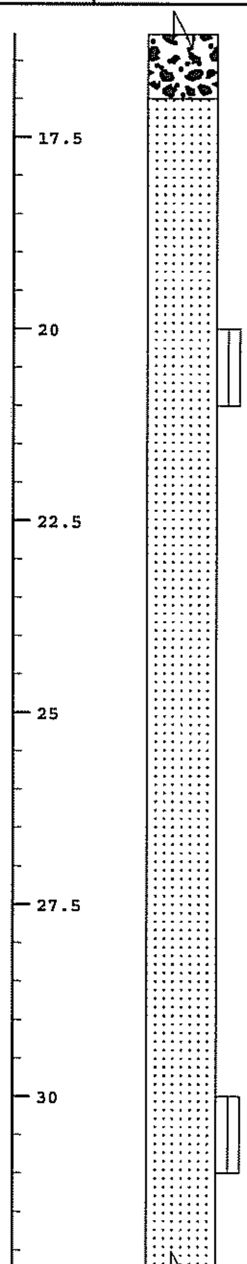
EXPLORATION LOG
DBSA-9

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-15-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			trachyte).						
		SW	Light brown (7.5 YR 6/4) well graded SAND, few gravel, dry and dense. 10% gravel, 85% sand, 1-5% fines. ...4" angular andesite cobbles to 20'. ...collect DBSA-9-Q-20 and DBSA-9-Q-20-FD PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...course, angular andesite gravel to 2. 5". From 25' to 27'. ...40-50% gravel (borderline well graded gravel (GW)). ... collect DBSA-9-Q-30 PIDs: 10.6, 11.7 eV = 0.0 ppmV						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 9

EXPLORATION LOG
DBSA-9

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-15-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5									
		GW	Brown (7.5 YR 5/4), well graded GRAVEL with sand, dry and very dense. Gravel consists of approximately 80% angular andesite and approximately 20% subangular basalt.						
35		SW	Brown (7.5 YR 5/4), well graded SAND with gravel, dry and very dense. Course, angular andesite gravel (1" to 2" diameter), to 38'.						
37.5									
40			...collect DBSA-9-Q-40. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
42.5									
			...5" angular basalt cobble.						
45									
47.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 9

EXPLORATION LOG
DBSA-9

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-15-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50			...2.5" angular andesite gravel Collect DBSA-9-Q-50, DBSA-9-Q-50-FD, and DBSA-9-Q-50-MS/MSD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
52.5									
55			...1" thick weakly cemented layer.						
57.5									
60			...collect DBSA-9-Q-60 PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
62.5									

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EXPLORATION LOG
DBSA-9

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-15-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
65									
			...15-20% gravel, 75-80% sand, and 1-5% fines.						
67.5									
70			...10% gravel, 85-90% sand, 1-5% fines. ...collect DBSA-9-Q-70 PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
72.5			...15-20% gravel, 75-80% sand, 1-5% fines.						
75									
77.5									
80			...collect DBSA-9-Q-80 PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 9

EXPLORATION LOG
DBSA-9

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-15-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			15% gravel, 80% sand, 1-5% fines.						
82.5									
			...3" angular andesite cobble.						
85									
87.5									
90			...collect DBSA-9-Q-90. PIDs: 10.6, 11.7 eV = 0.0 ppmV. 10-15% gravel, 85% sand, 1-5% fines.						
92.5									
95									
		GW	Brown (7.5 YR 5/4), well graded GRAVEL with sand, dry and very dense. Gravel						

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EXPLORATION LOG
DBSA-9

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-15-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
97.5			consists of 80% basalt and andesite, 20% trachyte, dacite, and latite.						
100			...collect DBSA-9-Q-100. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...weakly cemented nodules of sand with white salt coatings. Salt coatings observed in cemented soil to 160'.						
102.5									
		SW	Brown (7.5 YR 5/4), well graded SAND with gravel, dry and very dense.						
105			...weakly cemented sand layers 1" thick (multiple thin layers to 108').						
107.5									
110			...multiple weakly cemented sand layers 1" thick to 111'. ...collect DBSA-9-Q-110. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
112.5			...multiple weakly cemented sand layers 1" thick to 114'.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA-9

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-15-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
115									
117.5			...thin (.25"), white (10 YR 8/1), weathered and leached CALICHE lenses/stringers within cemented sand nodules. Caliche is soft to medium dense, moist. Caliche stringers are from 116' to 116.5'.						
120			...collect DBSA-9-Q-120 and DBSA-9-Q-120-FD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
122.5			...weakly cemented sand to 123.5'.						
125			...multiple weakly cemented layers of sand 1" to 1.5" thick to 130'.						
127.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA-9

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-15-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
130			...collect DBSA-9-Q-130. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
132.5									
135			...weakly cemented sand to 140'.						
137.5									
140		SW-SC	...moist: 140' to 143'. ...collect DBSA-9-Q-140. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...trace clay.						
142.5			...dry.						
145		SC	Brown (7.5 YR 4/4), clayey SAND with						

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EXPLORATION LOG
DBSA-9

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-15-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			gravel, moist and very dense.						
147.5									
150			...collect DBSA-9-Q-150. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Gravel: 50% angular basalt and andesite, 50% dacite and trachyte. Sand: poorly sorted.						
152.5			MUDDY CREEK FORMATION: Brown (7.5 YR 4/4), clayey SAND with gravel, moist and very dense. ...borderline sandy lean clay (CL) from 154' to 158' bgs.						
155									
157.5			...collect DBSA-9-Q-160. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
160			**END OF BORING AT 160.0 FEET**						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 10

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-16-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0		PAVE	Dark gray ASPHALT 2.0 inches thick.						
		FILL	Brown (7.5 YR 5/4), silty SAND with gravel, dry.						
2.5			Brown (7.5 YR 5/4), silty SAND with gravel, dry and dense.						
			...boring cleared with air knife to 5'.						
5		SW	Reddish brown (5 YR 5/3), well graded SAND, few gravel, dry, dense. Gravel is .5" to 1" size, angular andesite. Sand is poorly sorted. Trace fines (1%).						
7.5			...Collect DBSA-10-Q-5. PIDs: 10.6, 11.7 eV = 0.2, 0.1 ppmV. No odors or stained soils observed.						
10			...collect DBSA-10-Q-10. PIDs: 10.6, 11.7 eV = 2.1, 0.2 ppmV. No odors or stains observed.						
12.5			...occasional course gravel to 2" size, angular to subangular volcanics (basalt and andesite) to 20' depth.						
15									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 10

EXPLORATION LOG
DBSA 10

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-16-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...same soil (SW) as described at 5' bgs.						
17.5									
			...brown (7.5 YR 5/2).						
20			...collect DBSA-10-Q-20 and DBSA-10-Q-FD. PIDs: 10.6, 11.7 eV = 1.0, 0.0 ppmV.						
22.5									
25									
27.5									
30			...collect DBSA-10-Q-30 PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			...weakly cemented to 35'.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 10

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-16-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5			...same soil (SW) as described at 5' bgs.						
35			...uncemented.						
37.5									
40			...brown (7.5 YR 4/4). ...collect DBSA-10-Q-40. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
42.5			...moist to 45'.						
45			...dry.						
47.5									

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EXPLORATION LOG
DBSA 10

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-16-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...same soil (SW) as described at 5' bgs.						
50			...collect DBSA-10-Q-50. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
52.5									
55			...5" angular basalt cobble.						
57.5									
60			... collect DBSA-10-Q-60. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			...3" subangular basalt cobble.						
62.5			...white (10 YR 8/1), salt coatings on gravel and cemented sand nodules.						

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EXPLORATION LOG
DBSA 10

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-16-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
65			...same soil (SW) as described at 5' bgs.						
			...15-20% gravel (angular to subangular basalt and andesite), 75-80% sand (poorly sorted), 1% fines.						
67.5									
70			...collect DBSA-10-Q-70. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
72.5									
75			...borderline well graded gravel (GW) at 75' (approximately 40% gravel). Gravel consists of angular andesite and basalt.						
77.5									
80			...collect DBSA-10-Q-80. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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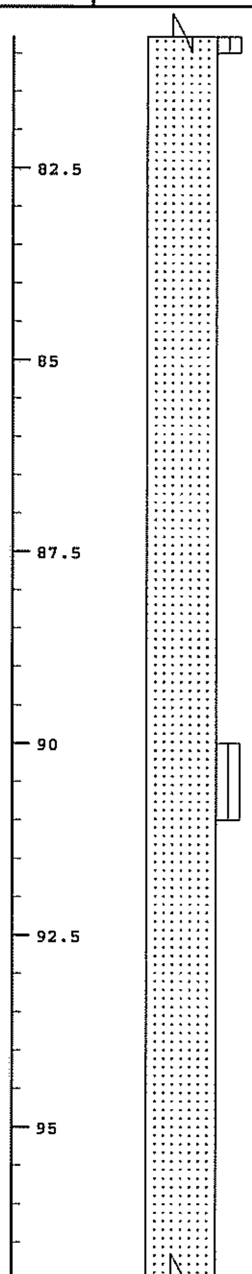
EXPLORATION LOG
DBSA 10

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-16-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...same soil (SW) as described at 5' bgs.						
82.5									
85			...4" subangular to angular "blocky" basalt cobble.						
			...weakly cemented sand to 94'.						
87.5									
90			...collect DBSA-10-Q-90. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...10% gravel, 90% sand, 1% fines.						
92.5									
95									



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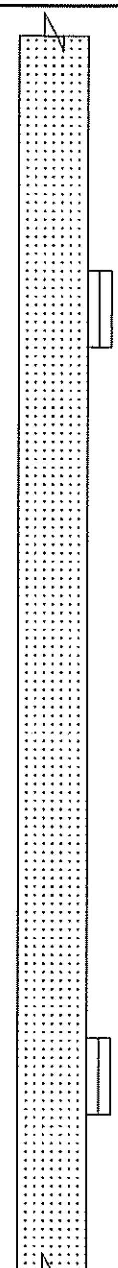
EXPLORATION LOG
DBSA 10

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-16-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
97.5			...same soil (SW) as described at 5' bgs.						
			...4" subangular basalt cobble.						
100			...collect DBSA-10-Q-100. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
102.5			...weakly cemented sand to 105'.						
105									
107.5									
110			...collect DBSA-10-Q-110. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
112.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 10

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-16-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...same soil (SW) as described at 5' bgs.						
115									
117.5									
120			...collect DBSA-10-Q-120. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
122.5									
125									
127.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 10

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-16-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
130			...same soil (SW) as described at 5' bgs. ...collect DBSA-10-Q-130. PIDs: 10.6, 11.7 eV = 0.0 ppmV. 10% gravel (angular andesite and subangular basalt), 90% sand (poorly sorted), 1% fines.						
132.5									
135			...weakly cemented sand to 137'.						
137.5									
140			...collect DBSA-10-Q-140. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
142.5									
145									

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

EXPLORATION LOG
DBSA 10

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-16-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...same soil (SW) as described at 5' bgs.						
147.5									
150			...collect DBSA-10-Q-150. PIDs: 10.6, 11.7 eV = 0.0 ppmV. 10% gravel (angular andesite and subangular basalt), 85-90% sand, (poorly sorted), 1-5% fines. No plasticity detected in the fine fraction using field tests.						
152.5									
155									
157.5			...weakly cemented sand with gravel to 160'.						
			...collect DBSA-10-Q-160. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
160			**END OF BORING AT 160.0 FEET**						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

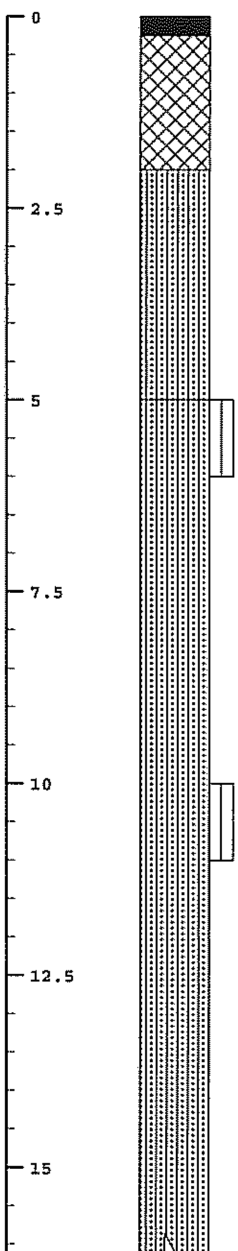
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 10

EXPLORATION LOG
DBSA 11

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-07-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0		PAVE	Dark gray ASPHALT 2.5 inches thick.						
		FILL	Brown silty SAND, few gravel, dry.						
2.5		SM	Brown silty SAND, few gravel, dry and dense. ...boring cleared with air knife to 5'.						
5		SM	...collect DBSA-11-Q-5. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Brown (7.5 YR 5/3), silty SAND with gravel, few cobbles to 8" diameter, dry, and dense. 5% Gravel (angular to subangular basalt and andesite), 85% sand (poorly sorted), 10% fines. ...collect DBSA-11-Q-10. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...few cobbles to 3" diameter.						

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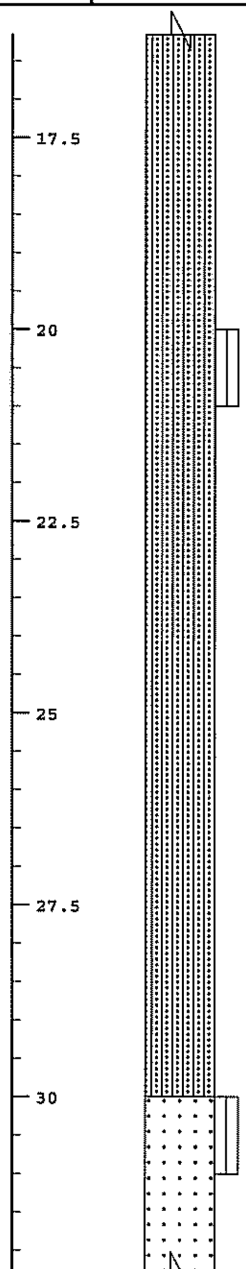
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 11

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-07-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
20			...collect DBSA-11-Q-20. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Brown (7.5 YR 5/3), silty SAND with gravel, few cobbles to 8" diameter, dry, and dense. 5% gravel (angular to subangular basalt and andesite), 85% sand (poorly sorted), 10% fines.						
25			...weakly cemented sand layer 1" thick.						
			...90% sand, well sorted.						
30		SP	...collect DBSA-11-Q-30. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Reddish gray (5 YR 3/2), poorly graded SAND, few gravel, dry and very dense. ...gravel size increases to 2" from 31' to 32'.						

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EXPLORATION LOG
DBSA 11

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-07-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5			...weakly cemented sand layers 1.5" thick.						
35									
37.5			...crystaline calcite to 1/16", forming rosettes.						
40		SW	...collect DBSA-11-Q-40 and DBSA-11-Q-40-FD. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Reddish brown (5 YR 5/3), well graded SAND with gravel, dry, and very dense. ...subangular basalt cobble 5" in diameter.						
42.5									
45									
47.5									

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EXPLORATION LOG
DBSA 11

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-07-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50			...collect DBSA-11-Q-50. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			...weakly cemented sand and gravel layer.						
52.5			...basalt cobble 4" in diameter.						
55			...brown (5 YR 5/4).						
57.5			...trace (1%) fines.						
60			...collect DBSA-11-Q-60. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
62.5									

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EXPLORATION LOG
DBSA 11

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-07-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
65									
67.5									
70			...collect DBSA-11-Q-70. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
72.5									
75			...4-1/2" diameter angular to subangular andesite cobble.						
77.5			...weakly cemented sand and gravel layer to 78'bgs.						
80			...collect DBSA-11-Q-80. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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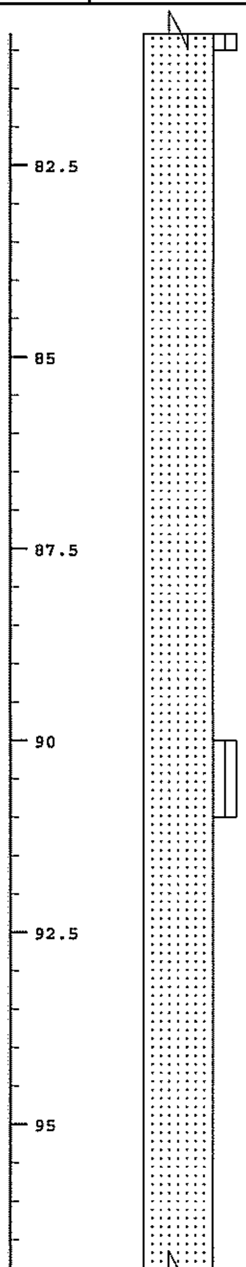
EXPLORATION LOG
DBSA 11

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-07-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...3" diameter andesite cobble. 20% gravel (angular), 75% sand (poorly sorted), 5% fines.						
82.5			...4" diameter subangular basalt cobble.						
85			...weakly cemented sand and gravel layer.						
87.5									
90			...collect DBSA-11-Q-90. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			...laminated sand and silt layers 1/4" to 1/2" thick, weakly cemented.						
92.5			...3" diameter andesite cobble, subrounded to subangular.						
			...course gravel and cobbles from 92.5' to 94'. 45% gravel (angular to subangular andesite and basalt), 50% sand (poorly sorted), 5% fines.						
95									
			...slight increase in soil moisture content.						

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EXPLORATION LOG
DBSA 11

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-07-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
97.5									
100			...10-15% gravel. ...collect DBSA-11-Q-100. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
102.5			...3" diameter basalt cobble, vessicular texture, with secondary calcite crystalization.						
105			...weakly cemented sand and gravel layer from 106' to 108'.						
107.5									
110			...gravel with weak red (10 YR 4/3) alteration mineralization. ...collect DBSA-11-Q-110. PIDs: 1.6, 11.7 eV = 0.0 ppmV.						
112.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 11

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-07-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
115									
117.5									
120			...collect DBSA-11-Q-120, DBSA-11-Q-120- FD, and DBSA-11-Q-120-MS/MSD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
122.5									
125									
		SC	Brownish gray (7.5 YR 6/2) clayey SAND, dry, weakly cemented and very dense.						
		SW	Reddish brown, well graded SAND with gravel, dry and very dense.						
127.5									
			...3" diameter subangular andesite cobble.						

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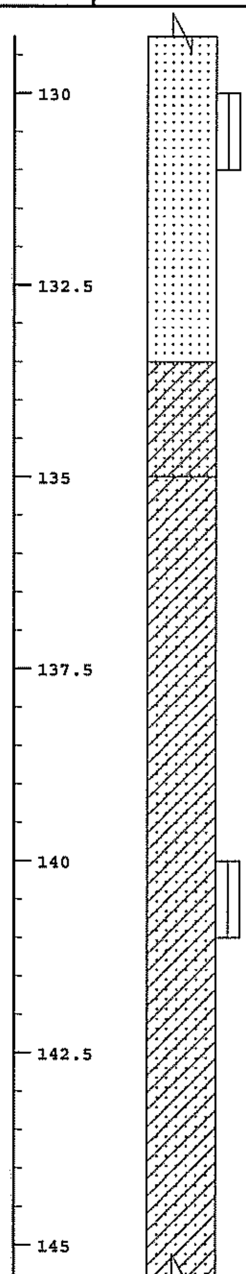
EXPLORATION LOG
DBSA 11

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-07-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
130			...collect DBSA-11-Q-130. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
132.5			...moist.						
		SW-SC	Reddish brown (7.5 YR 5/3), well graded SAND with clay, moist and dense.						
135		SC	MUDDY CREEK FORMATION: Reddish brown (7.5 YR 5/3), clayey SAND, few gravel, moist, and very dense. Massive layers of clayey sand. ...10% gravel (3/8" to 1" in size, sub angular to angular andesite and basalt).						
140			...collect DBSA-11-T-140. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
142.5			...multiple moist zones from 142' bgs to 159' bgs..						
145									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 11

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-07-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
147.5									
150			...collect DBSA-11-T-150. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
152.5									
155			...course gravel to 2.5" in diameter.						
157.5									
			...collect DBSA-11-T-160. PIDs: 10.6, 11.7 eV = 0.0 ppm.						
160			**END OF BORING AT 160.0 FEET**						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

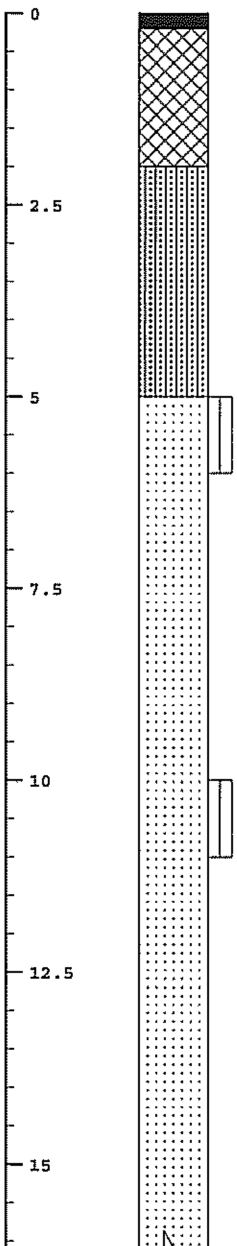
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 11

EXPLORATION LOG
DBSA 13

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0		PAVE	Dark gray ASPHALT 2.25 inches thick.						
		FILL	Brown (7.5 YR 4/4), silty SAND with gravel, dry. 25% gravel, 70% sand, 1-5% fines. Gravel consists of angular to subangular andesite and basalt. ...boring cleared with air knife to 5' bgs.						
2.5		SM	Brown (7.5 YR 4/4), silty SAND with gravel, dry and dense.						
5		SW	...collect DBSA-13-Q-5. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Brown (7.5 YR 4/3), well graded SAND with gravel, dry and dense. 10% gravel (angular to subangular basalt and andesite), 85% sand (poorly sorted), mostly medium to course grain, 1-5% Fines (silt).						
10			...collect DBSA-13-Q-10. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			...5" subangular basalt cobble.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 13

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
17.5									
20			...borderline gravel (30-40% gravel). ...collect DBSA-13-Q-20. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
22.5									
25		SP	Brown (7.5 YR 5/4), poorly graded SAND, few gravel, dry, and dense. 5-10% gravel (angular, less than 1" diameter), sand consists of 80% medium to course sand.						
27.5		SW	Reddish brown (5 YR 4/3), well graded SAND with gravel, dry and very dense.						
30			...collect DBSA-13-Q-30. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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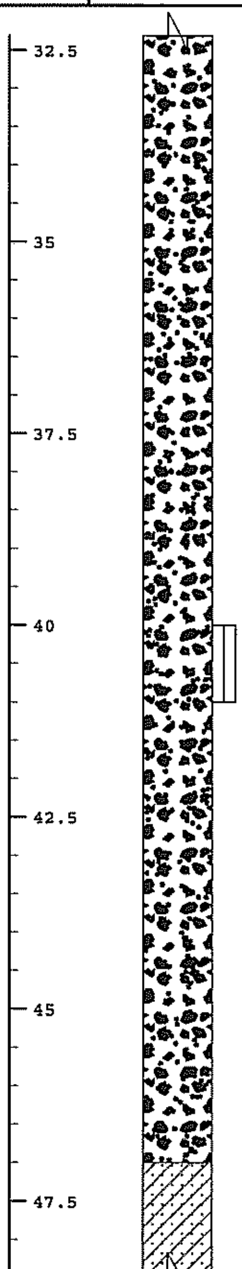
EXPLORATION LOG
DBSA 13

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5 – 47.5 (see graphic)		GW	Reddish brown (5 YR 4/3), well graded GRAVEL, dry, and very dense. Gravel consists of 80% basalt and andesite, 20% latite, dacite, and trachyte. ...4" subangular basalt cobble. ...collect DBSA-13-Q-40. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
		SC	Reddish brown (5 YR 4/3), clayey SAND with gravel, moist and very dense.						

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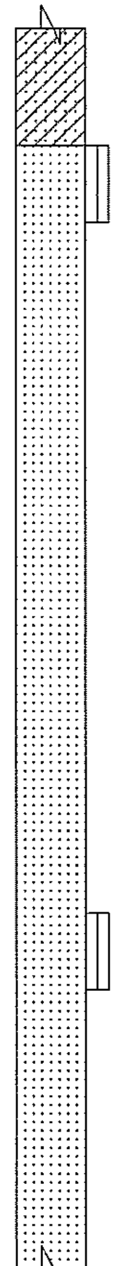
EXPLORATION LOG
DBSA 13

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...47' to 49' is weathered, brittle gravel/ cobble (basalt).						
50		SW	...collect DBSA-13-Q-50. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Reddish brown (5 YR 4/4), well graded SAND with gravel, dry and very dense. Light reddish brown (2.5 YR 6/4) oxidation coatings on gravel. Gravel is weathered and brittle, dominantly andesite and basalt.						
52.5									
55									
57.5									
			...5" subangular basalt cobble.						
60			...collect DSA-13-Q-60. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
62.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 13

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
65									
67.5			...4" sub-rounded basalt cobble.						
70			...collect DBSA-13-Q-70. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
72.5		GW	Reddish brown (5 YR 4/4), well graded GRAVEL with sand, dry and very dense.						
75		SW	Reddish brown (5 YR 4/4), well graded SAND with gravel, dry and very dense.						
77.5									
80			...collect DBSA-13-Q-80. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 12

EXPLORATION LOG
DBSA 13

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
82.5									
85		GW	Brown (7.5 YR 5/3), well graded GRAVEL with sand, dry and very dense.						
87.5			...weakly cemented to 91'.						
			...with course gravel up to 2" diameter and cobbles.						
90			...collect DBSA-13-Q-90. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
		SW	Brown (7.5 YR 4/4), well graded SAND with gravel, dry and very dense.						
92.5									
95									

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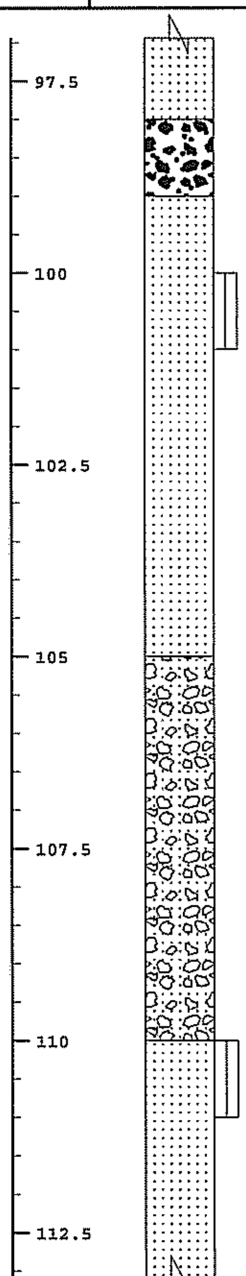
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 12

EXPLORATION LOG
DBSA 13

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
97.5		...weakly cemented to 98'.						
	GW	Brown (7.5 YR 4/4), well graded GRAVEL with sand, dry and very dense.						
100 102.5	SW	Brown (7.5 YR 4/4), well graded SAND with gravel, dry and very dense. ...collect DBSA-13-Q-100. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
105 107.5	SW	...borderline well graded gravel (GW) (approximately 40 % gravel). Course, angular to subangular basalt gravel (2" to 3"). ...SW/GW to 110'. ...6" subangular basalt cobble.						
110 112.5	SW	...collect DBSA-13-Q-110. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...105' to 120': Gravel consists of 20-30% angular basalt and andesite (80% of gravel) and 20% dacite and latite. 65-70%						

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EXPLORATION LOG
DBSA 13

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			sand (poorly sorted), medium to course sand. 5% Fines (silt).						
115			...4"-5" subangular basalt cobble with white (10 YR 8/1) carbonate cement coating.						
117.5			...4"-5" diameter subangular basalt cobble.						
120			...collect DBSA-13-Q-120 and DBSA-13-Q 120-FD. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...some basalt gravel is slightly chloritic (micro-chrystaline), 1- 3 % mica: .						
122.5		GW	Brown (5 YR 4/4), well graded GRAVEL with sand, trace mica, dry and very dense. ...4" diameter subangular basalt cobble.						
125		SW	Brown (5 YR 4/4), well graded SAND with gravel, dry and very dense. ...6" diameter subangular basalt cobble.						
127.5									

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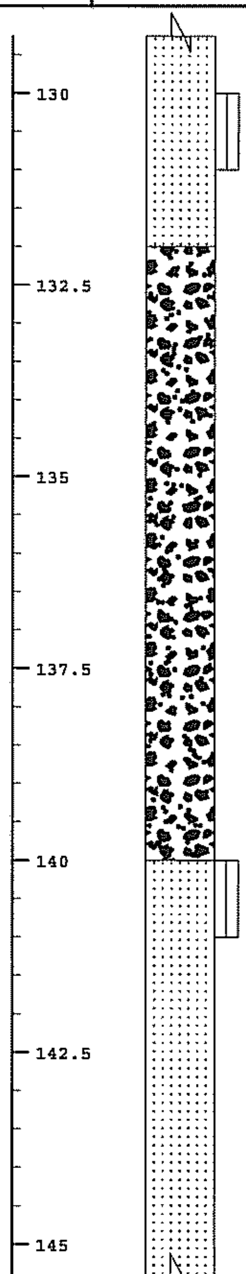
EXPLORATION LOG
DBSA 13

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
130			...collect DBSA-13-Q-130. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
132.5–140		GW	...mica - 1/16" diameter plates to 135' bgs. Brown (5 YR 4/4), well graded GRAVEL with sand, trace mica, dry and very dense. ...white (10 YR 8/1) caliche coatings and veins in gravel. Light greenish gray (Gley 1 7/1) coating on gravel (chloritic). ...weakly cemented to 140'. ...subangular basalt cobble, trace mica (1%).						
140–145		SW	...collect DBSA-13-Q-140. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Brown (5 YR 4/4), well graded SAND with gravel, dry and very dense.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 12

EXPLORATION LOG
DBSA 13

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-19-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
147.5									
150			...collect DBSA-13-Q-150. PIDs: 10.6, 11.7 = eV = 0.0 ppmV.						
		GW	Light reddish brown (5 YR 6/4) to dark reddish brown (5 YR 4/2), well graded GRAVEL with sand, few cobbles (basalt), dry, weakly to moderately cemented and hard.						
152.5		SW	Reddish brown (5 YR 5/3) well graded SAND with gravel, trace mica (less than 1%), dry, and very dense.						
155			...weakly cemented sand and gravel.						
157.5									
			...collect DBSA-13-Q-160. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
160			**END OF BORING AT 160.0 FEET**						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DSBA 14

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-09-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0		PAVE	Dark gray ASPHALT 3.0 inches thick.						
		FILL	Brown (7.5 YR 4/4) silty SAND, few gravel, moist. 5% gravel (angular to subrounded), 85% sand (poorly sorted), 10% fines.						
2.5		SM	Brown (7.5 YR 4/4) silty SAND, few gravel, moist and dense. ...boring cleared with air knife to 5'.						
5		SW	...collect DBSA-14-Q-5. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Brown (7.5 YR 4/3) well graded SAND with gravel, dry and dense. 15% gravel (angular to subangular basalt and andesite), gravel diameter up to 2.5".						
7.5									
10			...collect DBSA-14-Q-10. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
12.5									
15			...15' to 18': few cobbles to 6" diameter (subrounded basalt and subangular andesite).						

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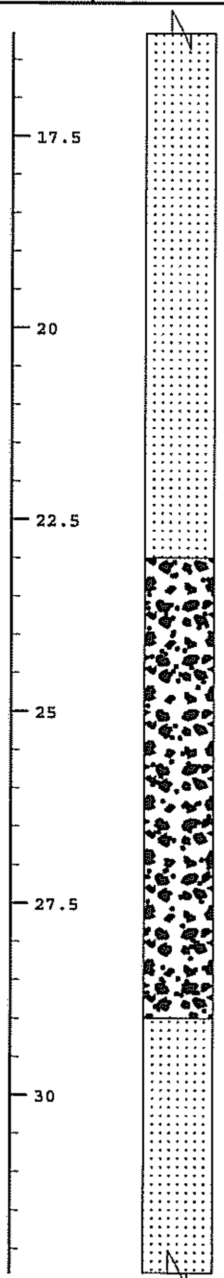
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DSBA 14

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-09-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
17.5, 20, 22.5			...collect DBSA-14-Q-20 PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...20-25% gravel.						
25, 27.5		GW	Brown (7.5 YR 5/3) well graded GRAVEL with sand, dry and very dense. Course gravel up to 2.5" diameter. Trace cobbles up to 3.5" diameter.						
30		SW	Brown (7.5 YR 5/3) well graded SAND with gravel, dry and very dense. ...collect DBSA-14-Q-30 PIDs: 10.6, 11.7 eV = 0.0 ppmV.						



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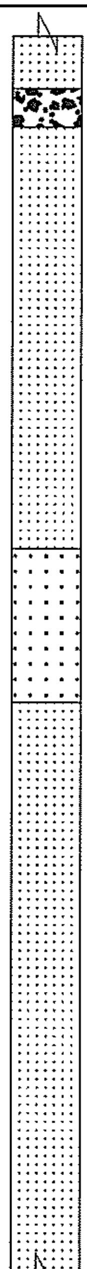
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 13

EXPLORATION LOG
DSBA 14

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-09-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5									
		GW	Brown (7.5 YR 5/3) well graded gravel with sand, dry and very dense.						
35		SW	Brown (7.5 YR 5/3) well graded SAND with gravel, dry and very dense. ...reddish brown (5 YR 4/4) ...gravel decreases to 10%. 90% sand, trace (1%) fines.						
37.5									
40		SP	Reddish brown (5 YR 5/3) poorly graded SAND, few gravel, dry and very dense. ...collect DBSA-14-Q-40 PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
42.5		SW	Reddish brown (5 YR 5/4) well graded SAND, few gravel, dry and very dense.						
45									
47.5			...2" thick weakly cemented sand layer.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DSBA 14

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-09-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
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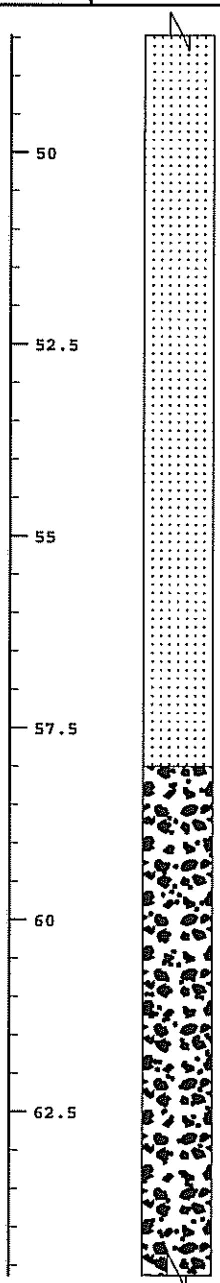
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50			...collect DBSA-14-Q-50, DBSA-14-Q-50-FD, DBSA-14-Q-50-MS/MSD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
52.5			...3"-4" diameter subangular basalt cobbles to 55' bgs. Cobbles comprise 10-15% of soil in this depth range. Soil is moist.						
57.5		GW	Reddish brown (5 YR 5/4) well graded GRAVEL with sand, dry and very dense.						
60			...collect DBSA-14-Q-60 PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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EXPLORATION LOG
DSBA 14

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-09-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** NA

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
65		SW	Reddish brown (5 YR 5/4) well graded SAND with gravel, dry and very dense.						
67.5		SP	Reddish brown (5 YR 5/4) poorly graded SAND, few gravel, dry and very dense. 5-10% gravel (angular to subangular andesite and basalt), 85% sand (well sorted), 5% fines.						
70 72.5 75 77.5		SW	...collect DBSA-14-Q-70 PIDs: 10.6, 11.7 eV = 0.0 ppmV. Reddish brown (5 YR 5/4) well graded SAND with gravel, dry and very dense. 20% gravel (angular to subangular andesite and basalt), 75% sand (poorly sorted), 1-5% fines.						
80		SP	Reddish brown (5 YR 5/4) poorly graded SAND little gravel, dry and very dense. 5-10% gravel (angular to subangular andesite and basalt), 85% sand (well sorted), 5% fines. ...collect DBSA-14-Q-80 PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DSBA 14

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
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EXPLORATION DATE: 10-09-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
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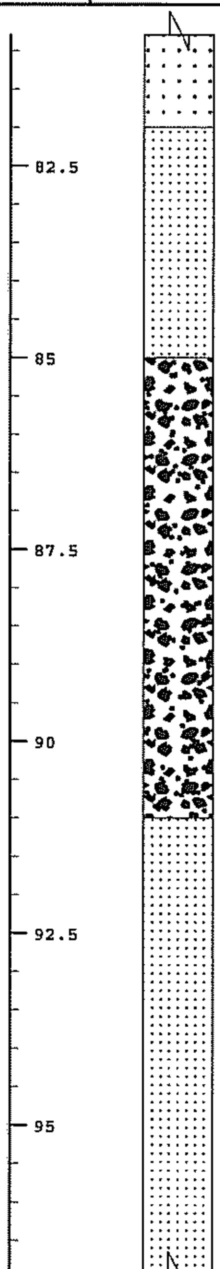
DATE MEASURED: NA



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
		SW	Reddish brown (5 YR 5/4) well graded SAND with gravel, dry and very dense.						
		GW	Reddish brown (5 YR 5/4) well graded GRAVEL with sand, dry and very dense. ...3" diameter andesite cobble with chloritic inclusions. ...collect DBSA-14-Q-90 PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
		SW	Reddish brown (5 YR 5/4) well graded SAND with gravel, dry and very dense.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DSBA 14

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
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EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
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ELEVATION: EXISTING GROUND SURFACE
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INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
97.5			...slight increase in soil moisture to 98.5'.						
100			...collect DBSA-14-Q-100. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
102.5									
105		SW	Reddish brown (5 YR 5/4) well graded SAND with gravel, dry and very dense.						
107.5									
110			...collect DBSA-14-Q-110 PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
112.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DSBA 14

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-09-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
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FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
115									
117.5		GW	Reddish brown (5 YR 5/4) well graded GRAVEL with sand, dry and very dense.						
120			...collect DBSA-14-Q-120 PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...trace 3" diameter cobbles (subangular basalt).						
122.5		SW	Reddish brown (5 YR 5/4) well graded SAND with gravel, dry and very dense.						
125			...moist to 127'.						
127.5			...multiple weakly cemented sand layers 1" to 2" thick to 130'.						

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EXPLORATION LOG
DSBA 14

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-09-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
130			...collect DBSA-14-Q-130 PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
132.5									
135									
137.5			...weakly cemented sand and gravel to 140'.						
			...4" diameter subangular basalt cobble.						
			4" diameter angular andesite cobble.						
140			...collect DBSA-14-Q-140 PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
142.5									
145									

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

EXPLORATION LOG
DSBA 14

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-09-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
147.5			...15% gravel (angular to subangular andesite and basalt), 85% sand (poorly sorted), trace (1%) fines. No plasticity observed in field tests of soil.						
150			...collect DBSA-14-Q-150. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
152.5									
155									
157.5									
160		GW	...collect DBSA-14-Q-160. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Light reddish brown (5 YR 6/3) well graded GRAVEL, some basalt cobbles, dry and very dense.						
			END OF BORING AT 160.0 FEET						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

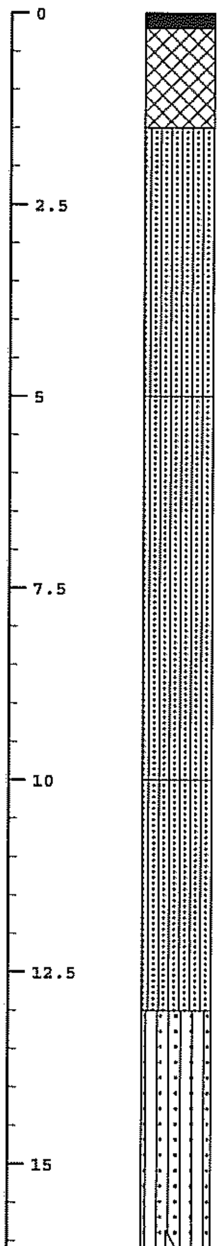
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 13

EXPLORATION LOG
DSBA 15

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-06-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0		PAVE	Dark gray ASPHALT 3.25 inches thick.						
		FILL	Light brown (7.5 YR 6/4) silty SAND with gravel, moist.						
2.5		SM	Light brown (7.5 YR 6/4) silty SAND with gravel, moist and dense. ...boring cleared with air knife to 5'.						
5 / 7.5		SM	...Sample DBSA-15-Q-5, PID's: 10.6 eV= 0.4 ppmv, 11.7 eV = 2.1 ppmv. Light brown (7.5 YR 6/4) silty Sand with gravel, (approximately 25% gravel (poorly graded, subrounded, approximately 30% medium gravel, 70% fine gravel), approximately 20% silt, 60% sand (well-graded, subrounded, approximately 30% course sand, 30% medium sand, 40% fine sand), moist and dense. Sand: approximately 20% mafics, 80% felsics. Gravel: approximately 30% rhyolite, 30% chloritic andesite, 20% basalt, 20% latite.						
10 / 12.5		SM	...Sample DBSA-15-Q-10. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv. Light brown (7.5 YR 6/4) silty SAND (approximately 10% gravel (poorly graded, angular (planar), approximately 50% medium gravel, 50% fine gravel), approximately 20% silt, 70% sand (well-graded, subangular, approximately 40% course sand, 20% medium sand, 40% fine sand), moist and very dense.						
15		SP-SM	Reddish yellow (7.5 YR 6/6) poorly graded SAND with silt (appproximately 10% gravel (poorly graded, angular, approximatley 50% medium gravel, 50% fine grain), 10% silt, 80% sand (subrounded, approximately						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 14

EXPLORATION LOG
DSBA 15

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-06-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
17.5 20			30% course sand, 10% medium sand, 70% fine sand), moist and very dense. Sand: approximately 15% mafics, 85% felsics. Gravel: approximately 30% dacite, 70% basaltic andesite, at 15.5', basalt (vesicular, plagioclase); caliche coats gravel clasts. ..."skip" graded (approximately 5% sand) ...Samples DSBA-15-Q-20, DSBA-15-Q-20- FD. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
22.5 25 27.5		SP-SM	...same as above, except: Gravel is approximately 90% basalt, 10% dacite, weakly cemented in banded layers.						
30		SM	Reddish yellow (7.5 YR 6/6) silty SAND with gravel (approximately 15-20% gravel (well-graded, angular, approximately 30% course gravel, 30% medium gravel, 40% fine gravel), approximately 20% silt, 60% sand (poorly-graded ("skip" graded), subrounded, approximately 20% course sand, 10% medium sand, 70% fine sand), moist and very dense. Sand:						

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EXPLORATION LOG
DSBA 15

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-06-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5			approximately 5% mafics 95% felsics. Gravel: approximately 80% basalt, 10% dacite, 10% latite. ...collect sample DBSA-15-Q-30PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
35		SM	Light yellowish brown (10YR 6/4) silty SAND (approximately 10% gravel (poorly graded, angular, approximately 100% fine gravel), approximately 20% silt, 70% sand (poorly graded ("Skip" graded), subrounded, approximately 30% course sand, 10% medium sand, 60% fine sand), moist and very dense. Sand: approximatley 10% mafics, 90% felsics. Gravel: approximately 20% dacite, 80% basalt. ...weakly to moderatly cemented.						
37.5									
40			...Sample DBSA-15-Q-40. PID's: 10.6 eV= 0.4 ppmv, 11.7 eV = 2.1 ppmv. ...uncemented.						
42.5			...salt or caliche coats gravel clasts.						
45									
47.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DSBA 15

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-06-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50		SM	...Sample DSBA-15-Q-50. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv. ; same as before, with minor encrustations of cahiche/salt on gravel.						
52.5									
55 57.5 60 62.5		SW-SM	Light brown (7.5 YR 6/3) well-graded SAND with silt and gravel (approximately 20% gravel (well-graded, angular, approximately 30% course gravel, 30% medium gravel, 40% fine gravel), approximately 10% silt, 70% sand (subrounded-subangular, approximately 30% course sand, 25% medium sand, 45% fine sand)), moist and very dense. Sand: approximately 10% mafics (as basalt), 90% felsics. Gravel: approximately 70% basalt, 20% andesite (basaltic), 5% dacite, 5% green chloritic andesite. Weakly cemented in small calcite nodules. ...Sample DBSA-15-Q-60. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.; Gravel content increases to approximately 30-40%, consists of approximately 40% basalt, 20% dacite, 20% basaltic andesite, and 20% chloritic andesite. 0.25"-0.5" thick layers of weakly cemented caliche at 60'.						

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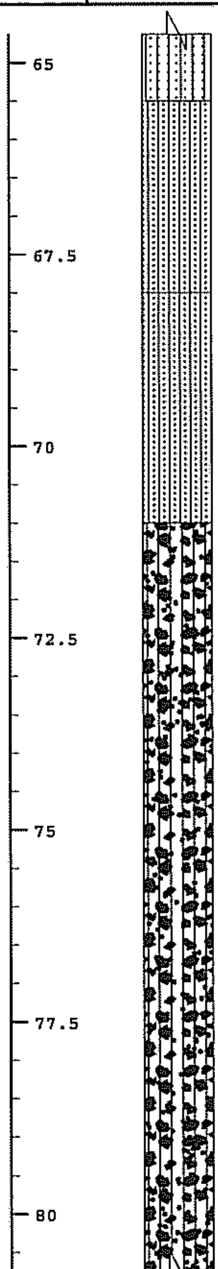
EXPLORATION LOG
DSBA 15

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-06-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
		SM	Strong brown (7.5 YR 4/6) silty SAND (approximately 30% silt, 70% sand (poorly-graded, subangular to subrounded, approximatley 30% course sand, 5% medium sand, 65% fine sand), moist. Sand: approximately 5% mafics, 95% felsics.						
		SM	Strong brown (7.5 YR 4/6) silty SAND with gravel (approximately 40% gravel, well-graded, angular, approximately 30% course gravel, 30% medium gravel, 40% fine gravel), approximately 20% silt, 40% sand, (poorly-graded, subrounded, approximately 20% course sand, 5% medium sand, 75% fine sand), moist and weakly cemented. Sand: approximately 10% mafics, 90% felsics. Gravel: approximately 60% basalt, 40% andesite. ...Sample DBSA-15-Q-70. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
		GW-GM	Light brown (7.5 YR 6/4) well-graded GRAVEL with silt and sand (approximately 10% silt, 30% sand (poorly-graded ("skip" graded), subrounded, approximately 20% course sand, 5% medium sand, 75% fine sand), approximately 60% gravel (angular, approximately 30% cobbles/boulders, 30% medium gravel, 40% fine gravel), moist and very dense. Gravel has approximately 60% basalt, 30% trachyte (propylitically altered), approximately 10% andesite. Sand: approximately 10% mafics, 90% felsics. ...from 77.5-81': laminated bed of silty sand with gravel (approximately 40% gravel (angular, well-graded), 60% sand (subrounded, poorly-graded), becomes weakly cemented at 80'.						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

EXPLORATION LOG
DSBA 15

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-06-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
82.5, 85		GW-GM	...Sample DBSA-15-Q-80. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv. ...similar to that encountered at 70' above. ...weakly to moderately cemented from 83'-85'; has 1'-2' beds of alternating flood deposits of well graded gravel with silt (GW-GM) and silty sand (SM).						
87.5, 90, 92.5, 95		SM	Light brown (7.5 YR 6/4) silty SAND with gravel (approximately 40% gravel (well-graded, angular, approximately 5% cobbles/boulders, 30% course gravel, 35% medium gravel, 30% fine gravel), approximately 20% silt, 40%-50% sand (subrounded, poorly-graded, approximately 30% course sand, 70% medium sand, 60% fine sand), moist and very dense. Gravel and sand have compositions similar to the soil at 75'. ...Sample DBSA-15-Q-90. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
		SM	Light brown (7.5 YR 6/4) silty SAND (approximately 5% gravel (poorly-graded, angular, 100% fine gravel), approximately 20% silt, 75% sand (poorly-graded, subrounded, approximately 10% course						

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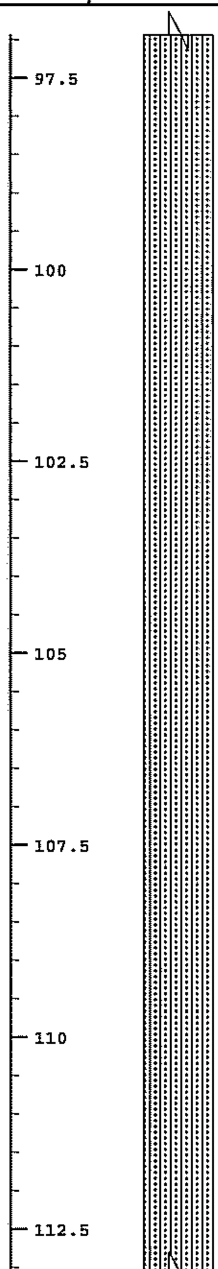
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DSBA 15

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-06-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
97.5–100			sand, 10% medium sand, 80% fine sand), moist and very dense. Sand: approximately 10% mafics, 90% felsics. Gravel: approximately 100% basalt. ...seguence is thinly-bedded to laminated. ...moderately cemented (99'-101'). ...sample DBSA-15-Q-100. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
110			...sample DBSA-15-Q-110. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv. ; same sediments as at 95'; weakly-moderately cemented layers occur at approximately every 1.5'-2.0'.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 14

EXPLORATION LOG
DSBA 15

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-06-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
115									
117.5									
120			...Sample DBSA-15-Q-120, -120-FD, -120 MS/MSD. PIDs: 10.6, 11.7 eV= 0.0 ppmV. Sediments are the same as described at 95', weakly cemented silty SAND with gravel. Gravel consists of angular volcanics, sand is poorly-graded.						
122.5									
125									
127.5			...weakly to moderately cemented sand with gravel.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DSBA 15

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-06-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: NA

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
130			...sampled DBSA-15-Q-130. PIDs: 10.6, 11.7 eV= 0.0 ppmV. ...uncemented at 130'.						
132.5			...weakly cemented.						
135									
137.5									
140			...borderline well graded gravel (GW). ...sampled DBSA-15-Q-140. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv. ...Increasing gravel percent to 35%. 5" basalt cobble at 140". Gravel is course (up to cobble size) and subangular to angular, sand is poorly graded.						
142.5									
145									

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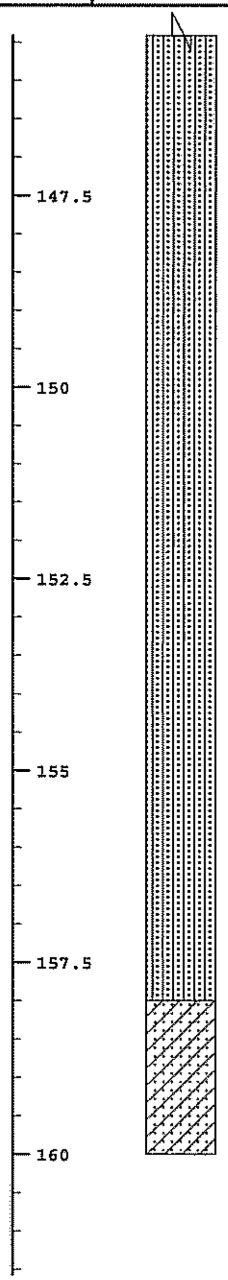
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DSBA 15

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-06-07
EXPLORATION SIZE (dia.): 6.0" CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** NA
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** NA



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
150			...weakly cemented. ...sampled DBSA-15-Q-150. PIDs: 10.6, 11.7 eV= 0.0 ppmV. 15-20% gravel (angular to subangular andesite and basalt), 75% sand (poorly-sorted), 5% fines. Gravel is dominatly basalt with accessory andesite, dacite.						
155			...3" basalt cobble.						
157.5		SW-SC	Reddish brown (2.5 YR 4/3) well graded SAND with clay, moist and very dense. Gravel size decrease to 1/2"-3/4". Gravel percentage= 10% subangular to angular. ...Sampled DBSA-15-Q-160. PIDs 10.6, 11. 7 eV= 0.0 ppmV.						
160			**END OF BORING AT 160.0 FEET**						

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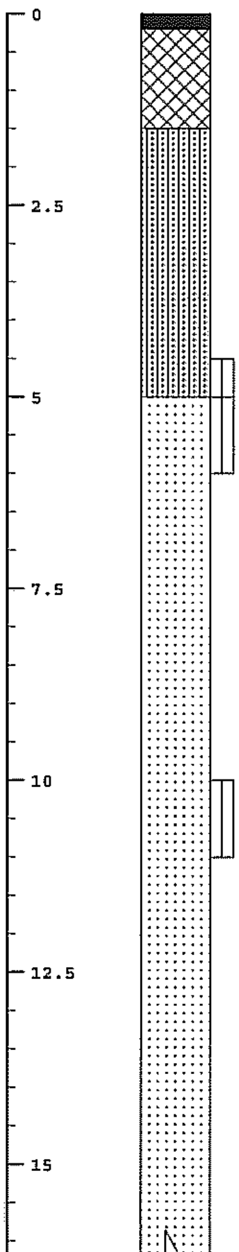
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 14

EXPLORATION LOG
DBSA 17

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-04-07
EXPLORATION SIZE (dia.): 6" O.D. CARIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: 140' BELOW GROUND SURFACE
DATE MEASURED: 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0		PAVE	Dark gray ASPHALT 2.0 inches thick.						
		FILL	Reddish brown (5 YR 3/2), silty SAND with gravel, dry. 30% gravel (angular to subangular andesite and basalt) 55% sand (poorly sorted), 15% fines.						
2.5		SM	Reddish brown (5 YR 3/2), silty SAND with gravel, dry and dense. ...boring cleared with air knife to 5'. ...dark reddish brown (5 YR 3/2)						
5		SW	Dark reddish brown (5 YR 3/2), well graded SAND with gravel, dry and very dense. ...collect DBSA-17-Q-5. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...15% gravel (angular to subangular), 75% sand (poorly sorted), 5-10% fines. 5-10%. ...weak red (2.5 YR 4/2). ...collect DBSA-17-Q-10. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...5% gravel, 90% sand, 5% fines. ...multiple thin (1" thick) weakly cemented layers.						

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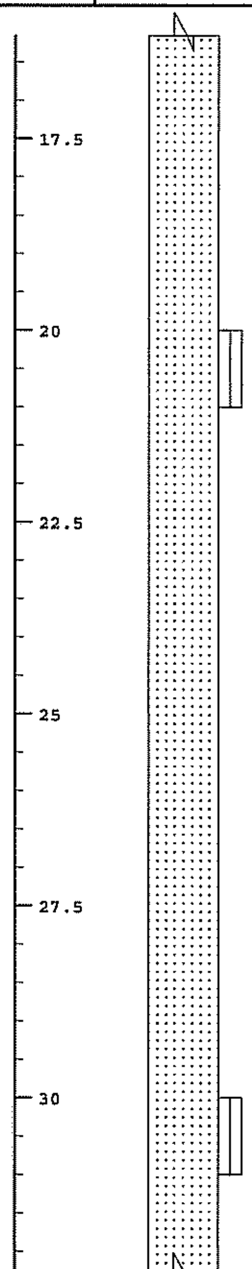
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 17

PROJECT: BRC DEEP BACKGROUND INVESTIGATION | **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 | **EXPLORATION DATE:** 10-04-07
EXPLORATION SIZE (dia.): 6" O.D. CARIDE TIP SHOE | **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE | **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: 140' BELOW GROUND SURFACE | **DATE MEASURED:** 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED | **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
17.5									
			...thin (1" thick) weakly cemented layer.						
20			...collect DBSA-17-Q-20. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			...reddish brown (5 YR 4/3), with 1" thick weakly cemented sand layers.						
22.5									
25									
27.5									
30			...collect DBSA-17-Q-30. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			...dark reddish brown (5 YR 4/2), with 1" thick weakly cemented layers of sand.						



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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 15

EXPLORATION LOG
DBSA 17

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-04-07
EXPLORATION SIZE (dia.): 6" O.D. CARIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: 140' BELOW GROUND SURFACE **DATE MEASURED:** 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5									
35									
37.5									
40			...collect DBSA-17-Q-40. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...1" thick weakly cemented sand layers.						
42.5									
45			...1" thick weakly cemented sand layers.						
47.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 17

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-04-07
EXPLORATION SIZE (dia.): 6" O.D. CARIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: 140' BELOW GROUND SURFACE **DATE MEASURED:** 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50			...reddish brown (5 YR 5/3). ...collect DBSA-17-Q-50. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...15-20% gravel (angular to subangular basalt and andesite), 65% sand (poorly sorted), 10-15% fines. ...moist.						
52.5									
55			...dry. ...weakly cemented, moist from 56'-57'.						
57.5									
60			...collect DBSA-17-Q-60. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...moist to 64'. ...increasing gravel size from 1" to 2.5".						
62.5		GW	Reddish brown (5 YR 5/3), well graded GRAVEL with sand, moist, and very dense. 55% gravel, 30% sand, 10-15% fines. ...moist to 64'.						

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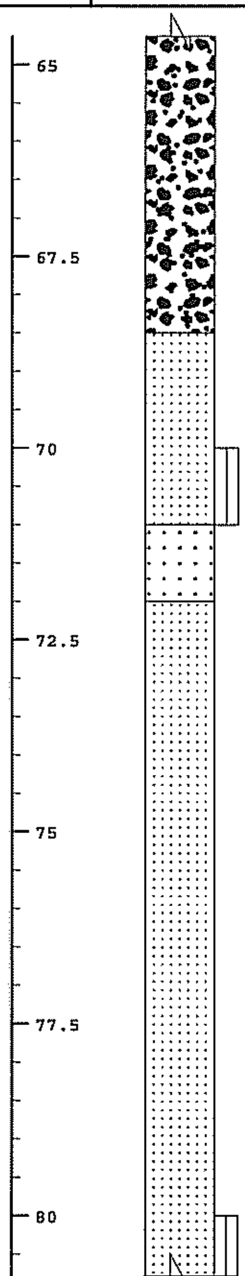
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 17

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-04-07
EXPLORATION SIZE (dia.): 6" O.D. CARIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: 140' BELOW GROUND SURFACE
DATE MEASURED: 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...general gravel size decreases to approximately 1" in diameter.						
		SW	Reddish brown (5 YR 5/3), well graded SAND with gravel, dry and very dense. ...collect DBSA-17-Q-70. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
		SP	Reddish brown (5 YR 5/3), poorly graded SAND, few gravels, moist and very dense.						
		SW	Reddish brown (5 YR 5/3), well graded SAND with gravel, dry and very dense. ...weakly cemented to 75'. ...moist to 77'. ...collect DBSA-17-Q-80, DBSA-17-Q-80-DUP, and DBSA-17-Q-80-MS/MSD						

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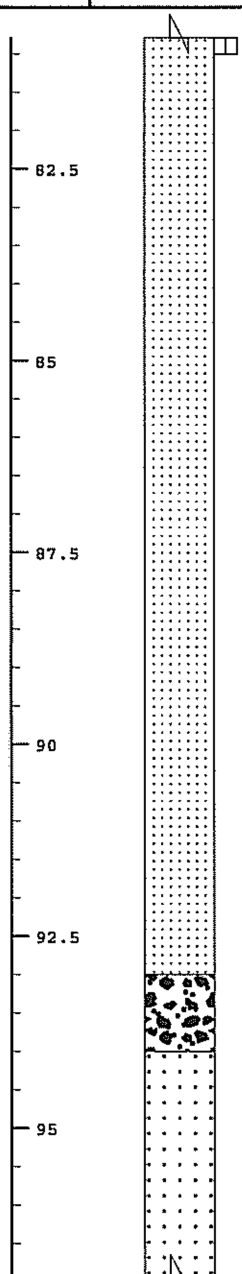
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 17

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-04-07
EXPLORATION SIZE (dia.): 6" O.D. CARIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: 140' BELOW GROUND SURFACE
DATE MEASURED: 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			...moist.						
			...moist to 89'.						
		GW	Reddish brown (5 YR 5/3), well graded GRAVEL with sand, dry and very dense.						
		SP	Reddish brown (5 YR 5/3), poorly graded SAND, few gravel, moist, and very dense. 5% gravel (angular to subangular andesite and basalt), 90% Sand (fine sand to medium sand), 5% fines.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 15

EXPLORATION LOG
DBSA 17

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-04-07
EXPLORATION SIZE (dia.): 6" O.D. CARIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: 140' BELOW GROUND SURFACE **DATE MEASURED:** 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
97.5 – 100			...collect DBSA-17-Q-100. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
102.5 – 112.5		SW	Reddish brown (5 YR 5/3), well graded SAND with silt and gravel, moist and very dense. ...andesite cobble 3" in diameter. ...collect DBSA-17-Q-110. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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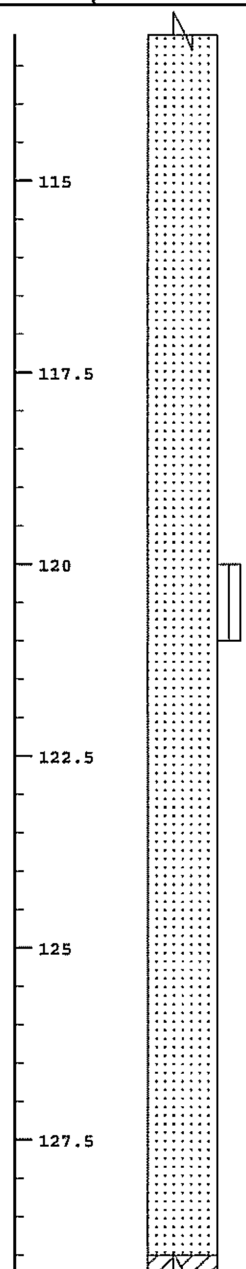
EXPLORATION LOG
DBSA 17

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-04-07
EXPLORATION SIZE (dia.): 6" O.D. CARIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: 140' BELOW GROUND SURFACE **DATE MEASURED:** 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED **DATE MEASURED:** N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
115			...moist to 117'.						
117.5									
120			...collect DBSA-17-Q-120. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
122.5			...15% gravel (angular to subangular andesite and basalt), 75% sand (poorly sorted), 10% fines.						
125									
127.5			...hard layer, slow drilling.						
			...reddish brown (5 YR 4/3).						

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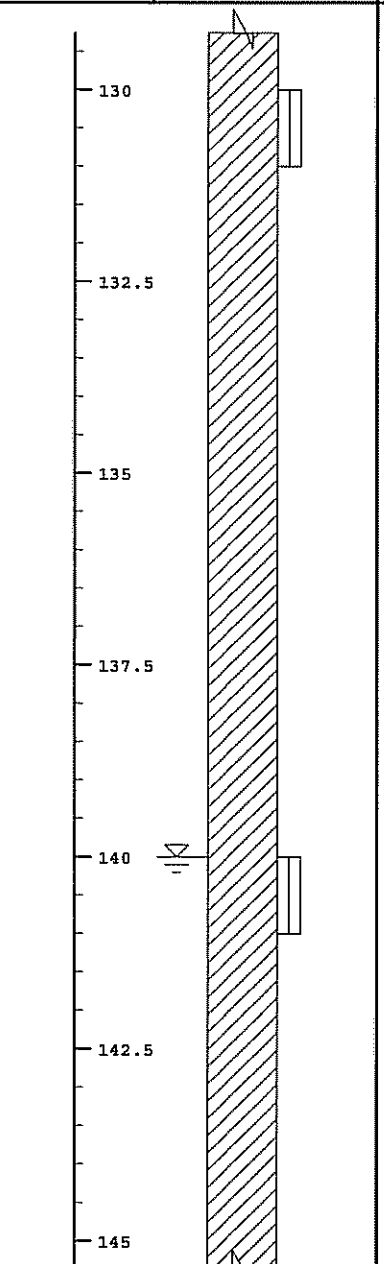
EXPLORATION LOG
DBSA 17

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-04-07
EXPLORATION SIZE (dia.): 6" O.D. CARIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: 140' BELOW GROUND SURFACE **DATE MEASURED:** 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
		CL	MUDDY CREEK FORMATION: Reddish brown (5 YR 5/3), sandy lean CLAY, moist and very stiff. Clay at 129' to 130' is crudely layered and contained fine layers (1/8" thick) of red (10YR 4/8) weathered mineralization, also white (10 YR 8/1) salt coatings on weakly cemented layers. ...collect DBSA-17-T-130. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...scattered thin deposits of altered mineralization, variably colored. ...wet. ...collect DBSA-17-T-140. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 17

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-04-07
EXPLORATION SIZE (dia.): 6" O.D. CARIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: 140' BELOW GROUND SURFACE **DATE MEASURED:** 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
147.5									
150			...collect DBSA-17-T-150. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			END OF BORING AT 150.0 FEET						
152.5									
155									
157.5									
160									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 15

EXPLORATION LOG
DBSA 20

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-03-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: 84.7' BELOW GROUND SURFACE **DATE MEASURED:** 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0		PAVE	Dark gray ASPHALT 2.25 inches thick.						
		FILL	Pale brown (10 YR 6/3), silty SAND with gravel, dry.						
2.5		SM	Pale brown (10 YR 6/3), silty SAND with gravel, dry and dense. ...boring cleared with air knife to 5'.						
5, 7.5		GM	Brown (7.5 YR 5/3), silty GRAVEL with sand, dry, and dense. 50% gravel (angular to subangular basalt, dacite, trace latite, trachyte, and andesite), 30% sand (poorly sorted), 10% fines. ...collect DBSA-20-Q-5. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
10, 12.5, 15		SW	Pale brown (10 YR 6/3), well graded SAND with gravel, trace cobbles, dry and very dense. ...collect DBSA-20-Q-10. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...weakly cemented. ...25% gravel (angular to subangular andesite and basalt), 70% sand (poorly sorted), 5% fines.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

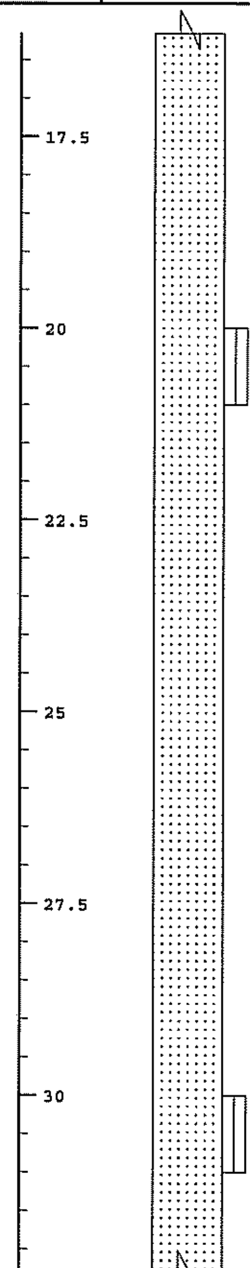
Figure No. 16

EXPLORATION LOG
DBSA 20

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-03-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: 84.7' BELOW GROUND SURFACE
DATE MEASURED: 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)



...collect DBSA-20-Q-20.
PIDs: 10.6, 11.7 eV = 0.0 ppmV.

...with cobbles 3.5" in diameter.

...multiple thin (1/2" to 1') weakly cemented layers.

...collect DBSA-20-Q-30.
PIDs: 10.6, 11.7 eV = 0.0 ppmV.

...white (10 YR 8/1) caliche layers, 1" thick.

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 16

EXPLORATION LOG
DBSA 20

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-03-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: 84.7' BELOW GROUND SURFACE **DATE MEASURED:** 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5			...multiple thin (1/2" to 1") weakly cemented layers.						
			...25% gravel (angular to subangular andesite and basalt), 65% sand (poorly sorted), 10% fines.						
35									
37.5			...borderline silty gravel (GM) with 30-40% gravel.						
40			...collect DBSA-20-Q-40. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
42.5									
45									
47.5			...15-20% gravel (angular to subangular andesite and basalt), 75% sand (poorly sorted), 5-10% fines.						
		CL							

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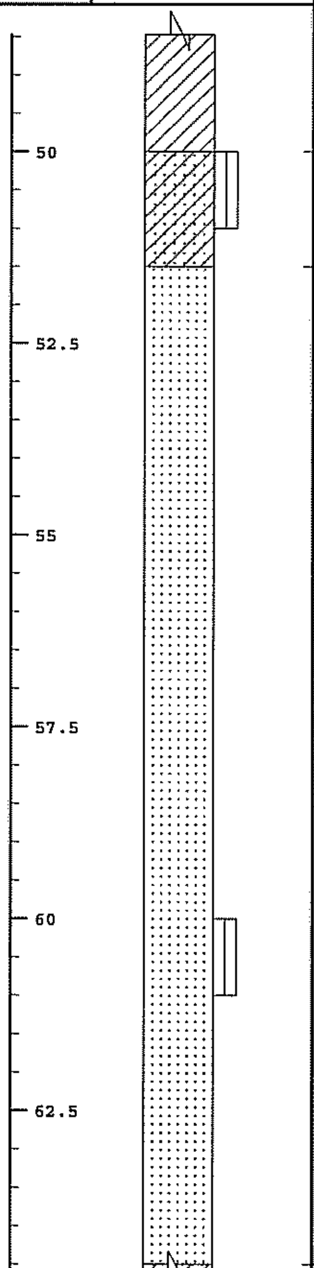
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 20

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-03-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: 84.7' BELOW GROUND SURFACE **DATE MEASURED:** 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED **DATE MEASURED:** N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			Pale brown (10 YR 6/3), sandy lean CLAY, moist and very stiff. ...white (10 YR 8/1) CALICHE gravel, 1/2" in diameter.						
50		SC	Brown (7.5 YR 5/3), clayey SAND with gravel, moist, and very dense. ...collect DBSA-20-Q-50. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
52.5–62.5		SW	Brown (7.5 YR 5/3), well graded SAND with gravel, dry, weakly cemented and very dense. ...15-20% gravel (angular to subangular andesite and basalt), 65-70% sand (poorly sorted), 5-10% fines. ...collect DBSA-20-Q-60. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...weakly cemented layer 2" thick.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 16

EXPLORATION LOG
DBSA 20

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-03-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: 84.7' BELOW GROUND SURFACE **DATE MEASURED:** 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
65		SC	Brown (7.5 YR 5/3), clayey SAND with gravel, moist and very dense.						
67.5		SW	Brown (7.5 YR 5/3), silty SAND with gravel, moist and very dense.						
70		SC	Pale brown, clayey SAND with gravel, dry and very dense. Salt laminations within clayey sand layers. ...collect DBSA-20-Q-70. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
72.5 75 77.5		SM	Light brown, silty SAND with gravel, dry and very dense. ...strong brown (7.5 YR 4/5). ...moist to 77'. ...with 4" diameter andesite cobbles. Cobbles are subangular, comprising 30% of course material from 76'-77'. ...reddish brown (5 YR 4/3). ...moist.						
80		SC	Reddish brown (5 YR 4/3), clayey SAND, trace gravel, moist, and very dense.						

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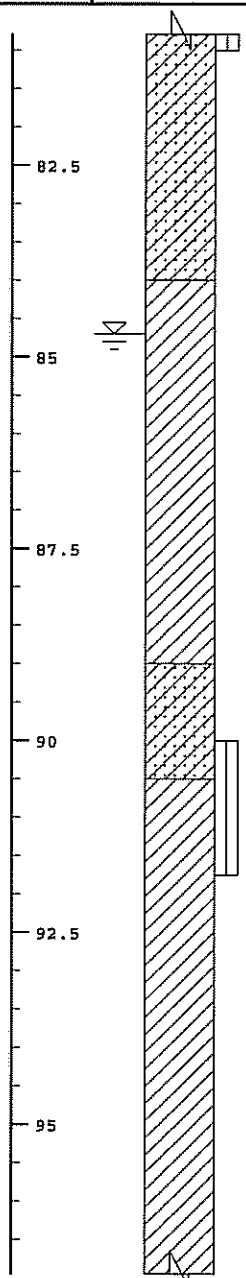
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 20

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-03-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: 84.7' BELOW GROUND SURFACE
DATE MEASURED: 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...collect DBSA-20-Q-80. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv. ...5-10% gravel (angular to subangular andesite and basalt), 60% sand (poorly sorted), 25-30% fines.						
		CL	MUDDY CREEK FORMATION: Pale brown, sandy lean CLAY, moist and very stiff. ...reddish brown (5 YR 5/4).						
		SC	Reddish brown, clayey SAND, trace gravel, moist and very dense. ...collect DBSA-20-T-90 and DBSA-20-T-90-DUP. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
		CL	Reddish brown, sandy lean CLAY, wet and very stiff. ...moist.						

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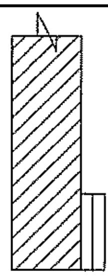
EXPLORATION LOG
DBSA 20

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 10-03-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** R. COOKE

INITIAL DEPTH TO WATER: 84.7' BELOW GROUND SURFACE **DATE MEASURED:** 10-05-07
FINAL DEPTH TO WATER: NOT MEASURED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
97.5 – 100			Reddish brown, clayey SAND, trace gravel, moist and very dense. ...collect DBSA-20-T-100. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
100			**END OF BORING AT 100.0 FEET**						
102.5									
105									
107.5									
110									
112.5									

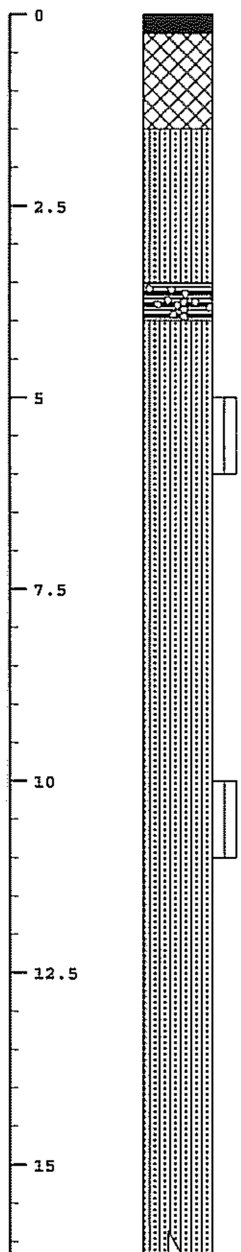
The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 21

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-2-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
		PAVE	Dark gray ASPHALT 2.5" thick.						
		FILL	Brown (7.5 YR 5/4), silty SAND with gravel, dry.						
		SM	Brown (7.5 YR 5/4), silty SAND with gravel, dry and dense. ...boring cleared with air knife to 5'.						
		CG	Brown (7.5 YR 5/4), cemented SAND and GRAVEL, some basalt cobbles, moist, weakly cemented and very dense.						
		SM	Brown (7.5 YR 4/3), silty SAND with gravel, moist and very dense. 10-15% gravel (angular to subangular basalt and andesite), 80% sand (well sorted), 5% fines. ...collect DBSA-21-Q-5. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...collect DBSA-21-Q-10. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...moderately cemented cobbles (basalt and andesite) to 13' bgs.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 17

EXPLORATION LOG
DBSA 21

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-2-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
17.5									
			...brown (7.5 YR 5/3), dry.						
20			...collect DBSA-21-Q-20 and DBSA-21-Q-20-DUP. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...course, angular gravel and cobbles (andesite and basalt). 20% Gravel, 10% cobbles, 65% sand, 5% fines.						
22.5									
25			...course, angular gravel and cobbles to 26' bgs.						
27.5			...multiple weakly cemented layers 1" to 2" thick to 37' bgs.						
30			...brown (7.5 YR 4/3). ...collect DBSA-21-Q-30. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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EXPLORATION LOG
DBSA 21

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-2-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5 – 37									
37 – 47		SC	Brown (7.5 YR 5/3), clayey SAND with gravel, dry and very dense. Trace Pyrite. ...pale brown (10 YR 6/3), weakly cemented. ...collect DBSA-21-Q-40. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...laminated clayey sand layers with fine, white (10 YR 8/1) salt coatings.						
47 – 48.5		CL	Pale brown (10 YR 6/3), sandy lean CLAY, trace gravel dry, and very stiff.						

Depth scale: 32.5, 35, 37.5, 40, 42.5, 45, 47.5

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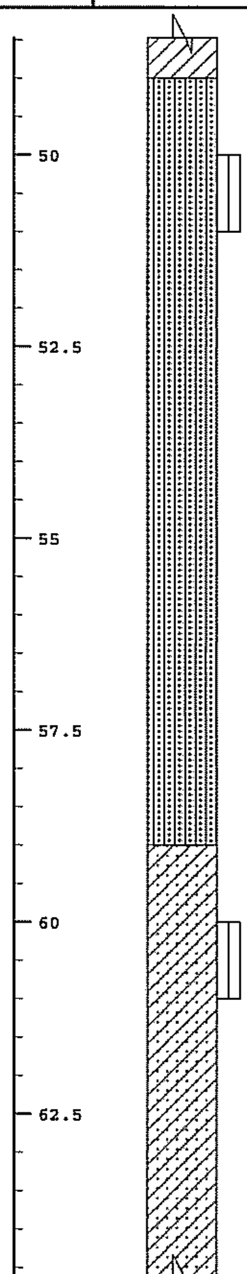
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 17

EXPLORATION LOG
DBSA 21

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-2-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
		SM	Brown (7.5 YR 5/4), silty SAND with gravel, dry, weakly cemented and very dense. ...collect DBSA-21-Q-50. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...red (2.5 YR 5/6), basalt cobble, volcanic, sub-rounded. ...brown (7.5 YR 5/3), weakly cemented.						
		SC	Brown (7.5 YR 5/4), clayey SAND, few gravel, moist and very dense. 5% Gravel (angular to subangular andesite and basalt), 80% sand (poorly sorted), 15% fines. ...collect DBSA-21-Q-60. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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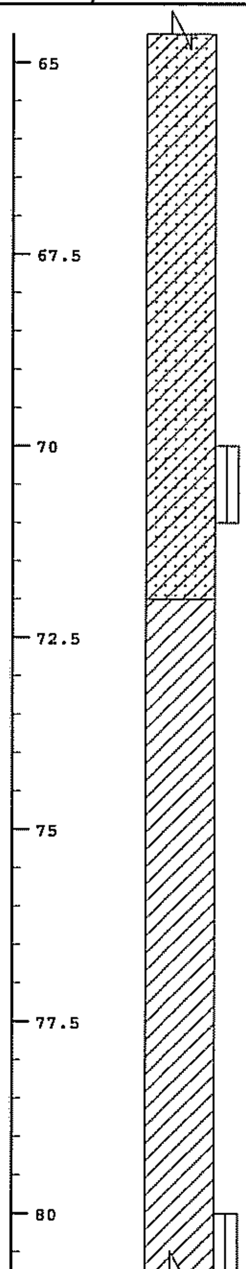
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 17

EXPLORATION LOG
DBSA 21

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-2-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
65–72.3			...course, poorly sorted sand. 5% gravel, 85% sand, 10% fines. ...wet to 66' bgs. ...moist. ...reddish brown (5 YR 5/4). ...thin (1/8") white (10 YR 8/1) caliche lamination. ...collect DBSA-21-Q-70, DBSA-21-Q-70-DUP, and DBSA-21-Q-70-MS/MSD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
72.3–81		CL	MUDDY CREEK FORMATION: Brown (7.5 YR 4/3), sandy lean CLAY, trace gravel, moist and very stiff. ...clay layers are mostly massive with occasional laminated clay layers. ...weakly cemented. ...collect DBSA-21-T-80. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 21

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 10-2-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: R. COOKE

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
82.5									
85									
87.5		SC	Brown (5 YR 5/4), silty SAND, trace gravel, moist and very dense.						
90		SM	Reddish brown (5 YR 4/3), silty SAND, trace gravel, moist and very dense. ...collect DBSA-21-T-90.						
			END OF BORING AT 90.0 FEET						
92.5									
95									

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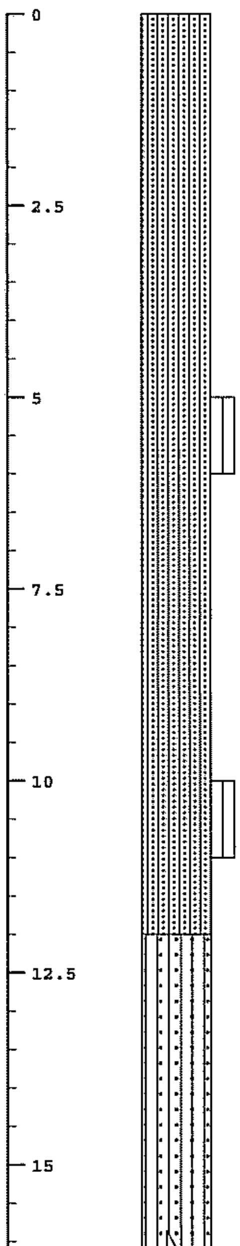
EXPLORATION LOG
DBSA 23

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-26-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
		SM	Yellow (10 YR 7/6), silty SAND with gravel (approximately 30% gravel (well graded, subangular, approximately 33% course gravel, 33% medium gravel, and 33% fine gravel), 15% silt, 55% sand (poorly graded, subrounded, approximately 20% course sand, 20% medium sand, and 60% fine sand), moist and dense. ...collect DBSA-23-Q-5. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv. Yellow (10 YR 7/6), silty SAND with gravel (approximately 30% gravel (well graded, subangular, approximately 33% course gravel, 33% medium gravel, and 33% fine gravel), 15% silt, 55% sand (poorly graded, subrounded, approximately 20% course sand, 20% medium sand, and 60% fine sand), moist and very dense . ...pale yellow (2.5 Y 8/4), sand has approximately 5% mafic, and 95% felsics. Gravel: approximately 20% basalt, and 80% latite. ...collect DBSA-23-Q-10. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
		SP-SM	Pale yellow (2.5 Y 7/4), poorly graded SAND with silt (approximately 10% gravel, 10% silt, 80% sand (subrounded, approximately 10% course sand, 5% medium sand, 85% fine sand), moist, weakly cemented (0.5" layers), and very dense. Sand: approximately 5% mafics, and 95% felsics. Gravel: 50% andesite, and 50% latite.						

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EXPLORATION LOG
DBSA 23

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-26-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
17.5 – 20 – 22.5 – 25 – 27.5 – 30		SM	Very pale brown (10YR 7/3) silty SAND with gravel (approximately 25% gravel (well-graded, subangular, approximately 33% course gravel, 33% medium gravel, 33% fine gravel), approximately 20% silt, 55% sand (well-graded, subrounded, approximately 30% course sand, 20% medium sand, 50% fine sand), moist and very dense. Sand: approximately 10% mafics, 90% felsics. Gravel: approximately 80% chloritic andesite, 20% latite. ...collected DBSA-23-Q-20. PID's: 10.6 eV= 1.3 ppmv, 11.7 eV = 0.0 ppmv. ...collected DBSA-23-Q-30, DBSA-23-Q-30- FD and DBSA-23-Q-30-MS/MD.						
		SM	...same as above, except weakly cemented in 0.5" layers.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 23

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-26-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5									
35									
37.5									
40			...collected DBSA-23-Q-40. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv; same soil as above except: light yellowish brown (10 YR 6/4), approximately 40% silt. Gravel: approximately 20% rhyolite, 30% latite, 30% basalt, 20% chloritic andesite.						
42.5			...past 42.5', same soil/sediments as before 39.0'.						
45									
47.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 23

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-26-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50			...collected DBSA-23-Q-50. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.; same soil as above.						
52.5									
55		SP-SM	Light yellowish brown (10yr 6/4) poorly-graded SAND with silt and gravel (approximately 20% gravel (well-graded, subangular, approximately 30% course gravel, 20% medium gravel, 50% fine gravel), approximately 10% silt, 70% sand (subrounded, approximately 20% course sand, 10% medium sand, 70% fine sand), moist and very dense. Sand: approximately 10% matics (as chlorite), 90% felsics. Gravel: approximately 30% basalt, 30% andesite (chloritic), 40% rhyolite. Contains 1.0" thick lenses of poorly graded sand with silt (SP-SM).						
57.5									
60		SP-SM	Light yellowish brown poorly-graded SAND with silt, few gravel, moist and very dense. Same grain size and composition as at 54'. ...collected DBSA-23-Q-60. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
62.5									

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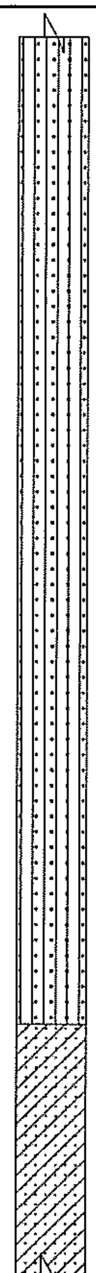
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 23

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-26-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
65									
67.5									
70			...collected DBSA-23-Q-70. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
72.5									
75									
			...abrupt contact at 77.5" (see below)						
77.5		SC	Brown (7.5 YR 5/4) clayey SAND (approximately 5% gravel (poorly-graded, subrounded, 100% fine gravel), 25% lean clay, 70% sand (poorly-graded, subrounded, approximatley 20% medium sand, 60% fine sand)), moist, weakly cemented and very dense. Sand: approximately 10% chlorite, 20% gypsum,						
80									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 23

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-26-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
82.5 85			70% felsics. Gravel: approximately 50% chloritic andesite, 50% basalt. Sequence is laminated. ...becomes thickly bedded. ...collected DBSA-23-Q-80. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
87.5 90 92.5		SP-SC	Light yellowish brown (10 YR 6/4) poorly-graded SAND with clay (approximately 5% gravel (well-graded, subrounded, approximately 33% course gravel, 33% medium gravel, 33% fine gravel), approximately 10% clay, 85% sand (subrounded, approximately 20%, course sand, 10% medium sand, 70% fine sand), moist and very dense. Sand: has approximately 10% mafics, 90% felsics. Gravel: has approximately 20% chloritic andesite, 30% basalt, 50% rhyolite. ...1' thick beds of approximately 100% sand and gravel layers. ...collect DBSA-23-Q-90. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
95		SC	Reddish yellow (7.5 YR 6/6) clayey SAND with gravel (approximately 20% gravel, (well-graded, subrounded, approximately 30% course gravel, 30% medium gravel, 40% fine gravel), approximately 20% lean						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 23

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 09-26-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
97.5			clay, 60% sand, (poorly-graded, subrounded, approximatley 20% course sand, 5% medium sand, 75% fine sand), moist and very dense. Sand: trace chlorite, 5% mafics, 95% felsics. Gravel: approximately 30% andesite (chloritic), 30% basalt, 40% rhyolite.						
100			...collected DBSA-23-Q-100. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv; samples have alternating interbeds of approximately 30% clay and then approximately 15% clay, with individual bedding thicknesses of 1.0'-1.5' thick.						
102.5									
105			...clayey beds gradually increase in thickness.						
107.5									
110			...collected DBSA-23-Q-110. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
112.5									

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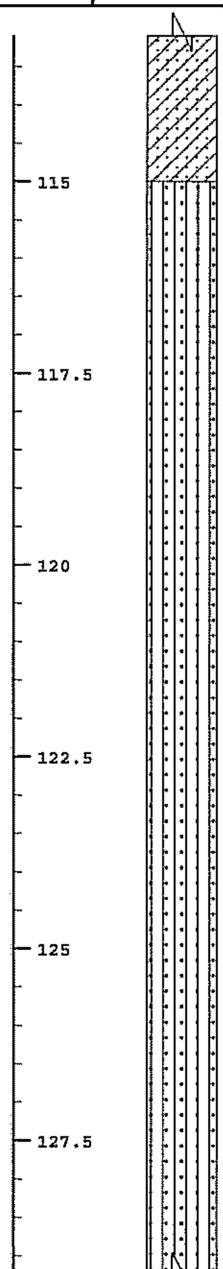
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 23

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-26-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
115		SP-SM	Brown (7.5 YR 5/4) poorly-graded SAND with silt and gravel (approximately 25% gravel (poorly-graded, subangular, approximately 30% medium gravel, 70% fine gravel), approximately 10% silt, approximately 65% sand (subrounded, approximately 20% course sand, 5% medium sand, 75% fine sand), moist and very dense. Sand: approximately 5% chlorite, 10% mafics, 85% felsics. Gravel: approximately 70% rhyolite, 15% latite, 15% andesite (chloritic).						
117.5									
120			...collected DBSA-23-Q-120. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv. ...approximately 5% to 10% gravel, 70% sand, 30% fines. Gravel is subangular and well graded; Sand is 70% medium sand, 30% fine sand. Trace white salt coatings.						
122.5									
125									
127.5			...poorly formed layering in soil. Layers are 1/8" to 1/4" thick.						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

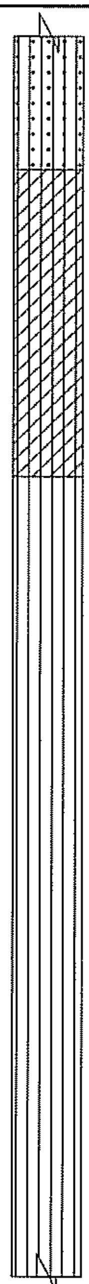
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 18

EXPLORATION LOG
DBSA 23

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-26-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
130			...collect sample DBSA-23-Q-130. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
132.5		CL-ML	Muddy Creek Formation: Brown (7.5 YR 5 4) silty CLAY with sand, moist and very stiff. Sand is fine grain, approximately 10% of soil.						
135 – 145		ML	Brown (7.5 YR 5/4) SILT, trace sand, trace clay, moist and very stiff. ...dark yellowish brown (10YR 4/4). ...collect DBSA-23-T-140. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 23

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-26-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
147.5		CL	Dark yellowish brown (10 YR 4/4) sandy lean CLAY, moist and very stiff.						
150		SC	Dark yellowish brown (10 YR 4/4) clayey SAND, moist and very dense. ...collect DBSA-23-T-150. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
			END OF BORING AT 150.0 FEET						
152.5									
155									
157.5									
160									

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

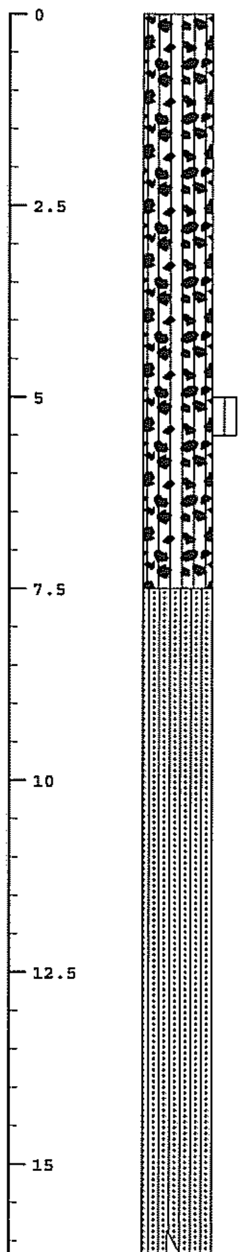
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 18

EXPLORATION LOG
DBSA 26

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0		GM	Yellowish brown (10 YR 5/6) silty GRAVEL with sand (approximately 60% gravel (well-graded, subrounded, approximately 20% cobbles, 20% course gravel, 20% medium gravel, 20% fine gravel), approximately 15% silt, 25% sand, (well-graded, subrounded, approximately 40% course sand, 20% medium sand, 40% fine sand), moist and dense. Gravel: approximately 30% rhyolite, 30% latite, 20% andesite, 10% chloritic andesite. Sand: approximately 5% mafics, 95% felsics. ...collect DBSA-23-Q-5. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv. ...6" thick layers of silty gravel with sand (see soil description at 0.0').						
7.5		SM	Yellowish brown (10 YR 5/6) silty SAND with gravel (appproximately 40% gravel, 20% silt, 40% sand), moist. Gravel is poorly-graded, subangular, approximately 10% medium gravel, 90% fine gravel, has approximately 40% andesite, 30% rhyolite, 30% latite. Sand is well-graded, subrounded, approximately 30% course sand, 20% medium sand, 50% fine sand, approximatley 5% mafics, 95% felsics. ...collect DBSA-26-Q-10. PID's: 10.6 eV = 0.0 ppmv, 11.7 eV = 0.0 ppmV.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 26

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
17.5			...6" thick gravel layer (poorly-graded), has thin alternating beds of silty SAND and silty SAND with gravel within the layer.						
20			...collected DBSA-26-Q-20, PIDs: 11.7 eV = 0.0 ppmv, 10.6 eV = 1.5 ppmv.						
22.5									
25									
27.5									
30			...collected DBSA-26-Q-30. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmV. Same soil as above.						
		SW-SM	Very pale brown (10 YR 7/4) well-graded SAND with silt (approximately 5% gravel (poorly-graded, subangular, 100% fine						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

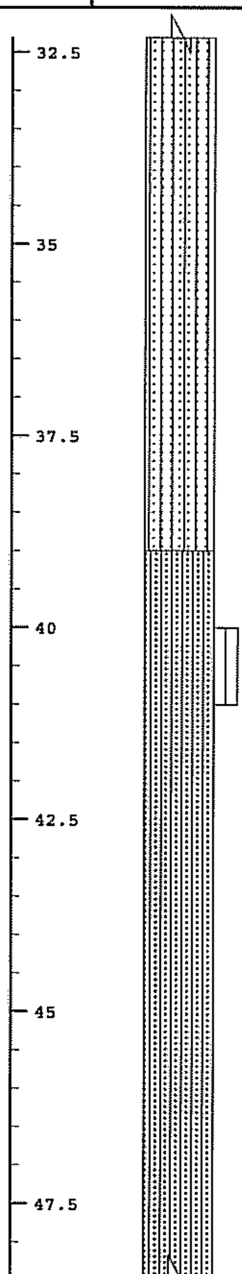
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 19

EXPLORATION LOG
DBSA 26

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			gravel), approximately 10% silt, 85% sand (subrounded, well-graded, approximately 30% course sand, 30% medium sand, 40% fine sand)), moist and very dense. Sand: approximately 20% mafics (as chloritic andesite), 80% felsics; Gravel: approximately 20% andesite (chloritic), 80% rhyolite.						
		SM	Light yellowish brown (10 Y/R 6/4) silty SAND with gravel (approximately 25% gravel (welll-graded, subangular, approximately 20% course gravel, 30% medium gravel, 50% fine gravel), approximatley 20% silt, 55% sand (subrounded, poorly graded, approximately 30% course sand, 10% medium sand, 60% fine sand), dry and very dense. Sand: approximately 10% mafics, 90% felsics. Gravel: approximatley 10% andsite (chlorite), 40% latite, 40% rhyolite, 10% basalt. ...collected DBSA-23-Q-40. PID's: 10.6 eV= 0.0 ppmV, 11.7 eV = 0.0 ppmv. Same soil as above except: light yellowish brown (10 YR 6/4), approximately 40% silt. Gravel: approximately 20% rhyolite, 30% latite, 30% basalt, 20% chloritic andesite. ...past 42.5', same soil/sediments as before 39.0'.						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 19

EXPLORATION LOG
DBSA 26

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50			...collected DBSA-23-Q-50. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
52.5									
55			...andesite cobble.						
57.5									
60		SC	Light yellowish brown (10 YR 6/4) clayey SAND with gravel (approximately 25% gravel (well-graded, subangular, approximately 20% course gravel, 30% medium gravel, 50% fine gravel),						
62.5		SM	aproximately 30% clay, 45% sand (poorly-graded, subrounded, approximately 20% course sand, 10% medium sand, 70% fine sand), moist and very dense. Sand: approximately 15% mafics, 85% felsics. Gravel: approximately 70% rhyolite, 30% andesite. Weakly cemented 1"-2" thick layers. ...collected DBSA-26-Q-60. PID's: 10.6						

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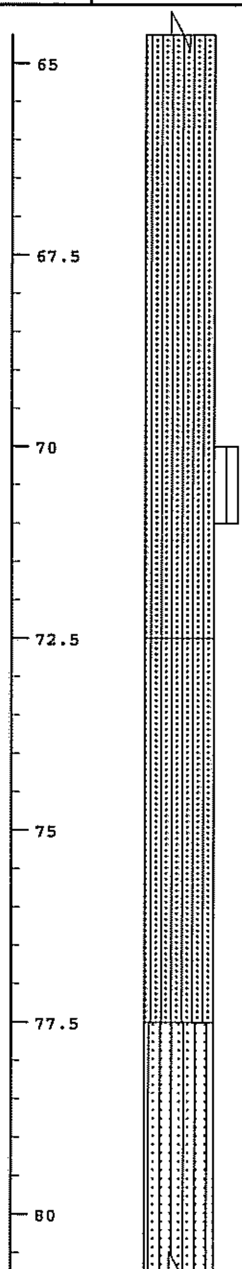
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 19

EXPLORATION LOG
DBSA 26

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A



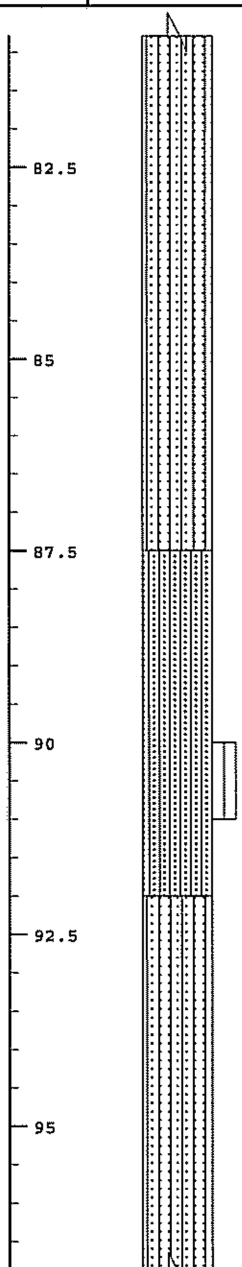
ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
65 – 72.5			eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
			Light yellowish brown (10 YR 6/4) silty SAND with gravel (approximately 35% gravel (well-graded, subangular, approximately 30% course gravel, 30% medium gravel, 40% fine gravel), approximately 20% silt, 45% sand, (poorly graded, subrounded, approximately 10% course sand, 10% medium sand, 80% fine sand), moist and very dense. Gravel: approximately 70% rhyolite, 30% andesite. Sand: approximatley 15% mafics, 85% felsics. ...collected DBSA-26-Q-70, PID's: 11.7eV= 3.8 ppmv, 10.6 eV= 1.6 ppmv.						
72.5 – 77.5		SM	Very pale brown (10 YR 7/4) silty SAND (approximately 10% gravel (poorly graded, subrounded, approximately 10% medium gravel, 90% fine gravel), approximately 20% silt, 70% sand (poorly graded, subrounded, approximately 30% fine sand, 20% medium sand, 50% fine sand), moist and very dense. Sand: approximately 5% mafics, 95% felsics. Gravel: approximatley 30% rhyolite, 40% chloritic andesite, 30% latite.						
77.5 –		SW-SM	Very pale brown (10 YR 7/4) well-graded SAND with silt (approximately 10% gravel (poorly graded, subangular, 100% fine gravel), approximately 10% silt, 80% sand (subrounded, well-graded, 40% course sand, 30% medium sand, 30% fine sand)), moist and very dense. Sand: approximately 20% matics (as basalt/						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

EXPLORATION LOG
DBSA 26

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			chloritic andesite), approximately 80% felsics. Gravel: approximately 30% rhyolite, 30% latite, 40% green chloritic andesite. ...collect DBSA-26-Q-80. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmV.						
87.5		SM	Brown (10 YR 5/3) well-graded SAND with silt and gravel (approximately 20% gravel (well-graded, subangular, approximately 30% course gravel, 30% medium gravel, 40% fine gravel), approximately 20% silt, 50% sand (poorly-graded, subrounded, approximately, 20% course gravel, 10% medium sand, 70% fine sand)), moist and very dense. Sand: approximately 10% mafics, 90% felsics. Gravel: approximately 50% rhyolite, 25% andesite (chloritic), 25% latite. ...collected DBSA-26-Q-90. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmV.						
92		SW-SM	Brown (10 YR 5/3) well-graded SAND with silt and gravel (approximately 20% gravel (poorly graded, subangular, approximately 10% medium gravel, 90% fine gravel), approximately 10% silt, 70% sand (subrounded, approximately 30% course sand, 30% medium sand, 40% fine sand)), moist and very dense. Sand: approximately 10% basalt, 10% andesite, 80% felsics. Gravel: approximately 50%						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

EXPLORATION LOG
DBSA 26

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
97.5			basalt, 25% andesite, 25% rhyolite.						
100			...collected DBSA-26-Q-100; ...collected DBSA-26-Q-100, PID's: 11.7 eV = 2.4 ppmv, 10.6 eV = 2.0 ppmv.						
102.5 / 105 / 107.5		SM	Very pale brown (10 YR 7/3) silty SAND with gravel (approximately 20% gravel (well-graded, subangular, approximately 33% course gravel, 33% medium gravel, 33% fine gravel), approximately 30% silt, 50% sand (well-graded, subrounded, approximately 40% course sand, 10% medium sand, 50% fine sand)), moist and very dense. Sand: approximately 5% mafics (as chlorite), approximately 95% felsics. Gravel: approximately 40% rhyolite, 30% latite, 30% andesite.						
110			...collected DBSA-26-Q-110. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
112.5									

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EXPLORATION LOG
DBSA 26

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
115		SP-SM	Reddish yellow (7.5 YR 6/6) poorly graded SAND with silt and gravel (approximately 30% gravel (well graded, subangular, approximately 33% course gravel, 33% medium gravel, 33% fine gravel), approximately 10% silt, 60% sand (subrounded, approximately 20% course sand, 10% medium sand, 70% fine sand), moist and very dense. Sand: approximately 5% mafics, 95% felsics. Gravel: approximately 40% latite, 60% rhyolite.						
117.5									
120			...collected DBSA-26-Q-120. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv.						
122.5									
125									
127.5									

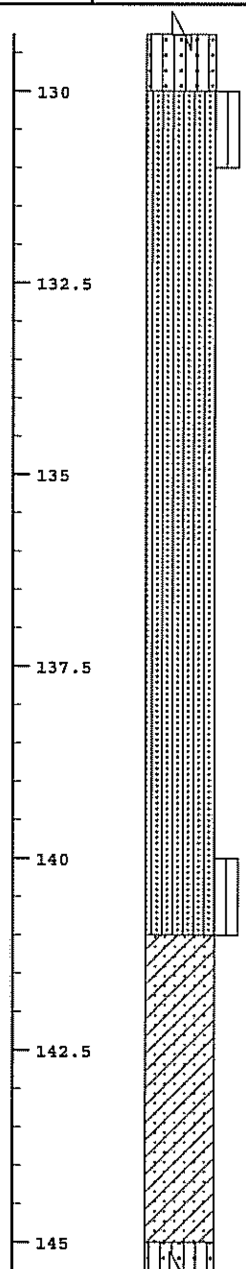
The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 26

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
130		SM	...collected DBSA-26-Q-130. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv. Brownish yellow (10 YR 6/6) silty SAND with gravel (approximately 25% gravel (well graded, subangular, approximately 30% course gravel, 35% medium gravel, 35% fine gravel), approximately 20% silt, 55% sand (poorly graded, subrounded, approximately 25% course sand, 10% medium sand, 65% fine sand)), moist and very dense. Sand: approximately 5% mafics, 95% felsics. Gravel: approximately 50% latite, 50% rhyolite.						
140			...collected DBSA-26-Q-140. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmV.						
		SC	Strong brown (7.5 YR 5/6) clayey SAND with gravel (approximately 20% gravel (poorly graded, subangular, approximately 40% course gravel, 60% fine gravel), approximaely 25% lean clay, approximately 55% sand (well graded, subrounded, approximately 30% course sand, 30% medium sand, 40% fine sand)), moist and very dense. Sand: 10% mafics, 90% felsics. Gravel: 80% rhyolite, 10% latite, 10% chloritic andesite.						
145		SP-SM							

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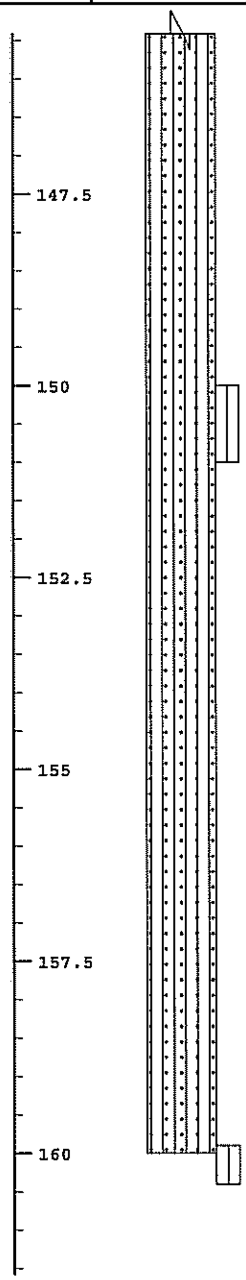
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 26

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

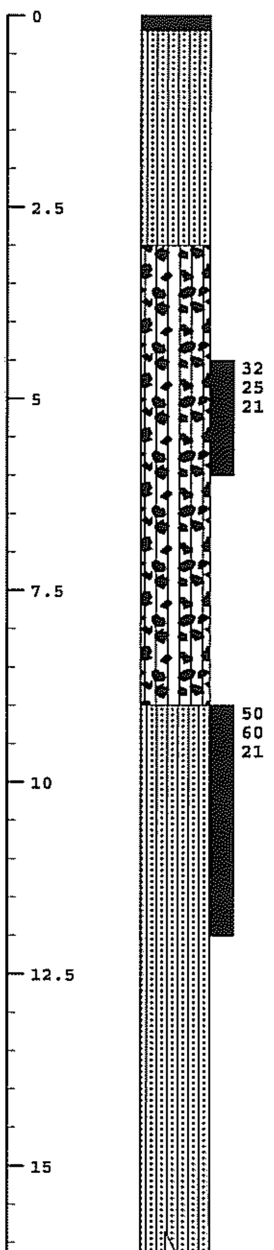
ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
147.5 – 160			Yellowish brown (10 YR 5/4) silty SAND with gravel (approximately 20% gravel (poorly graded, subangular, approximately 20% course gravel, 10% medium gravel, 70%), approximately 20% silt, 60% sand (poorly graded, subrounded, approximatley 20% course sand, 20% medium sand, 60% fine sand)), moist and very dense. Sand: approximately 10% mafics, 90% felsics. Gravel: approximately 80% andesite, 10% latite, 10% chloritic andesite. ...collected DBSA-26-Q-150. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv. ...same soil as above.						
160			...collected DBSA-26-Q-160. PID's: 10.6 eV= 0.0 ppmv, 11.7 eV = 0.0 ppmv. ...same soil as above. **END OF BORING AT 160.0 FEET**						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

EXPLORATION LOG
DBSA-27

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/9/07-8/13/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M.MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0		PAVE	Dark gray ASPHALT 2" thick. Sample DBSA-27-Q-0 from field adjacent to the boring.						
		SM	Reddish brown (5 YR 5/4) silty SAND with gravel, moist.						
		GM	Reddish yellow (5 YR 6/6) silty GRAVEL with sand, moist and medium dense. Gravel is subangular to subrounded, well-graded, consists of 80% latite, 20% basalt. Sand is subrounded, poorly graded, with 40% mafics, 60% felsics. Approximately 20% silt, 25% sand, 55% gravel. ...boring cleared with air knife to 4.5'. ...sample DBSA-27-Q-5, Pid's: 10.6 eV = 1.7 ppmv, 11.7 eV = 0.0 ppmv.						
		SM	Light greenish gray (GLEY 2 7/1) silty SAND, moist, weakly cemented and dense. Sand is subrounded, poorly graded, with 30% gypsum, 70% felsics. Approximately 30% silt, 70% sand. Samples DBSA-27-Q-10 and DBSA-27-Q-10-FD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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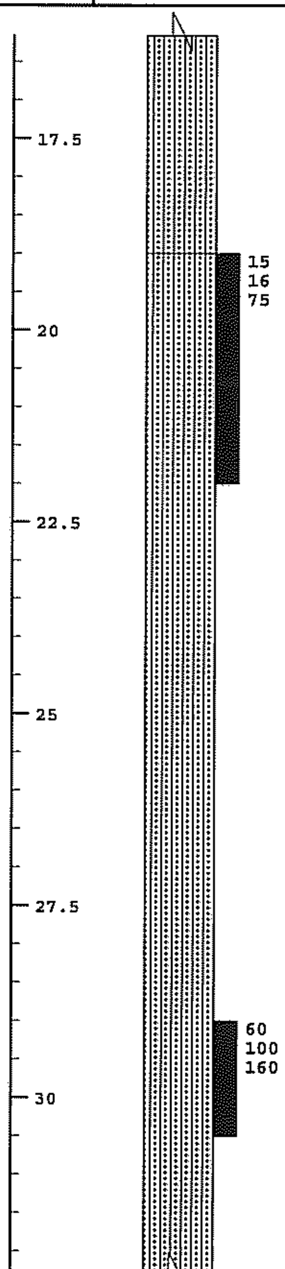
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA-27

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/9/07-8/13/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M.MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
		SM	Greenish gray silty SAND with gravel, moist, weakly cemented and very dense. Sand is subrounded, well-graded, consists of 10% gypsum, 20% mafics, 70% felsics. Gravel is angular, well-graded, with 30% cemented sand, 30% andesite, 40% rhyolite. Approximately 20% silt, 20% gravel, 40% sand. Samples DBSA-27-Q-20 and DBSA-27-Q-20-FD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			...light yellowish brown (10 YR 6/4), sample DBSA 27-Q-30. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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EXPLORATION LOG
DBSA-27

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 8/9/07-8/13/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER **EQUIPMENT:** DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M.MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5									
35									
37.5									
40	98 167 250		...gravel consists of 30% basalt, 70% rhyolite, sample DBSA-27-Q-40. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
42.5									
45									
47.5									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA-27

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/9/07-8/13/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M.MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50 52.5 55 57.5	78 124 170	SM	Yellowish brown silty SAND, moist, weakly cemented and very dense. Sand is subrounded, poorly graded, consisting of 30% mafics, 70% felsics. Gravel is subangular, poorly graded, with 90% rhyolite, 10% latite. Approximately 20% silt, 10% gravel, 70% sand. Collect DBSA-27-Q-50. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
60 62.5		SM	Yellowish brown silty SAND with gravel, moist and very dense. Sand is subrounded, well-graded, has 40% mafics, 60% felsics. Gravel is subangular, poorly graded, with 30% rhyolite, 30% basalt, 40% andesite. Sequence is thinly bedded. Approximately 20% silt, 25% gravel, 55% sand. Sample DBSA-27-Q-60, Pid's: 11.7 eV = 0. 9 ppmv, 10.6 eV = 0.0 ppmv.						

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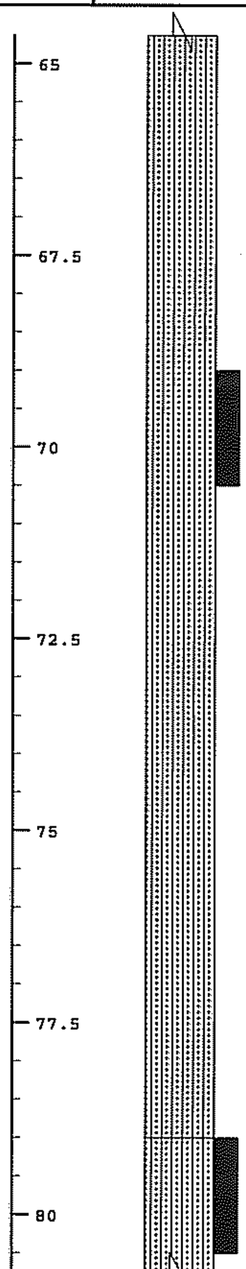
EXPLORATION LOG
DBSA-27

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/9/07-8/13/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M.MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...same as 58' bgs except: thin beds of silty SAND and silty SAND with gravel, sand composition is 25% mafics, 75% felsics, weakly cemented and veined. Collect DBSA-27-Q-70. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
		SM	Yellowish brown silty SAND, moist and very dense. Sand is subrounded, well - graded, 40% mafics, 60% felsics. Gravel is subangular, poorly graded, with 30%						

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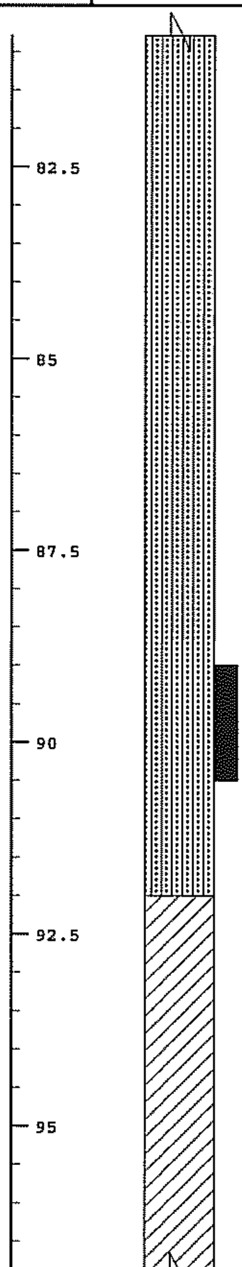
EXPLORATION LOG
DBSA-27

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/9/07-8/13/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M.MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			rhyolite, 30% basalt, 40% andesite. Approximately 20% silt, 10% gravel, 70% sand. Sample DBSA-27-Q-80. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
			...same soil as above, sample DBSA-27-Q= 90. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
		CL	MUDDY CREEK FORMATION: Light yellowish brown sandy lean CLAY, moist, weakly cemented and very stiff. Sequnce is laminated and cross cut by 1/ 8" gypsum veinlets. Approximately 40% sand, 60% clay. Contact inferred by changes in drilling behavior and drill rates.						

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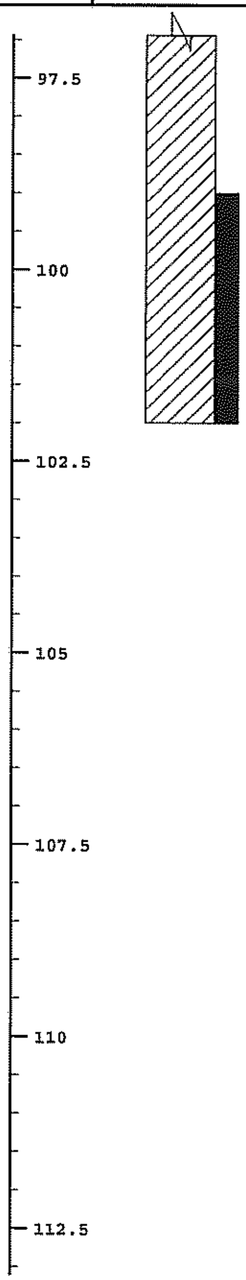
EXPLORATION LOG
DBSA-27

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/9/07-8/13/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M.MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
97.5 – 102.0			...light greenish gray, weakly cemented with thin laminae of clayey sand, samples: DBSA-27-T-100, PIDs: 10.6, 11.7 eV = 0.0 ppmV. DBSA-27-T-100-FD, DBSA-27-T-100-MS/MSD.						
102.5			**END OF BORING AT 102.0 FEET**						

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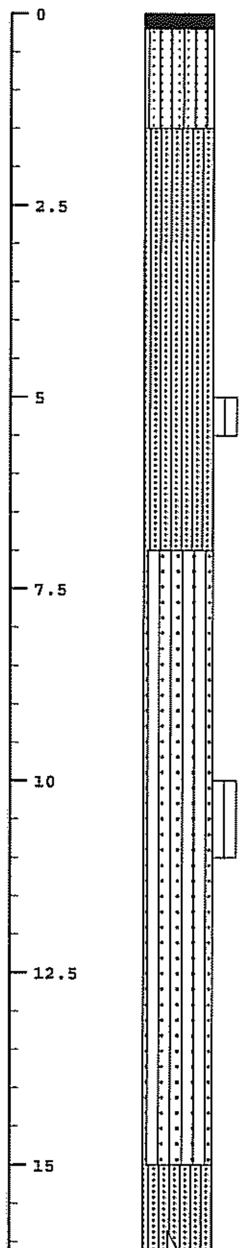
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 20

EXPLORATION LOG
DBSA 29

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
		PAVE	Dark gray ASPHALT 2" thick.						
		SW-SM	Brownish yellow (10YR 6/6) well-graded SAND with silt (approximatley 10% gravel (poorly graded, subangular, approximatley 5% medium gravel, 95% fine gravel), approximately 10% silt, 80% sand (well graded, subangular, approximatley 30% course sand, 40% medium sand, 30% fine sand), moist and dense. Sand: approximately 5% mafics, 95% feslics. Gravel: approximately 90% rhyolite, 10% andesite.						
		SM	Brownish yellow (10YR 6/6) well-graded SAND with silt, dry and dense. ...collected DBSA-29-Q-5, PID's: 11.7 eV = 1.3 ppmv, 10.6 eV = 0.8 ppmv. ...boring cleared with air knife to 5'.						
		SP-SM	Brownish yellow (10 YR 6/6) poorly graded SAND (approximately 10% gravel, 10% silt, 80% sand (poorly graded, subrounded, 10% course sand, 90% fine sand), moist and very dense. Sand: approximately 10% mafics, 90% felsics, Gravel: 80% andesite, 20% latite. ...collected DBSA-29-Q-10, and DBSA-29-Q-10-FD. PID's: 11.7 eV= 1.9 ppmv, 10.6 eV= 1.6 ppmv. Same as above.						
		SM	Brownish yellow (10 YR 6/6) silty SAND with gravel (approximately 20% gravel (poorly graded, subangular, approximately						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 21

EXPLORATION LOG
DBSA 29

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
17.5 20			30% medium gravel, 70% fine gravel), approximately 10% silt, 70% sand (well graded, subrounded, approximately 25% course sand, 30% medium sand, 45% fine sand)), moist, weakly cemented and very dense. Sand: approximately 30% mafics (basalt, chloritic andesite), approximately 70% felsics; Gravel: approximately 20% rhyolite, 20% latite, 60% andesite. ...collected DBSA-29-Q-10, PID's: 11.7 eV= 0.0 ppmv, 10.6 eV= 0.5 ppmv.						
22.5 25 27.5 30		SM	Brownish yellow (10 YR 6/6) silty SAND with gravel (approximately 20% gravel (poorly graded, subangular, approximately 10% medium gravel, 90% fine gravel), approximately 20% silt, 60% sand (subround, poorly graded, approximately 10% course sand, 10% medium sand, 80% fine sand), moist, weakly cemented (in layers) and very dense. Sand: approximately 10 % mafics, 90% felsics; Gravel: approximately 30% rhyolite, 70% latite: caliche coats on gravel clasts. ...collected DBSA-29-Q-30, PID's: 11.7 eV = 0.0 ppmv, 10.6 eV = 0.4 ppmv, same soil as 22.5' bgs.						

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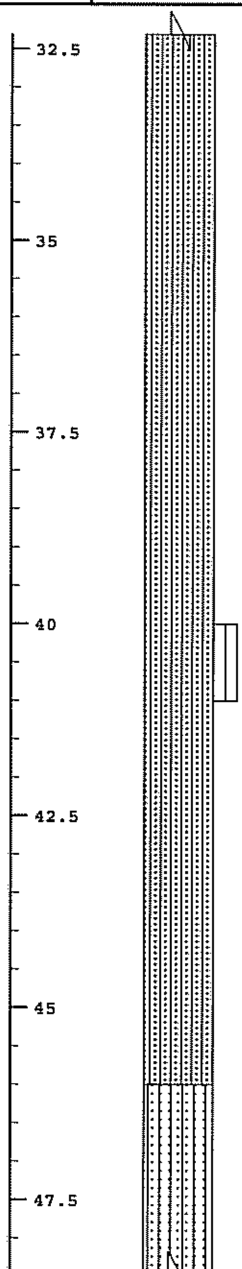
EXPLORATION LOG
DBSA 29

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5									
35			...weakly cemented, gravel clasts contain approximately 30% green/olive choritically altered andesite.						
37.5									
40			...collected DBSA-29-Q-40. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Same soil as 22.5' bgs except: approximately 5% course gravel as latite.						
42.5									
45									
47.5		SW-SM	Light brown (75 YR 6/3) well-graded SAND with silt and gravel (approximately 40% gravel (well graded subangular, approximately 10% course gravel, 40% medium gravel 50% fine gravel), approximately 10% silt, 50% sand (well-						

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EXPLORATION LOG
DBSA 29

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50			graded, subrounded, approximately 30% course sand, 30% medium sand, 40% fine sand)) moist and very dense. Sand: approximately 20% mafics (basalt, chloritic andesite), approximately 80% felsics. Gravel: approximately 20% rhyolite, 30% latite, 50% andesite. ...collected DBSA-29-Q-50. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Same soil as 22.5' bgs, except sand consists of 50% mafics (basalt, chloritic andesite and 50% felsics; weakly cemented.						
52.5 / 55 / 57.5		SM	Very pale brown (10 YR 7/4) silty SAND (approximately 15% gravel, (poorly graded, subangular, approximately 10% medium gravel, 90% fine gravel), approximately 20% silt, 65% sand (poorly graded, subrounded, approximately 20% course sand, 80% fine sand), moist and very dense. Sand: approximately 10% matics (basalt), 90% felsics. Gravel: approximately 50% andesite (chloritic), 50% latite.						
60 / 62.5			...collected DBSA-29-Q-60. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Same as 52.0' bgs.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 29

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
65									
67.5									
		SM	Strong brown (7.5 YR 5/6) silty SAND wih gravel (approximately 25% gravel (poorly graded, subangular, approximatley 30% medium gravel, 70% fine gravel), approximately 20% silt, 55% sand (well graded, subrounded, approximately 20% course sand, 20% medium sand, 60% fine sand), moist and very dense. Sand: approximately 15% mafics (basalt, chlorite), 85% felsics. Gravel: approximately 50% andesite (chlorite), approximately 20% basalt, 30% latite. ...collect DBSA-29-Q-70. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
70									
72.5									
75									
77.5									
80		SM	...collected DBSA-29-Q-80, PID's: 11.7 eV= 0.0 ppmv, 10.6 eV = 1.4 ppmv.						

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EXPLORATION LOG
DBSA 29

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
82.5 85 87.5			Light brown (7.5 YR 6/4) silty SAND (approximately 10% gravel, (poorly graded, subangular, approximately 5% medium gravel, 95% fine gravel), approximately 15% silt, 75% sand (well-graded, subrounded, approximately 20% course sand. 30% medium sand, 50% fine sand)), moist and very dense. Sand: approximately 10% mafics (basalt), 90% felsics. Gravel: approximately 50% andesite, 50% latite.						
90 92.5 95			...collected DBSA-29-Q-90. PIDs: 10.6, 11.7 eV = 0.0 ppmV. Same soil as 80' bgs except: brownish yellow (10 YR 6 6); gravel clasts consist of approximately 30% chloritic andesite.						

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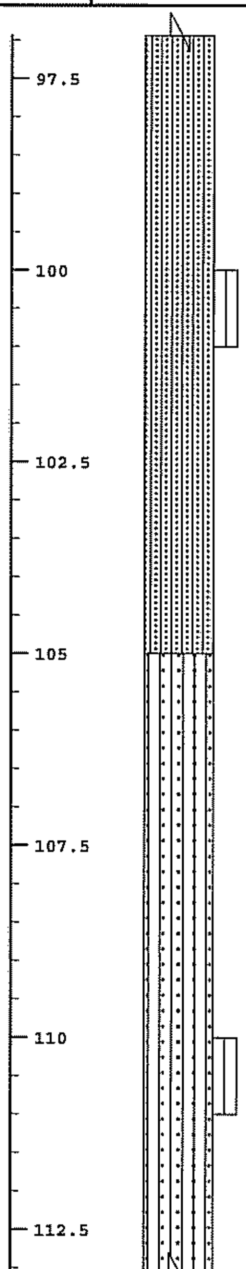
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 21

EXPLORATION LOG
DBSA 29

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
97.5–105			...very pale brown (10 YR 7/4), moisture content is gradually increasing. ...collected DBSA-29-Q-100. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
105–112.5		SP-SM	Very pale brown (10 YR 7/4) poorly graded SAND with silt and gravel (approximately 20% gravel (poorly graded, subangular, approximately 40% medium gravel, 60% fine gravel), approximately 10% silt, 70% sand, (poorly graded, subrounded, approximately 15% course sand, 5% medium sand, 80% fine sand), moist and very dense. Sand: approximately 10% mafics, 90% felsics. Gravel: approximately 40% rhyolite, 60% andesite (approximately 20% is chloritically altered). ...collected DBSA-29-Q-110, PIDs: 11.7 eV = 0.0 ppmv, 10.6 eV = 1.0 ppmv.						

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EXPLORATION LOG
DBSA 29

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
115		SP-SM	Yellowish brown (10 YR 5/6) poorly graded SAND with silt (approximately 10% gravel (poorly graded, subangular, 30% medium gravel, 70% fine gravel), 10% silt, 80% sand (poorly graded, subrounded, 30% course sand, 5% medium sand, 65% fine sand), moist, weakly cemented (in sheets) and very dense. Sand: approximately 10% mafics (andesite, trace chloritic), approximately 90% felsics, Gravel: approximately 70% rhyolite, 30% andesite.						
117.5									
120			...collected DBSA-29-Q-120, PID's: 11.7 eV = 0.0 ppmv, 10.6 eV = 0.7 ppmv.						
122.5									
125									
127.5		SP-SM	Yellowish brown (10 YR 5/6), poorly graded SAND with silt and gravel (approximately 20% gravel (poorly graded, subangular, approximately 20% medium gravel, 80% fine gravel), approximately						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 29

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
130 132.5			10% silt, 70% sand (poorly graded, subrounded, approximately 30% course sand, 10% medium sand, 70% fine sand)), moist and very dense. Sand: approximately 20% mafics (as andesite/ chloritic andesite), 80% felsics, Gravel: approximately 20% rhyolite, 60% andesite, 20% latite. ...collected DBSA-29-Q-130. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
135 137.5		SM	Brown (7.5 YR 5/4) silty SAND (approximately 15% gravel (poorly graded, subrounded, approximately 10% medium gravel, 90% fine gravel), approximately 20% silt, 65% sand (poorly graded, subrounded, approximately 15% course sand, 5% medium sand, 80% fine sand), moist and very dense. Sand: approximately 20% sand as chloritic andesite, 80% felsics; Gravel: approximately 40% latite, 60% andesite (chloritic).						
140		SM	Reddish yellow (7.5 YR 6/6) silty SAND with gravel (approximately 30% gravel (well graded, subangular, approximately 40% medium gravel, 60% fine gravel), 20% silt, 50% sand (well graded, subround, approximately 40% course sand, 30% medium sand, 30% fine sand) moist and very dense. Sand: approximately 20% mafics, 80% felsics; Gravel: approximately 20% chloritic andesite, 10% basalt, 10% latite, 60% rhyolite. ...collect DBSA-29-Q-140. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...wet at approximately 140'.						
142.5 145		SW-SM							

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

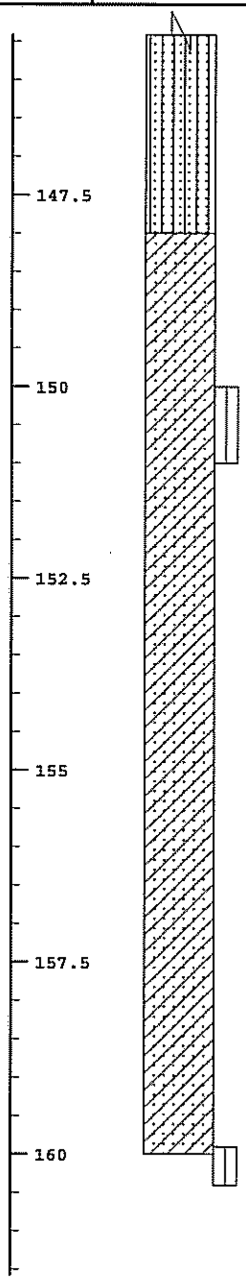
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 21

EXPLORATION LOG
DBSA 29

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			Brown (7.5 YR 5/4) well graded SAND with silt and gravel (approximately 20% gravel (poorly graded, subrounded, approximately 20% medium gravel, 80% fine gravel), approximately 10% silt, 70% sand (well graded, subrounded, approximately 40% course, 20% medium gravel, 40% fine sand), wet and very dense. Sand: approximately 20% mafics (as basalt and chloritic andesite), 80% felsics, Gravel: approximately 30% rhyolite, 30% andesite (chloritic), 30% andesite, 10% latite.						
		SC	Light brown (7.5 YR 6/4) clayey SAND (approximately 10% gravel (subrounded, poorly graded, 100% fine gravel), approximately 30% clay, 60% sand (poorly graded, subrounded, approximately 20% course sand, 10% medium sand, 70% fine sand), wet and very dense. Gravel: approximately 40% rhyolite, 30% chloritic andesite, 30% latite; Sand: approximately 10% mafics, 90% felsics. ...collected DBSA-29-Q-150. ...1.0' thick of clayey sand with gravel; clay content gradually increases to approximately 40% down hole to 160'.						
			...collected DBSA-29-Q-160, DBSA-29-Q-160-FD, and DBSA-29-GW (groundwater sample).						

END OF BORING AT 160.0 FEET

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 21

EXPLORATION LOG
DBSA 30

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0 – 7.5		SM	Very pale brown (10 YR 8/2) silty SAND with gravel (approximately 40% gravel (well graded, subangular), approximately 15% silt, 45% sand (well graded, subangular)), dry and dense. Sand: approximately 80% felsics, 20% mafics, Gravel: approximately 20% basalt, 20% rhyolite, 40% andesite, 20% latite. ...collected DBSA-30-Q-5, PID's: 10.6 eV = 0.9 ppmv, 11.7 eV = 1.7 ppmv.						
7.5 – 13		SM	Light yellowish brown (10 YR 6/4) silty SAND (approximately 10% gravel (poorly graded, subangular), approximately 15% silt, 75% sand (well graded, subrounded), moist and very dense. Sand: approximately 25% mafics, 75% felsics; Gravel: approximately 100% andesite. ...collected DBSA-30-Q-10, PID: 10.6 eV = 0.7 ppmv.						
13 – 15		SM	Pale brown (10 YR 6/3) silty SAND with gravel (approximately 20% gravel), dry and very dense.						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

EXPLORATION LOG
DBSA 30

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
17.5			...very pale brown (10 YR 7/3).						
20			...collected DBSA-30-Q-20, PID: 10.6 eV = 0.1 ppmv. ...same soil as 13' bgs.						
22.5									
25									
27.5									
30		SM	...collected DBSA-30-Q-3, PID's: 10.6 eV = 0.9 ppmv, 11.7 ev = 1.7 ppmv. Pale brown (10 YR 6/3) silty SAND with gravel (approximately 20% gravel (well graded, subangular), approximately 15%						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

EXPLORATION LOG
DBSA 30

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5 35			silt, 65% sand (poorly graded, subround), moist and very dense. Sand: approximately 10% mafics, 90% felsics; Gravel: approximately 50% basalt, 50% rhyolite. Gravel occurs as 6" thick beds.						
37.5		SM	...slower more resistant drilling. Brown (10 YR 5/3) silty SAND (approximately 30% silt, 70% sand (well graded, subangular), moist, weakly cemented and very dense. Sand: approximately 90% andesite/felsics, 10% mafics.						
40 42.5 45 47.5		SM	...collected DBSA-30-Q-40, PID's: 10.6 eV= 2.4 ppmv, 11.7 eV= 0.5 ppmv. Very pale brown (10 YR 7/3) silty SAND with gravel (approximately 20% gravel (well graded, subangular), approximately 20% silt, 60% sand (well graded, subangular), moist and very dense. Sand: approximately 20% mafics, 80% felsics; Gravel: approxmiately 40% andesite, 20% basalt, 40% rhyolite.						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 30

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50 52.5 55 57.5		SC	Yellowish brown (10 YR 5/4) clayey SAND with gravel (approximately 15% gravel (well graded, subangular), approximately 30% clay, 55% sand, (poorly graded, subrounded), moist. Sand: approximately 15% mafics, 855 felsics; Gravel: approximately 90% andesite, 10% rhyolite. ...collect DBSA-30-Q-50. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...minor 0.5" thick lean CLAY layers.						
60 62.5		SM	Very pale brown (10 YR 7/4) silty SAND (approximately 10% gravel (poorly graded, subangluar), 25% silt, 75% sand (well graded, subrounded), moist and very dense. Sand: approximately 10% mafics, 90% felsics; Gravel: consists of 100% andesite. ...collected DBSA-30-Q-60. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

EXPLORATION LOG
DBSA 30

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
65 – 67.5									
69 – 75		SM	Brownish yellow (10 YR 6/6) silty SAND with gravel (approximately 20% gravel (poorly graded, subrounded), approximately 15% silt, 65% sand (well graded, subrounded), moist and very dense. Sand: approximately 5% chlorite, 10% mafics, 85% felsics; Gravel: approximately 80% andesite, 20% latite. ...collected DBSA-30-Q-70. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
75 – 78		SP-SM	Light yellowish brown (10 YR 6/4) poorly graded SAND with silt (approximately 10% silt, 90% sand (subrounded), moist and very dense. Weakly cemented nodules; Sand: approximately 5% mafics, 95% felsics, trace gypsum.						
78 – 80		SM	Very pale brown (10 YR 7/4) silty SAND with gravel (approximately 20% gravel (well graded, subangular), approximately 15% silt, 65% sand (well graded,						

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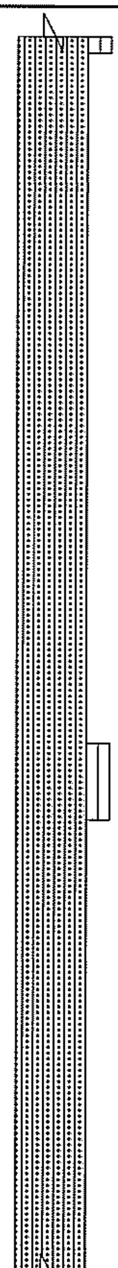
EXPLORATION LOG
DBSA 30

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
82.5			subrounded), moist and very dense. Sand: approximately 10% mafics, 90% felsics: Gravel: approximately 20% green chloritic andesite, 70% latite, 10% rhyolite. Sequence is thinly bedded. ...collected DBSA-30-Q-80. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
85									
87.5									
90			...collected DBSA-30-Q-90. PIDs: 10.6, 11.7 eV = 0.0 ppmV. same soil as 80' bgs.						
92.5									
95									

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

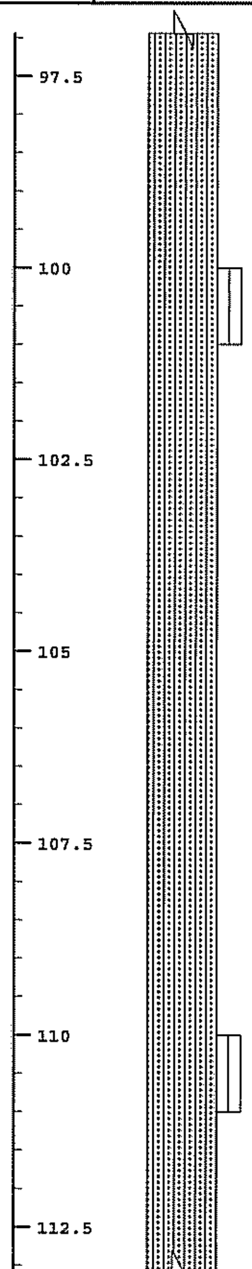
Figure No. 22

EXPLORATION LOG
DBSA 30

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
97.5									
100			...collected DBSA-30-Q-100, PID's: 10.6 eV= 0.8 ppmv: same soil as 80' bgs.						
102.5									
105									
107.5									
110			...collected DBSA-30-Q-110. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...weakly cemented layers.						
112.5									



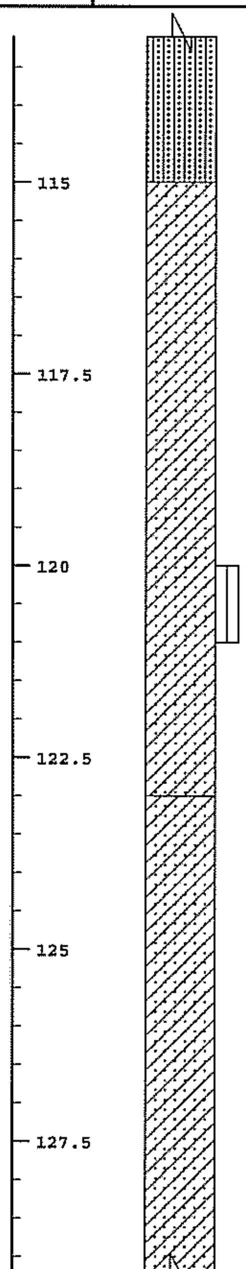
The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 30

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
115		SC	Yellowish brown (10 YR 5/4) clayey SAND (approximately 5% gravel (poorly graded, subangular), approximately 20% clay, 75% sand (well graded, subrounded), moist and very dense. Sand: approximately 5% mafics, 95% felsics; Gravel: approximately 100% andesite. ...clay increases to approximately 40%, wet in bands. ...collected DBSA-30-Q-120. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
		SC	...wet at 123'. Mottled brown (7.5 YR 4/4) clayey SAND with gravel (approximately 20% gravel (well graded, subangular) approximately 20% clay, 60% sand (coarse, well graded, subrounded), wet and very dense. Sand: approximately 20% mafics, 80% felsics; Gravel: approximately 30% rhyolite, 30% andesite (chloritic), 40% basalt.						

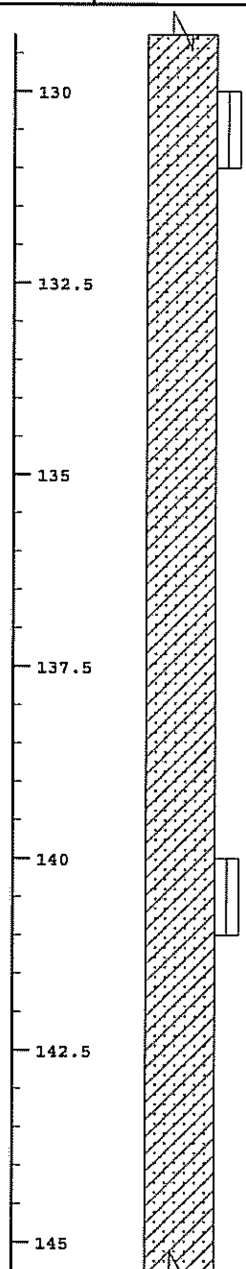
The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA 30

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
130			...collected DBSA-30-Q-130. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...clay occurs as 2" thick beds; gravel consists of approximately 30% choloritic andesite, 40% basalt, 30% latite.						
140			...collected DBSA-30-Q-140. PIDs: 10.6, 11.7 eV = 0.0 ppmV.; same soil as 123' bgs except: brown (7.5 YR 5/4) sandy lean CLAY with gravel occurs as 2. 0" wide beds.						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

EXPLORATION LOG
DBSA 30

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 09-21-07
EXPLORATION SIZE (dia.): 6" O.D. CARBIDE TIP SHOE **EQUIPMENT:** SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MELHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED **DATE MEASURED:** N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
147.5									
150 152.5 155 157.5		CL	Muddy Creek Formation: Yellowish brown (7.5 YT 5/4) sandy lean CLAY (approximately 40% sand (well graded, subrounded, approximately 60% course sand, 20% medium sand, 20% fine sand), wet and very stiff. Sand: approximately 50% mafics, 50% felsics. Sand contains 1.0" thick interbeds of: yellowish brown (7.5 YR 5/4) clayey SAND with gravel (approximately 15% gravel (poorly graded, subangular, approximatley 20% medium gravel, 80% fine gravel), approximatley 20% clay, 65% sand (well graded, subrounded, approximately 40% course sand, 30% medium sand, 30% fine sand), wet and very stiff. Sand: approximately 10% chloritic, 30% mafics, 60% felsics; Gravel: approximately 60% latite, 40% andesite. ...collected DBSA-30-T-150, and DBSA-30- T-150-MS/MSD.						
160			...sample DBSA-30-T-160, same soil as 147.5' bgs. **END OF BORING AT 160.0 FEET**						

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

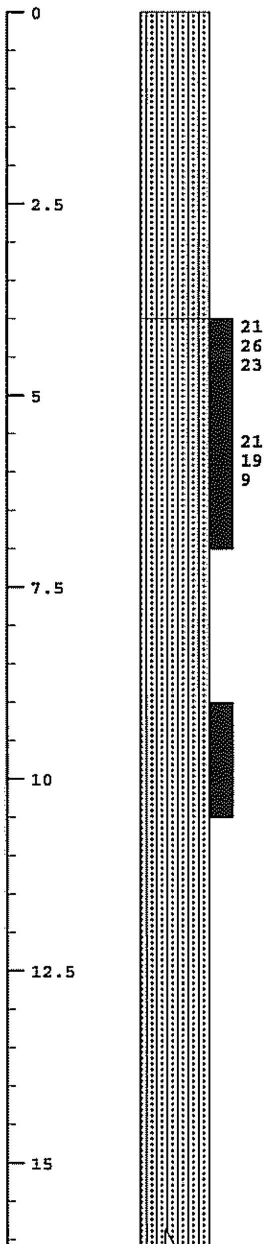
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 22

EXPLORATION LOG
DBSA-32

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/14/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: 67.0'
DATE MEASURED: 8/14/07
FINAL DEPTH TO WATER: 66.1'
DATE MEASURED: 8/14/07



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0		SM	Yellowish brown silty SAND with gravel, dry and loose.						
4	21 26 23 / 21 19 9	SM	Yellowish brown silty SAND, moist and medium dense. Sand is subrounded, well-graded, has 30% mafics/biotite, 70% felsics. Gravel is angular, poorly graded, with 30% rhyolite, 30% basalt, 40% andesite. Sequence is thinly bedded. Approximately 20% silt, 10% gravel, 70% sand. Samples DBSA- 32-Q-5 and DBSA-32-Q-5-FD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
9			...same soil as 4' bgs except: 5% gravel, 20% silt, 75% sand; gravel consists of 10% rhyolite, 30% andesite, 60% latite. Sample DBSA-32-Q-10. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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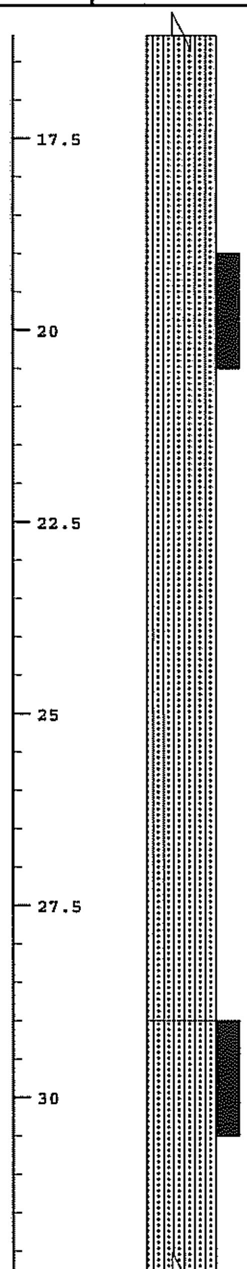
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA-32

PROJECT: BRC DEEP BACKGROUND INVESTIGATION **PROJECT NO.:** 20072226V1
BORING LOCATION: SEE FIGURE 2 **EXPLORATION DATE:** 8/14/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER **EQUIPMENT:** DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE **LOGGED BY:** M. MEHLHORN

INITIAL DEPTH TO WATER: 67.0' **DATE MEASURED:** 8/14/07
FINAL DEPTH TO WATER: 66.1' **DATE MEASURED:** 8/14/07



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...same soil as 4' bgs, andesite clasts contain chlorite and epidote, very dense. Sample DBSA-32-Q-20. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
		SM	Very pale brown silty SAND with gravel, moist, weakly cemented and very dense. Sand is subrounded, well-graded with 5% biotite, 25% mafics, 70% felsics. Gravel is angular, poorly graded, 70% rhyolite, 10% andesite, 10% latite, 10% weakly cemented sand. Approximately 25% silt, 25% gravel, 50% sand.						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA-32

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/14/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: 67.0'
DATE MEASURED: 8/14/07
FINAL DEPTH TO WATER: 66.1'
DATE MEASURED: 8/14/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5, 35, 37.5			...sample DBSA-32-Q-30. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
40, 42.5, 45, 47.5		SM	Light reddish brown silty SAND, moist, weakly cemented and very dense. Sand is subangular, well-graded, 50% rhyolite, 40% andesite, 10% felsics. Approximately 20% silt, 80% sand. ...sample DBSA-32-Q-40. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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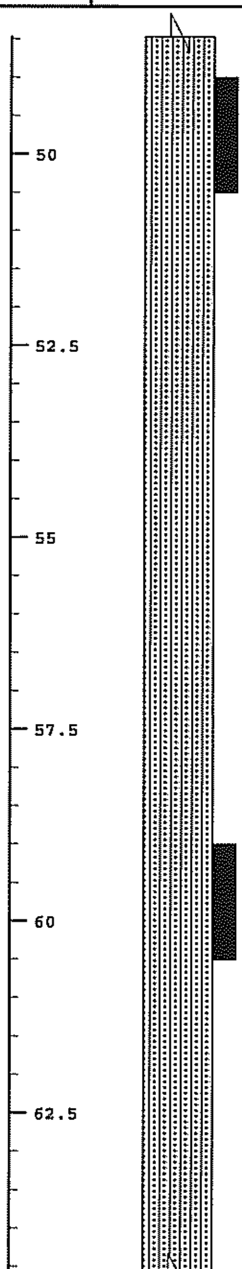
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA-32

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/14/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: 67.0'
DATE MEASURED: 8/14/07
FINAL DEPTH TO WATER: 66.1'
DATE MEASURED: 8/14/07



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
50			...same soil as 39' bgs except: 5% gravel (subangular, poorly graded, 100% latite), 20% silt, 75% sand. ...sample DBSA-32-Q-50. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
60			...same soil as 39' bgs except: yellowish brown, 15% silt, 10% gravel (angular, poorly graded, 20% rhyolite, 80% latite) 75% sand (20% mafics (biotie), 80% felsics). ...sample DBSA-32-Q-60. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						

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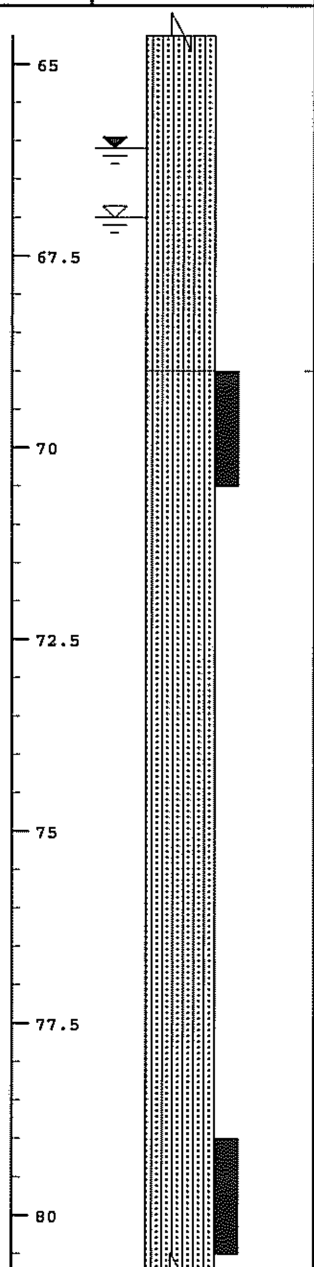
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA-32

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/14/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: 67.0'
DATE MEASURED: 8/14/07
FINAL DEPTH TO WATER: 66.1'
DATE MEASURED: 8/14/07

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...final ground water depth. ...initial groundwater depth.						
		SM	MUDDY CREEK FORMATION: Yellowish brown silty SAND with gravel, wet, weakly cemented and very dense. Sand is subangular, well-graded, consists of 30% mafics (as chlorite, andesite), 70% felsics (latite, rhyolite). Gravel is angular, poorly graded, and same composition as sand. Approximately 20% silt, 20% gravel, 60% sand. ...sample DBSA-32-Q-70. ...collect groundwater sample DBSA-32-GW. ...same soil as 69' bgs, sample DBSA-32-T-80.						



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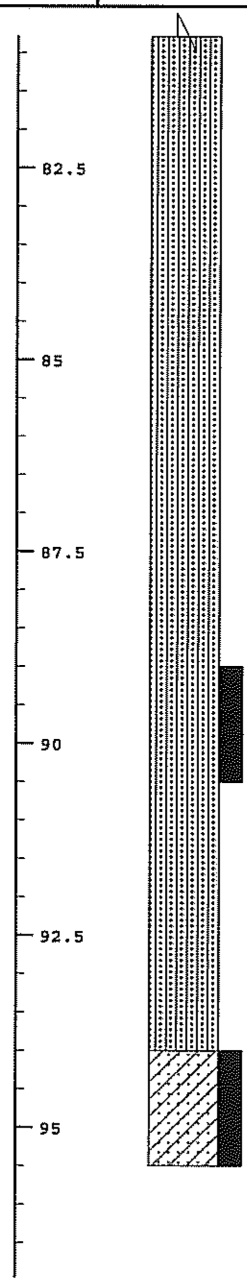
GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 23

EXPLORATION LOG
DBSA-32

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 8/14/07
EXPLORATION SIZE (dia.): 6" O.D. H.S. AUGER
EQUIPMENT: DIEDRICH D-120 DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: M. MEHLHORN

INITIAL DEPTH TO WATER: 67.0'
DATE MEASURED: 8/14/07
FINAL DEPTH TO WATER: 66.1'
DATE MEASURED: 8/14/07



ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
			...same soil as 69' bgs. No sample recovery: re-sample at 94.0'.						
		SC	Reddish yellow clayey SAND, wet, weakly cemented and very dense. Sand is subangular, well-graded, with 40% mafics (chloritically altered andesite), 60% felsics (latite,rhyolite). Approximately 40% lean clay, 60% sand. Sample DBSA-32-T-95.						
			END OF BORING AT 95.5 FEET						

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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

Figure No. 23

EXPLORATION LOG
DBSA-33

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 9/17/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
0 2.5		SM	Light yellowish brown (10YR 6/4) silty SAND (Approximately 10% gravel (poorly graded, subangular), 15% silt, 75% sand (well-graded, subangular), dry and loose. Sand has approximately 20% rhyolite, 15% mafics, 30% andesite, 35% felsics. Gravel consists of 80% rhyolite, 20% basalt.						
5 7.5 10 12.5		SM	Reddish yellow (7.5 YR 6/6) silty SAND with gravel (Approximately 20% gravel (poorly graded, subrounded), 20% silt, 60% sand (subrounded, poorly graded), moist and very dense. Sand has 90% felsics, 10% mafics. Gravel consists of 10% rhyolite, 90% basalt. ...sample DBSA-33-5. PIDs: 10.6, 11.7 eV = 0.0 ppmV. ...sample DBSA-33-10. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
15		CL	MUDDY CREEK FORMATION: Reddish yellow (7.5YR 6/6) sandy lean CLAY (Approximately 30% sand (poorly graded, subrounded), 70% lean clay), moist and very stiff. Sand has 15% gypsum (as veinlets and crystals), 75% felsics.						

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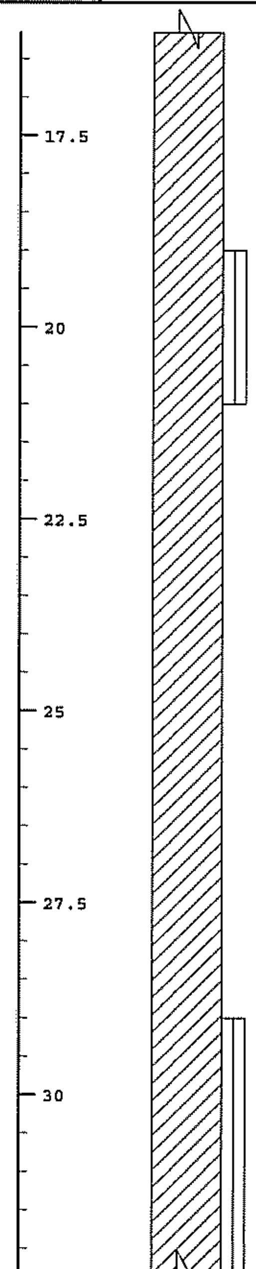
EXPLORATION LOG
DBSA-33

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 9/17/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
17.5			...0.5" thick weakly cemented clay layers with gypsum veins.						
20			...samples DBSA-33-20 and DBSA-33-20-FD. PIDs: 10.6, 11.7 eV = 0.0 ppmV.						
22.5									
25									
27.5									
30			...light brown (7.5YR 6/4), approximately 35% sand, 65% lean clay. ...sample DBSA-33-T-30. Pid's: 11.7eV = 0.0 ppmv, 10.6eV = 1.7 ppmv. ...sand occurs as 1/8" laminations.						



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GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

EXPLORATION LOG
DBSA-33

PROJECT: BRC DEEP BACKGROUND INVESTIGATION
PROJECT NO.: 20072226V1
BORING LOCATION: SEE FIGURE 2
EXPLORATION DATE: 9/17/07
EXPLORATION SIZE (dia.): 6" O.D. SAMPLER
EQUIPMENT: SONIC DRILL RIG
ELEVATION: EXISTING GROUND SURFACE
LOGGED BY: HILLMAN/MEHLHORN

INITIAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A
FINAL DEPTH TO WATER: NOT ENCOUNTERED
DATE MEASURED: N/A

ELEVATION/ DEPTH	SOIL & SAMPLE SYMBOLS	USCS	DESCRIPTION	PI	LL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL (%)	POCKET PENETROMETER (tsf)
32.5									
			END OF BORING AT 32.5 FEET						
35									
37.5									
40									
42.5									
45									
47.5									

The descriptions contained within this exploration log apply only at the specific exploration location and at the time the exploration was made. It is not intended to be representative of subsurface conditions at other locations or times.

GEOTECHNICAL & ENVIRONMENTAL SERVICES, INC.

APPENDIX D

DETAILED SAMPLE ANALYSIS SUMMARY TABLE

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Irvine	DBSA 11-Q-20	IQJ0948-01	IQJ0948	S	10/07/07	16:20															
TA-Irvine	DBSA 11-Q-30	IQJ0948-02	IQJ0948	S	10/07/07	16:40															
TA-Irvine	DBSA 11-Q-40	IQJ0948-03	IQJ0948	S	10/07/07	17:00															
TA-Irvine	DBSA 11-Q-40-FD	IQJ0948-04	IQJ0948	S	10/07/07	17:00															
TA-Irvine	DBSA 11-Q-50	IQJ0948-05	IQJ0948	S	10/07/07	17:20															
TA-Irvine	DBSA 11-Q-60	IQJ0948-06	IQJ0948	S	10/07/07	17:45															
TA-Irvine	DBSA 11-T-150	IQJ1106-01	IQJ1106	S	10/08/07	15:10															
TA-Irvine	DBSA 11-T-160	IQJ1106-02	IQJ1106	S	10/08/07	15:40															
TA-Irvine	DBSA 14-Q-150	IQJ1215-01	IQJ1215	S	10/10/07	8:00															
TA-Irvine	DBSA 14-Q-160	IQJ1215-02	IQJ1215	S	10/10/07	8:20															
TA-Irvine	DBSA 14-Q-160FD	IQJ1215-03	IQJ1215	S	10/10/07	8:20															
TA-St. Louis	DBSA 15 TRIP BLANK	F7J090259-001	DB101007*	WQ	10/07/07	6:45															
TA-St. Louis	DBSA 15-Q-120	F7J090259-002	DB101007*	S	10/07/07	6:50					X					X	X	X	X	X	X
TA-Richland	DBSA 15-Q-120	F7J090264-001	DB1010RD*	S	10/07/07	6:50															
TA-Irvine	DBSA 17-T-130	IQJ0952-01	IQJ0952	S	10/05/07	14:20															
TA-Irvine	DBSA 17-T-140	IQJ0952-02	IQJ0952	S	10/05/07	15:15															
TA-Irvine	DBSA 17-T-150	IQJ0952-03	IQJ0952	S	10/05/07	15:30															
TA-Irvine	DBSA 21-Q-20	IQJ0456-01	IQJ0456	S	10/02/07	12:55															
TA-Irvine	DBSA 21-Q-20 DUP	IQJ0456-02	IQJ0456	S	10/02/07	12:55															
TA-Irvine	DBSA 21-Q-30	IQJ0456-03	IQJ0456	S	10/02/07	13:30															
TA-Irvine	DBSA 21-Q-40	IQJ0456-04	IQJ0456	S	10/02/07	13:50															
TA-Irvine	DBSA 21-Q-50	IQJ0456-05	IQJ0456	S	10/02/07	14:15															
TA-St. Louis	DBSA-10-Q-10	F7J180242-003	DB101807*	S	10/16/07	13:15					X									X	
TA-St. Louis	DBSA-10-Q-20	F7J180242-004	DB101807*	S	10/16/07	13:30					X					X	X	X	X	X	X
TA-Richland	DBSA-10-Q-20	F7J180263-001	DB1018RD*	S	10/16/07	13:30															
TA-Richland	DBSA-10-Q-20	F8A150214-017	F8A150214	S	10/16/07	13:30															
TA-Richland	DBSA-10-Q-20	F8B080335-001	F8B080335	S	10/16/07	13:30															
TA-Irvine	DBSA-10-Q-20	IQJ1944-01	IQJ1944	S	10/16/07	13:30															
TA-St. Louis	DBSA-10-Q-20-FD	F7J180242-005	DB101807*	S	10/16/07	13:30					X					X	X	X	X	X	X
TA-Richland	DBSA-10-Q-20-FD	F7J180263-002	DB1018RD*	S	10/16/07	13:30															
TA-Richland	DBSA-10-Q-20-FD	F8A150214-018	F8A150214	S	10/16/07	13:30															
TA-Richland	DBSA-10-Q-20-FD	F8B080335-002	F8B080335	S	10/16/07	13:30															
TA-Irvine	DBSA-10-Q-20-FD	IQJ1944-02	IQJ1944	S	10/16/07	13:30															
TA-St. Louis	DBSA-10-Q-30	F7J180242-006	DB101807*	S	10/16/07	13:50					X					X	X	X	X	X	X

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Richland	DBSA-10-Q-30	F7J180263-003	DB1018RD*	S	10/16/07	13:50															
TA-Richland	DBSA-10-Q-30	F8A150214-019	F8A150214	S	10/16/07	13:50															
TA-Richland	DBSA-10-Q-30	F8B080335-003	F8B080335	S	10/16/07	13:50															
TA-Irvine	DBSA-10-Q-30	IQJ1944-03	IQJ1944	S	10/16/07	13:50															
TA-St. Louis	DBSA-10-Q-40	F7J180242-007	DB101807*	S	10/16/07	14:05					X					X	X	X	X	X	X
TA-Richland	DBSA-10-Q-40	F7J180263-004	DB1018RD*	S	10/16/07	14:05															
TA-Richland	DBSA-10-Q-40	F8A150214-020	F8A150214	S	10/16/07	14:05															
TA-Richland	DBSA-10-Q-40	F8B080335-004	F8B080335	S	10/16/07	14:05															
TA-Irvine	DBSA-10-Q-40	IQJ1944-04	IQJ1944	S	10/16/07	14:05															
TA-St. Louis	DBSA-10-Q-5	F7J180242-002	DB101807*	S	10/16/07	13:10					X									X	
TA-St. Louis	DBSA-10-Q-50	F7J180242-008	DB101807*	S	10/16/07	14:30					X					X	X	X	X	X	X
TA-Richland	DBSA-10-Q-50	F7J180263-005	DB1018RD*	S	10/16/07	14:30															
TA-Richland	DBSA-10-Q-50	F8A150224-001	F8A150224	S	10/16/07	14:30															
TA-Richland	DBSA-10-Q-50	F8B080335-005	F8B080335	S	10/16/07	14:30															
TA-Irvine	DBSA-10-Q-50	IQJ1944-05	IQJ1944	S	10/16/07	14:30															
TA-St. Louis	DBSA-10-Q-50-FD	F7J180242-009	DB101807*	S	10/16/07	14:30					X					X	X	X	X	X	X
TA-Richland	DBSA-10-Q-50-FD	F7J180263-006	DB1018RD*	S	10/16/07	14:30															
TA-Richland	DBSA-10-Q-50-FD	F8A150224-002	F8A150224	S	10/16/07	14:30															
TA-Richland	DBSA-10-Q-50-FD	F8B080335-006	F8B080335	S	10/16/07	14:30															
TA-Irvine	DBSA-10-Q-50-FD	IQJ1944-06	IQJ1944	S	10/16/07	14:30															
TA-St. Louis	DBSA-11-Q-10	F7J090254-003	DB100907*	S	10/07/07	16:05					X									X	
TA-St. Louis	DBSA-11-Q-120	F7J100176-006	DB101007*	S	10/08/07	11:45					X					X	X	X	X	X	X
TA-Richland	DBSA-11-Q-120	F7J100192-006	DB1010RD*	S	10/08/07	11:45															
TA-Richland	DBSA-11-Q-120	F8A150205-016	F8A150205	S	10/08/07	11:45															
TA-St. Louis	DBSA-11-Q-120-FD	F7J100176-007	DB101007*	S	10/08/07	11:45															
TA-St. Louis	DBSA-11-Q-20	F7J090254-004	DB100907**	S	10/07/07	16:20					X					X	X	X	X	X	X
TA-Richland	DBSA-11-Q-20	F7J090257-001	DB1009RD*	S	10/07/07	16:20															
TA-Richland	DBSA-11-Q-20	F8A150205-007	F8A150205	S	10/07/07	16:20															
TA-Richland	DBSA-11-Q-20	F8B080335-007	F8B080335	S	10/07/07	16:20															
TA-Irvine	DBSA-11-Q-20	IQJ1814-01	IQJ1814	S	10/08/07	16:20															
TA-St. Louis	DBSA-11-Q-30	F7J090254-005	DB100907*	S	10/07/07	16:40					X					X	X	X	X	X	X
TA-Richland	DBSA-11-Q-30	F7J090257-002	DB1009RD*	S	10/07/07	16:40															
TA-Richland	DBSA-11-Q-30	F8A150205-008	F8A150205	S	10/07/07	16:40															
TA-Richland	DBSA-11-Q-30	F8B080335-008	F8B080335	S	10/07/07	16:40															

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Irvine	DBSA-11-Q-30	IQJ1814-02	IQJ1814	S	10/08/07	16:40															
TA-St. Louis	DBSA-11-Q-40	F7J090254-006	DB100907*	S	10/07/07	17:00					X					X	X	X	X	X	X
TA-Richland	DBSA-11-Q-40	F7J090257-003	DB1009RD*	S	10/07/07	17:00															
TA-Richland	DBSA-11-Q-40	F8A150205-009	F8A150205	S	10/07/07	17:00															
TA-Richland	DBSA-11-Q-40	F8B080335-009	F8B080335	S	10/07/07	17:00															
TA-Irvine	DBSA-11-Q-40	IQJ1814-03	IQJ1814	S	10/08/07	17:00															
TA-St. Louis	DBSA-11-Q-40FD	F7J090254-007	DB100907*	S	10/07/07	17:00					X					X	X	X	X	X	X
TA-Richland	DBSA-11-Q-40FD	F7J090257-004	DB1009RD*	S	10/07/07	17:00															
TA-Richland	DBSA-11-Q-40FD	F8A150205-010	F8A150205	S	10/07/07	17:00															
TA-Richland	DBSA-11-Q-40FD	F8B080335-010	F8B080335	S	10/07/07	17:00															
TA-Irvine	DBSA-11-Q-40FD	IQJ1814-04	IQJ1814	S	10/08/07	17:00															
TA-St. Louis	DBSA-11-Q-5	F7J090254-002	DB100907*	S	10/07/07	16:00					X									X	
TA-St. Louis	DBSA-11-Q-50	F7J090254-008	DB100907*	S	10/07/07	17:20					X					X	X	X	X	X	X
TA-Richland	DBSA-11-Q-50	F7J090257-005	DB1009RD*	S	10/07/07	17:20															
TA-Richland	DBSA-11-Q-50	F8A150205-011	F8A150205	S	10/07/07	17:20															
TA-Richland	DBSA-11-Q-50	F8B080335-011	F8B080335	S	10/07/07	17:20															
TA-Irvine	DBSA-11-Q-50	IQJ1814-05	IQJ1814	S	10/08/07	17:20															
TA-St. Louis	DBSA-11-Q-60	F7J090254-009	DB100907*	S	10/07/07	17:45					X					X	X	X	X	X	X
TA-Richland	DBSA-11-Q-60	F7J090257-006	DB1009RD*	S	10/07/07	17:45															
TA-Richland	DBSA-11-Q-60	F8A150205-012	F8A150205	S	10/07/07	17:45															
TA-Richland	DBSA-11-Q-60	F8B080335-012	F8B080335	S	10/07/07	17:45															
TA-Irvine	DBSA-11-Q-60	IQJ1814-06	IQJ1814	S	10/08/07	17:45															
TA-St. Louis	DBSA-11-T-150	F7J100176-010	DB101007*	S	10/08/07	15:10					X					X	X	X	X	X	X
TA-Richland	DBSA-11-T-150	F7J100192-010	DB1010RD*	S	10/08/07	15:10															
TA-Richland	DBSA-11-T-150	F8A150205-018	F8A150205	S	10/08/07	15:10															
TA-Richland	DBSA-11-T-150	F8B090159-013	F8B090159	S	10/08/07	15:10															
TA-St. Louis	DBSA-11-T-160	F7J100176-011	DB101007*	S	10/08/07	15:40					X					X	X	X	X	X	X
TA-Richland	DBSA-11-T-160	F7J100192-011	DB1010RD*	S	10/08/07	15:40															
TA-Richland	DBSA-11-T-160	F8A150205-019	F8A150205	S	10/08/07	15:40															
TA-St. Louis	DBSA-13-Q-10	F7J200153-003	DB102007*	S	10/18/07	15:10					X									X	
TA-St. Louis	DBSA-13-Q-20	F7J200153-004	DB102007*	S	10/18/07	15:25					X					X	X	X	X	X	X
TA-Richland	DBSA-13-Q-20	F7J200157-001	DB102RD*	S	10/18/07	15:25															
TA-Richland	DBSA-13-Q-20	F8A150224-009	F8A150224	S	10/18/07	15:25															
TA-Richland	DBSA-13-Q-20	F8B080335-013	F8B080335	S	10/18/07	15:25															

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Irvine	DBSA-13-Q-20	IQJ2234-01	IQJ2234	S	10/18/07	15:25															
TA-St. Louis	DBSA-13-Q-20-FD	F7J200153-005	DB102007*	S	10/18/07	15:25					X					X	X	X	X	X	X
TA-Richland	DBSA-13-Q-20-FD	F7J200157-002	DB102RD*	S	10/18/07	15:25															
TA-Richland	DBSA-13-Q-20-FD	F8A150224-010	F8A150224	S	10/18/07	15:25															
TA-Richland	DBSA-13-Q-20-FD	F8B080335-014	F8B080335	S	10/18/07	15:25															
TA-Irvine	DBSA-13-Q-20-FD	IQJ2234-02	IQJ2234	S	10/18/07	15:25															
TA-St. Louis	DBSA-13-Q-30	F7J200153-006	DB102007*	S	10/18/07	15:40					X					X	X	X	X	X	X
TA-Richland	DBSA-13-Q-30	F7J200157-003	DB102RD*	S	10/18/07	15:40															
TA-Richland	DBSA-13-Q-30	F8A150224-011	F8A150224	S	10/18/07	15:40															
TA-Richland	DBSA-13-Q-30	F8B080335-015	F8B080335	S	10/18/07	15:40															
TA-Irvine	DBSA-13-Q-30	IQJ2234-03	IQJ2234	S	10/18/07	15:40															
TA-St. Louis	DBSA-13-Q-40	F7J200153-007	DB102007*	S	10/18/07	16:00					X					X	X	X	X	X	X
TA-Richland	DBSA-13-Q-40	F7J200157-004	DB102RD*	S	10/18/07	16:00															
TA-Richland	DBSA-13-Q-40	F8A150224-012	F8A150224	S	10/18/07	16:00															
TA-Richland	DBSA-13-Q-40	F8B080335-016	F8B080335	S	10/18/07	16:00															
TA-Irvine	DBSA-13-Q-40	IQJ2234-04	IQJ2234	S	10/18/07	16:00															
TA-St. Louis	DBSA-13-Q-5	F7J200153-002	DB102007*	S	10/18/07	15:00					X									X	
TA-St. Louis	DBSA-13-Q-50	F7J200153-008	DB102007*	S	10/18/07	16:25					X					X	X	X	X	X	X
TA-Richland	DBSA-13-Q-50	F7J200157-005	DB102RD*	S	10/18/07	16:25															
TA-Richland	DBSA-13-Q-50	F8A150224-013	F8A150224	S	10/18/07	16:25															
TA-Richland	DBSA-13-Q-50	F8B080335-017	F8B080335	S	10/18/07	16:25															
TA-Irvine	DBSA-13-Q-50	IQJ2234-05	IQJ2234	S	10/18/07	16:25															
TA-St. Louis	DBSA-13-Q-50-FD	F7J200153-019	DB102007*	S	10/18/07	16:25					X					X	X	X	X	X	X
TA-Richland	DBSA-13-Q-50-FD	F7J200157-006	DB102RD*	S	10/18/07	16:25															
TA-Richland	DBSA-13-Q-50-FD	F8A150224-014	F8A150224	S	10/18/07	16:25															
TA-Richland	DBSA-13-Q-50-FD	F8B080335-018	F8B080335	S	10/18/07	16:25															
TA-Irvine	DBSA-13-Q-50-FD	IQJ2234-06	IQJ2234	S	10/18/07	16:25															
TA-St. Louis	DBSA-13-Q-60	F7J200153-009	DB102007*	S	10/18/07	16:45					X					X	X	X	X	X	X
TA-Richland	DBSA-13-Q-60	F7J200157-007	DB102RD*	S	10/18/07	16:45															
TA-Richland	DBSA-13-Q-60	F8A150224-015	F8A150224	S	10/18/07	16:45															
TA-Richland	DBSA-13-Q-60	F8B080335-019	F8B080335	S	10/18/07	16:45															
TA-Irvine	DBSA-13-Q-60	IQJ2234-07	IQJ2234	S	10/18/07	16:45															
TA-St. Louis	DBSA-13-Q-70	F7J200153-010	DB102007*	S	10/18/07	17:10					X					X	X	X	X	X	X
TA-Richland	DBSA-13-Q-70	F7J200157-008	DB102RD*	S	10/18/07	17:10															

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DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Richland	DBSA-13-Q-70	F8A150224-016	F8A150224	S	10/18/07	17:10															
TA-Irvine	DBSA-13-Q-70	IQJ2234-08	IQJ2234	S	10/18/07	17:10															
TA-St. Louis	DBSA-13-Q-80	F7J200153-011	DB102007*	S	10/18/07	17:40					X					X	X	X	X	X	X
TA-Richland	DBSA-13-Q-80	F7J200157-009	DB102RD*	S	10/18/07	17:40															
TA-Richland	DBSA-13-Q-80	F8A150224-017	F8A150224	S	10/18/07	17:40															
TA-Irvine	DBSA-13-Q-80	IQJ2234-09	IQJ2234	S	10/18/07	17:40															
TA-St. Louis	DBSA-14-Q-10	F7J110226-003	DB101107*	S	10/09/07	10:55					X									X	
TA-St. Louis	DBSA-14-Q-140	F7J110226-018	DB101107*	S	10/10/07	17:55					X					X	X	X	X	X	X
TA-Richland	DBSA-14-Q-140	F7J110245-015	DB1011RD*	S	10/10/07	17:55															
TA-Irvine	DBSA-14-Q-140	IQJ1216-15	IQJ1216	S	10/09/07	17:55															
TA-St. Louis	DBSA-14-Q-20	F7J110226-004	DB101107*	S	10/09/07	11:15					X					X	X	X	X	X	X
TA-Richland	DBSA-14-Q-20	F7J110245-001	DB1011RD*	S	10/09/07	11:15															
TA-Richland	DBSA-14-Q-20	F8A150205-020	F8A150205	S	10/09/07	11:15															
TA-Richland	DBSA-14-Q-20	F8A150214-006	F8A150214	S	10/09/07	11:15															
TA-Richland	DBSA-14-Q-20	F8B080335-020	F8B080335	S	10/09/07	11:15															
TA-Irvine	DBSA-14-Q-20	IQJ1216-01	IQJ1216	S	10/09/07	11:15															
TA-St. Louis	DBSA-14-Q-20 FD	F7J110226-005	DB101107*	S	10/09/07	11:15					X					X	X	X	X	X	X
TA-Richland	DBSA-14-Q-20 FD	F7J110245-002	DB1011RD*	S	10/09/07	11:15															
TA-Richland	DBSA-14-Q-20 FD	F8A150214-001	F8A150214	S	10/09/07	11:15															
TA-Irvine	DBSA-14-Q-20 FD	IQJ1216-02	IQJ1216	S	10/09/07	11:15															
TA-Richland	DBSA-14-Q-20-FD	F8B090125-001	F8B090125	S	10/09/07	11:15															
TA-St. Louis	DBSA-14-Q-30	F7J110226-006	DB101107*	S	10/09/07	11:40					X					X	X	X	X	X	X
TA-Richland	DBSA-14-Q-30	F7J110245-003	DB1011RD*	S	10/09/07	11:40															
TA-Richland	DBSA-14-Q-30	F8A150214-002	F8A150214	S	10/09/07	11:40															
TA-Richland	DBSA-14-Q-30	F8B090125-002	F8B090125	S	10/09/07	11:40															
TA-Irvine	DBSA-14-Q-30	IQJ1216-03	IQJ1216	S	10/09/07	11:40															
TA-St. Louis	DBSA-14-Q-40	F7J110226-007	DB101107*	S	10/09/07	12:05					X					X	X	X	X	X	X
TA-Richland	DBSA-14-Q-40	F7J110245-004	DB1011RD*	S	10/09/07	12:05															
TA-Richland	DBSA-14-Q-40	F8A150214-003	F8A150214	S	10/09/07	12:05															
TA-Richland	DBSA-14-Q-40	F8B090125-003	F8B090125	S	10/09/07	12:05															
TA-Irvine	DBSA-14-Q-40	IQJ1216-04	IQJ1216	S	10/09/07	12:05															
TA-St. Louis	DBSA-14-Q-5	F7J110226-002	DB101107*	S	10/09/07	10:45					X									X	
TA-St. Louis	DBSA-14-Q-50	F7J110226-008	DB101107*	S	10/09/07	12:30					X					X	X	X	X	X	X
TA-Richland	DBSA-14-Q-50	F7J110245-005	DB1011RD*	S	10/09/07	12:30															

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2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Richland	DBSA-14-Q-50	F8A150214-004	F8A150214	S	10/09/07	12:30															
TA-Richland	DBSA-14-Q-50	F8B090125-004	F8B090125	S	10/09/07	12:30															
TA-Irvine	DBSA-14-Q-50	IQJ1216-05	IQJ1216	S	10/09/07	12:30															
TA-St. Louis	DBSA-14-Q-50 FD	F7J110226-009	DB101107*	S	10/09/07	12:30					X					X	X	X	X	X	X
TA-Richland	DBSA-14-Q-50 FD	F7J110245-006	DB1011RD*	S	10/09/07	12:30															
TA-Richland	DBSA-14-Q-50 FD	F8A150214-005	F8A150214	S	10/09/07	12:30															
TA-Richland	DBSA-14-Q-50 FD	F8B090125-005	F8B090125	S	10/09/07	12:30															
TA-Irvine	DBSA-14-Q-50 FD	IQJ1216-06	IQJ1216	S	10/09/07	12:30															
TA-St. Louis	DBSA-14-Q-60	F7J110226-010	DB101107*	S	10/09/07	13:40					X								X	X	
TA-St. Louis	DBSA-15-Q-10	F7J090244-003	DB100907*	S	10/06/07	10:40					X									X	
TA-St. Louis	DBSA-15-Q-150	F7J090259-006	DB101007*	S	10/07/07	9:45					X					X	X	X	X	X	X
TA-Richland	DBSA-15-Q-150	F7J090264-005	DB1010RD*	S	10/07/07	9:45															
TA-Irvine	DBSA-15-Q-150	IQJ0945-06	IQJ0945	S	10/07/07	9:45															
TA-St. Louis	DBSA-15-Q-160	F7J090259-007	DB101007*	S	10/07/07	10:05					X					X	X	X	X	X	X
TA-Richland	DBSA-15-Q-160	F7J090264-006	DB1010RD*	S	10/07/07	10:05															
TA-Irvine	DBSA-15-Q-160	IQJ0945-07	IQJ0945	S	10/07/07	10:05															
TA-St. Louis	DBSA-15-Q-20	F7J090244-004	DB100907*	S	10/06/07	11:25					X					X	X	X	X	X	X
TA-Richland	DBSA-15-Q-20	F7J090251-001	DB1009RD*	S	10/06/07	11:25															
TA-Richland	DBSA-15-Q-20	F8A140155-016	F8A140155	S	10/06/07	11:25															
TA-Richland	DBSA-15-Q-20	F8B090125-006	F8B090125	S	10/06/07	11:25															
TA-Irvine	DBSA-15-Q-20	IQJ0935-01	IQJ0935	S	10/06/07	11:25															
TA-St. Louis	DBSA-15-Q-20 FD	F7J090244-005	DB100907*	S	10/06/07	11:25					X					X	X	X	X	X	X
TA-Richland	DBSA-15-Q-20 FD	F7J090251-002	DB1009RD*	S	10/06/07	11:25															
TA-Richland	DBSA-15-Q-20 FD	F8A140155-017	F8A140155	S	10/06/07	11:25															
TA-Richland	DBSA-15-Q-20 FD	F8B090125-007	F8B090125	S	10/06/07	11:25															
TA-Irvine	DBSA-15-Q-20 FD	IQJ0935-02	IQJ0935	S	10/06/07	11:25															
TA-St. Louis	DBSA-15-Q-30	F7J090244-006	DB100907*	S	10/06/07	12:00					X					X	X	X	X	X	X
TA-Richland	DBSA-15-Q-30	F7J090251-003	DB1009RD*	S	10/06/07	12:00															
TA-Richland	DBSA-15-Q-30	F8A140155-018	F8A140155	S	10/06/07	12:00															
TA-Richland	DBSA-15-Q-30	F8B090125-008	F8B090125	S	10/06/07	12:00															
TA-Irvine	DBSA-15-Q-30	IQJ0935-03	IQJ0935	S	10/06/07	12:00															
TA-St. Louis	DBSA-15-Q-40	F7J090244-007	DB100907*	S	10/06/07	12:40					X					X	X	X	X	X	X
TA-Richland	DBSA-15-Q-40	F7J090251-004	DB1009RD*	S	10/06/07	12:40															
TA-Richland	DBSA-15-Q-40	F8A140155-019	F8A140155	S	10/06/07	12:40															

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LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Richland	DBSA-15-Q-40	F8B090125-009	F8B090125	S	10/06/07	12:40															
TA-Irvine	DBSA-15-Q-40	IQJ0935-04	IQJ0935	S	10/06/07	12:40															
TA-St. Louis	DBSA-15-Q-5	F7J090244-002	DB100907*	S	10/06/07	10:35					X									X	
TA-St. Louis	DBSA-15-Q-50	F7J090244-008	DB100907*	S	10/06/07	14:20					X					X	X	X	X	X	X
TA-Richland	DBSA-15-Q-50	F7J090251-005	DB1009RD*	S	10/06/07	14:20															
TA-Richland	DBSA-15-Q-50	F8A140155-020	F8A140155	S	10/06/07	14:20															
TA-Richland	DBSA-15-Q-50	F8B090125-010	F8B090125	S	10/06/07	14:20															
TA-Irvine	DBSA-15-Q-50	IQJ0935-05	IQJ0935	S	10/06/07	14:20															
TA-St. Louis	DBSA-17-GW	F7J090279-013	DB100807*	W	10/05/07	16:30	X	X	X	X		X	X	X	X	X	X	X	X	X	X
TA-Richland	DBSA-17-GW	F7J090293-013	DB1008RD*	W	10/05/07	16:30															
Alpha	DBSA-17-GW	ERM07100951-01	ERM07100951	W	10/05/07	16:30															
TA-Irvine	DBSA-17-GW	IQJ0901-01	IQJ0901	W	10/05/07	16:30															
TA-St. Louis	DBSA-17-Q-10	F7J060109-002	DB100807*	S	10/04/07	16:50					X									X	
TA-St. Louis	DBSA-17-Q-100	F7J090279-007	DB100807*	S	10/05/07	10:30					X					X	X	X	X	X	X
TA-Richland	DBSA-17-Q-100	F7J090293-007	DB1008RD*	S	10/05/07	10:30															
TA-St. Louis	DBSA-17-Q-110	F7J090279-008	DB100807*	S	10/05/07	11:40					X					X	X	X	X	X	X
TA-Richland	DBSA-17-Q-110	F7J090293-008	DB1008RD*	S	10/05/07	11:40															
TA-St. Louis	DBSA-17-Q-120	F7J090279-009	DB100807*	S	10/05/07	12:10					X					X	X	X	X	X	X
TA-Richland	DBSA-17-Q-120	F7J090293-009	DB1008RD*	S	10/05/07	12:10															
TA-Irvine	DBSA17-Q-20	IQJ0761-01	IQJ0761	S	10/04/07	17:15															
TA-St. Louis	DBSA-17-Q-20	F7J060109-003	DB100807*	S	10/04/07	17:00					X					X	X	X	X	X	X
TA-Richland	DBSA-17-Q-20	F7J060111-001	DB1008RD*	S	10/04/07	17:00															
TA-Richland	DBSA-17-Q-20	F8B090125-012	F8B090125	S	10/04/07	17:00															
TA-Irvine	DBSA-17-Q-30	IQJ0761-02	IQJ0761	S	10/04/07	17:35															
TA-St. Louis	DBSA-17-Q-30	F7J060109-004	DB100807*	S	10/04/07	17:15					X					X	X	X	X	X	X
TA-Richland	DBSA-17-Q-30	F7J060111-002	DB1008RD*	S	10/04/07	17:15															
TA-Richland	DBSA-17-Q-30	F8B090125-013	F8B090125	S	10/04/07	17:15															
TA-Irvine	DBSA-17-Q-40	IQJ0761-03	IQJ0761	S	10/04/07	17:55															
TA-St. Louis	DBSA-17-Q-40	F7J060109-005	DB100807*	S	10/04/07	17:35					X					X	X	X	X	X	X
TA-Richland	DBSA-17-Q-40	F7J060111-003	DB1008RD*	S	10/04/07	17:35															
TA-Richland	DBSA-17-Q-40	F8B090125-014	F8B090125	S	10/04/07	17:35															
TA-St. Louis	DBSA-17-Q-5	F7J060109-001	DB100807*	S	10/04/07	16:45					X									X	
TA-St. Louis	DBSA-17-Q-50	F7J090279-001	DB100807*	S	10/05/07	7:45					X					X	X	X	X	X	X
TA-Richland	DBSA-17-Q-50	F7J090293-001	DB1008RD*	S	10/05/07	7:45															

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Richland	DBSA-17-Q-50	F8B090125-015	F8B090125	S	10/05/07	7:45															
TA-St. Louis	DBSA-17-Q-60	F7J090279-002	DB100807*	S	10/05/07	8:15					X					X	X	X	X	X	X
TA-Richland	DBSA-17-Q-60	F7J090293-002	DB1008RD*	S	10/05/07	8:15															
TA-Richland	DBSA-17-Q-60	F8B090125-016	F8B090125	S	10/05/07	8:15															
TA-St. Louis	DBSA-17-Q-70	F7J090279-003	DB100807*	S	10/05/07	8:45					X					X	X	X	X	X	X
TA-Richland	DBSA-17-Q-70	F7J090293-003	DB1008RD*	S	10/05/07	8:45															
TA-St. Louis	DBSA-17-Q-80	F7J090279-004	DB100807*	S	10/05/07	9:30					X					X	X	X	X	X	X
TA-Richland	DBSA-17-Q-80	F7J090293-004	DB1008RD*	S	10/05/07	9:30															
TA-St. Louis	DBSA-17-Q-80-DUP	F7J090279-005	DB100807*	S	10/05/07	9:30					X					X	X	X	X	X	X
TA-Richland	DBSA-17-Q-80-DUP	F7J090293-005	DB1008RD*	S	10/05/07	9:30															
TA-St. Louis	DBSA-17-Q-90	F7J090279-006	DB100807*	S	10/05/07	10:00					X					X	X	X	X	X	X
TA-Richland	DBSA-17-Q-90	F7J090293-006	DB1008RD*	S	10/05/07	10:00															
TA-St. Louis	DBSA-17-T-130	F7J090279-010	DB100807*	S	10/05/07	14:20					X					X	X	X	X	X	X
TA-Richland	DBSA-17-T-130	F7J090293-010	DB1008RD*	S	10/05/07	14:20															
TA-Richland	DBSA-17-T-130	F8B090159-014	F8B090159	S	10/05/07	14:20															
TA-St. Louis	DBSA-17-T-140	F7J090279-011	DB100807*	S	10/05/07	15:15					X					X	X	X	X	X	X
TA-Richland	DBSA-17-T-140	F7J090293-011	DB1008RD*	S	10/05/07	15:15															
TA-Richland	DBSA-17-T-140	F8B090159-015	F8B090159	S	10/05/07	15:15															
TA-St. Louis	DBSA-17-T-150	F7J090279-012	DB100807*	S	10/05/07	15:30					X					X	X	X	X	X	X
TA-Richland	DBSA-17-T-150	F7J090293-012	DB1008RD*	S	10/05/07	15:30															
TA-Richland	DBSA-17-T-150	F8A150205-015	F8A150205	S	10/05/07	15:30															
TA-Richland	DBSA-17-T-150	F8B090159-016	F8B090159	S	10/05/07	15:30															
TA-St. Louis	DBSA-1-Q-0	F7H070367-001	DB080807*	S	08/06/07	8:00					X										X
TA-Irvine	DBSA-1-Q-0	IQH1020-01	IQH1020	S	08/06/07	8:00					X										
TA-St. Louis	DBSA-1-Q-10	F7H070367-003	DB080807*	S	08/06/07	10:30					X									X	X
TA-Irvine	DBSA-1-Q-10	IQH1020-03	IQH1020	S	08/06/07	10:30					X										
TA-St. Louis	DBSA-1-Q-20	F7H070367-004	DB080807*	S	08/06/07	10:55					X					X	X	X	X	X	X
TA-Richland	DBSA-1-Q-20	F7H070375-001	DB0808RD*	S	08/06/07	10:55															
TA-Richland	DBSA-1-Q-20	F8A140146-001	F8A140146	S	08/06/07	10:55															
TA-Richland	DBSA-1-Q-20	F8B090125-017	F8B090125	S	08/06/07	10:55															
TA-Irvine	DBSA-1-Q-20	IQH1020-04	IQH1020	S	08/06/07	10:55					X										
TA-St. Louis	DBSA-1-Q-30	F7H070367-005	DB080807*	S	08/06/07	11:40					X					X	X	X	X	X	X
TA-Richland	DBSA-1-Q-30	F7H070375-002	DB0808RD*	S	08/06/07	11:40															
TA-Richland	DBSA-1-Q-30	F8A140146-002	F8A140146	S	08/06/07	11:40															

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DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Richland	DBSA-1-Q-30	F8B090125-018	F8B090125	S	08/06/07	11:40															
TA-Irvine	DBSA-1-Q-30	IQH1020-05	IQH1020	S	08/06/07	11:40					X										
TA-St. Louis	DBSA-1-Q-40	F7H070367-007	DB080807*	S	08/06/07	12:15					X					X	X	X	X	X	X
TA-Richland	DBSA-1-Q-40	F7H070375-004	DB0808RD*	S	08/06/07	12:15															
TA-Richland	DBSA-1-Q-40	F8A140146-003	F8A140146	S	08/06/07	12:15															
TA-Richland	DBSA-1-Q-40	F8B090125-019	F8B090125	S	08/06/07	12:15															
TA-Irvine	DBSA-1-Q-40	IQH1020-07	IQH1020	S	08/06/07	12:15					X										
TA-St. Louis	DBSA-1-Q-5	F7H070367-002	DB080807*	S	08/06/07	10:00					X									X	X
TA-Irvine	DBSA-1-Q-5	IQH1020-02	IQH1020	S	08/06/07	10:00					X										
TA-St. Louis	DBSA-1-Q-50	F7H070367-008	DB080807*	S	08/06/07	12:40					X					X	X	X	X	X	X
TA-Richland	DBSA-1-Q-50	F7H070375-005	DB0808RD*	S	08/06/07	12:40															
TA-Richland	DBSA-1-Q-50	F8A140146-004	F8A140146	S	08/06/07	12:40															
TA-Richland	DBSA-1-Q-50	F8B090125-020	F8B090125	S	08/06/07	12:40															
TA-Irvine	DBSA-1-Q-50	IQH1020-08	IQH1020	S	08/06/07	12:40					X										
TA-St. Louis	DBSA-1-Q-60	F7H070367-009	DB080807*	S	08/06/07	13:00					X					X	X	X	X	X	X
TA-Richland	DBSA-1-Q-60	F7H070375-006	DB0808RD*	S	08/06/07	13:00															
TA-Richland	DBSA-1-Q-60	F8A140146-005	F8A140146	S	08/06/07	13:00															
TA-Richland	DBSA-1-Q-60	F8B090159-001	F8B090159	S	08/06/07	13:00															
TA-Irvine	DBSA-1-Q-60	IQH1020-09	IQH1020	S	08/06/07	13:00					X										
TA-St. Louis	DBSA-1-Q-70	F7H070367-010	DB080807*	S	08/06/07	13:30					X					X	X	X	X	X	X
TA-Richland	DBSA-1-Q-70	F7H070375-007	DB0808RD*	S	08/06/07	13:30															
TA-Richland	DBSA-1-Q-70	F8A140146-006	F8A140146	S	08/06/07	13:30															
TA-Irvine	DBSA-1-Q-70	IQH1020-10	IQH1020	S	08/06/07	13:30					X										
TA-St. Louis	DBSA-1-Q-80	F7H070367-011	DB080807*	S	08/06/07	14:10					X					X	X	X	X	X	X
TA-Richland	DBSA-1-Q-80	F7H070375-008	DB0808RD*	S	08/06/07	14:10															
TA-Richland	DBSA-1-Q-80	F8A140146-007	F8A140146	S	08/06/07	14:10															
TA-Irvine	DBSA-1-Q-80	IQH1020-11	IQH1020	S	08/06/07	14:10					X										
TA-St. Louis	DBSA-1-Q-90	F7H070367-012	DB080807*	S	08/06/07	14:40					X					X	X	X	X	X	X
TA-Richland	DBSA-1-Q-90	F7H070375-009	DB0808RD*	S	08/06/07	14:40															
TA-Richland	DBSA-1-Q-90	F8A140146-008	F8A140146	S	08/06/07	14:40															
TA-Irvine	DBSA-1-Q-90	IQH1020-12	IQH1020	S	08/06/07	14:40					X										
TA-St. Louis	DBSA-20-GW	F7J050251-014	DB100507*	W	10/04/07	10:00	X	X	X	X		X	X	X	X	X	X	X	X	X	X
TA-Richland	DBSA-20-GW	F7J050268-011	DB1005RD*	W	10/04/07	10:00															
Alpha	DBSA-20-GW	ERM07100532-01A	ERM07100532	W	10/04/07	10:00															

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
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LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Irvine	DBSA-20-GW	IQJ0573-01	IQJ0573	W	10/04/07	10:00															
TA-Irvine	DBSA-20-GW	IQJ0610-01	IQJ0610	W	10/04/07	10:00															
TA-St. Louis	DBSA-20-Q-10	F7J050251-002	DB100507*	S	10/03/07	14:00					X									X	
TA-St. Louis	DBSA-20-Q-20	F7J050251-003	DB100507*	S	10/03/07	14:20					X					X	X	X	X	X	X
TA-Richland	DBSA-20-Q-20	F7J050268-001	DB1005RD*	S	10/03/07	14:20															
TA-Richland	DBSA-20-Q-20	F8A140155-006	F8A140155	S	10/03/07	14:20															
TA-Richland	DBSA-20-Q-20	F8B090159-002	F8B090159	S	10/03/07	14:20															
TA-Irvine	DBSA-20-Q-20	IQJ0623-01	IQJ0623	S	10/03/07	14:20															
TA-St. Louis	DBSA-20-Q-30	F7J050251-004	DB100507*	S	10/03/07	15:00					X					X	X	X	X	X	X
TA-Richland	DBSA-20-Q-30	F7J050268-002	DB1005RD*	S	10/03/07	15:00															
TA-Richland	DBSA-20-Q-30	F8A140155-007	F8A140155	S	10/03/07	15:00															
TA-Richland	DBSA-20-Q-30	F8B090159-003	F8B090159	S	10/03/07	15:00															
TA-Irvine	DBSA-20-Q-30	IQJ0623-02	IQJ0623	S	10/03/07	15:00															
TA-St. Louis	DBSA-20-Q-40	F7J050251-005	DB100507*	S	10/03/07	16:00					X					X	X	X	X	X	X
TA-Richland	DBSA-20-Q-40	F7J050268-003	DB1005RD*	S	10/03/07	16:00															
TA-Richland	DBSA-20-Q-40	F8A140155-008	F8A140155	S	10/03/07	16:00															
TA-Richland	DBSA-20-Q-40	F8B090159-004	F8B090159	S	10/03/07	16:00															
TA-Irvine	DBSA-20-Q-40	IQJ0623-03	IQJ0623	S	10/03/07	16:00															
TA-St. Louis	DBSA-20-Q-5	F7J050251-001	DB100507*	S	10/03/07	13:55					X									X	
TA-St. Louis	DBSA-20-Q-50	F7J050251-006	DB100507*	S	10/03/07	16:30					X					X	X	X	X	X	X
TA-Richland	DBSA-20-Q-50	F7J050268-004	DB1005RD*	S	10/03/07	16:30															
TA-Richland	DBSA-20-Q-50	F8A140155-009	F8A140155	S	10/03/07	16:30															
TA-Richland	DBSA-20-Q-50	F8B090159-005	F8B090159	S	10/03/07	16:30															
TA-Irvine	DBSA-20-Q-50	IQJ0623-04	IQJ0623	S	10/03/07	16:30															
TA-St. Louis	DBSA-20-Q-60	F7J050251-007	DB100507*	S	10/03/07	17:00					X										
TA-St. Louis	DBSA-20-Q-70	F7J050251-008	DB100507*	S	10/03/07	17:35					X					X	X	X		X	X
TA-Richland	DBSA-20-Q-70	F7J050268-006	DB1005RD*	S	10/03/07	17:35															
TA-Richland	DBSA-20-Q-70	F8A140155-011	F8A140155	S	10/03/07	17:35															
TA-Irvine	DBSA-20-Q-70	IQJ0623-06	IQJ0623	S	10/03/07	17:35															
TA-St. Louis	DBSA-20-Q-80	F7J050251-009	DB100507*	S	10/03/07	18:00					X					X	X	X	X	X	X
TA-Richland	DBSA-20-Q-80	F7J050268-007	DB1005RD*	S	10/03/07	18:00															
TA-Richland	DBSA-20-Q-80	F8A140155-012	F8A140155	S	10/03/07	18:00															
TA-Irvine	DBSA-20-Q-80	IQJ0623-07	IQJ0623	S	10/03/07	18:00															
TA-St. Louis	DBSA-20-T-100	F7J050251-012	DB100507*	S	10/04/07	9:30					X					X	X	X	X	X	X

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CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Richland	DBSA-20-T-100	F8A140155-015	F8A140155	S	10/04/07	9:30															
TA-Richland	DBSA-20-T-100	F8B090159-017	F8B090159	S	10/04/07	9:30															
TA-Irvine	DBSA-20-T-100	IQJ0625-03	IQJ0625	S	10/04/07	9:30															
TA-St. Louis	DBSA-20-T-90	F7J050251-010	DB100507*	S	10/04/07	9:15					X					X	X	X	X	X	X
TA-Richland	DBSA-20-T-90	F7J050268-008	DB1005RD*	S	10/04/07	9:15															
TA-Richland	DBSA-20-T-90	F8A140155-013	F8A140155	S	10/04/07	9:15															
TA-Richland	DBSA-20-T-90	F8B090159-018	F8B090159	S	10/04/07	9:15															
TA-Irvine	DBSA-20-T-90	IQJ0625-01	IQJ0625	S	10/04/07	9:15															
TA-Irvine	DBSA-20-T-90 DUP	IQJ0625-02	IQJ0625	S	10/04/07	9:15															
TA-St. Louis	DBSA-20-T-90-DUP	F7J050251-011	DB100507*	S	10/04/07	9:15					X					X	X	X	X	X	X
TA-Richland	DBSA-20-T-90-DUP	F7J050268-009	DB1005RD*	S	10/04/07	9:15															
TA-Richland	DBSA-20-T-90-DUP	F8A140155-014	F8A140155	S	10/04/07	9:15															
TA-Richland	DBSA-20-T-90-DUP	F8B090159-019	F8B090159	S	10/04/07	9:15															
TA-St. Louis	DBSA-21-GW	F7J040245-013	DB100507*	W	10/02/07	7:30	X		X	X		X	X	X	X	X	X	X	X	X	X
TA-Richland	DBSA-21-GW	F7J040280-011	DB1005RD*	W	10/02/07	7:30															
Alpha	DBSA-21-GW	ERM07100430-01A	ERM07100430	W	10/03/07	7:30															
TA-Irvine	DBSA-21-GW	IQJ0414-01	IQJ0414	W	10/03/07	7:30															
TA-Irvine	DBSA-21-GW	IQJ0430-01	IQJ0430	W	10/03/07	7:30															
TA-St. Louis	DBSA-21-Q-10	F7J040245-002	DB100507*	S	10/02/07	12:30					X									X	
TA-St. Louis	DBSA-21-Q-20	F7J040245-003	DB100507*	S	10/02/07	12:55					X					X	X	X	X	X	X
TA-Richland	DBSA-21-Q-20	F7J040280-001	DB1005RD*	S	10/02/07	12:55															
TA-Richland	DBSA-21-Q-20	F8A140153-016	F8A140153	S	10/02/07	12:55															
TA-Richland	DBSA-21-Q-20	F8B090159-007	F8B090159	S	10/02/07	12:55															
TA-St. Louis	DBSA-21-Q-20-DUP	F7J040245-004	DB100507*	S	10/02/07	12:55					X					X	X	X	X	X	X
TA-Richland	DBSA-21-Q-20-DUP	F7J040280-002	DB1005RD*	S	10/02/07	12:55															
TA-Richland	DBSA-21-Q-20-DUP	F8A140153-017	F8A140153	S	10/02/07	12:55															
TA-Richland	DBSA-21-Q-20-DUP	F8B090159-008	F8B090159	S	10/02/07	12:55															
TA-St. Louis	DBSA-21-Q-30	F7J040245-005	DB100507*	S	10/02/07	13:30					X					X	X	X	X	X	X
TA-Richland	DBSA-21-Q-30	F7J040280-003	DB1005RD*	S	10/02/07	13:30															
TA-Richland	DBSA-21-Q-30	F8A140153-018	F8A140153	S	10/02/07	13:30															
TA-Richland	DBSA-21-Q-30	F8B090159-009	F8B090159	S	10/02/07	13:30															
TA-St. Louis	DBSA-21-Q-40	F7J040245-006	DB100507*	S	10/02/07	13:50					X					X	X	X	X	X	X
TA-Richland	DBSA-21-Q-40	F7J040280-004	DB1005RD*	S	10/02/07	13:50															
TA-Richland	DBSA-21-Q-40	F8A140153-019	F8A140153	S	10/02/07	13:50															

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LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Richland	DBSA-21-Q-40	F8B090159-010	F8B090159	S	10/02/07	13:50															
TA-St. Louis	DBSA-21-Q-5	F7J040245-001	DB100507*	S	10/02/07	12:25					X									X	
TA-St. Louis	DBSA-21-Q-50	F7J040245-007	DB100507*	S	10/02/07	14:15					X					X	X	X	X	X	X
TA-Richland	DBSA-21-Q-50	F7J040280-005	DB1005RD*	S	10/02/07	14:15															
TA-Richland	DBSA-21-Q-50	F8A140153-020	F8A140153	S	10/02/07	14:15															
TA-Richland	DBSA-21-Q-50	F8B090159-005	F8B090159	S	10/02/07	14:15															
TA-St. Louis	DBSA-21-Q-70	F7J040245-009	DB100507*	S	10/02/07	16:00					X					X	X	X	X	X	X
TA-St. Louis	DBSA-21-T-80	F7J040245-011	DB100507*	S	10/02/07	16:30					X					X	X	X	X	X	X
TA-Richland	DBSA-21-T-80	F7J040280-009	DB1005RD*	S	10/02/07	16:30															
TA-Richland	DBSA-21-T-80	F8A140155-004	F8A140155	S	10/02/07	16:30															
TA-Richland	DBSA-21-T-80	F8B090159-020	F8B090159	S	10/02/07	16:30															
TA-Irvine	DBSA-21-T-80	IQJ0456-09	IQJ0456	S	10/02/07	16:30															
TA-St. Louis	DBSA-21-T-90	F7J040245-012	DB100507*	S	10/02/07	17:05					X					X	X	X	X	X	X
TA-Richland	DBSA-21-T-90	F7J040280-010	DB1005RD*	S	10/02/07	17:05															
TA-Richland	DBSA-21-T-90	F8A140155-005	F8A140155	S	10/02/07	17:05															
TA-Richland	DBSA-21-T-90	F8B090161-001	F8B090161	S	10/02/07	17:05															
TA-Irvine	DBSA-21-T-90	IQJ0456-10	IQJ0456	S	10/02/07	17:05															
TA-St. Louis	DBSA-23-Q-10	F7I250260-007	DB092707*	S	09/23/07	9:55					X									X	
TA-St. Louis	DBSA-23-Q-20	F7I250260-008	DB092707*	S	09/23/07	10:20					X					X	X	X	X	X	X
TA-Richland	DBSA-23-Q-20	F7I250279-001	DB0927RD*	S	09/23/07	10:20															
TA-Richland	DBSA-23-Q-20	F8A140153-001	F8A140153	S	09/23/07	10:20															
TA-Richland	DBSA-23-Q-20	F8A140153-006	F8A140153	S	09/23/07	10:20															
TA-Richland	DBSA-23-Q-20	F8B090161-009	F8B090161	S	09/23/07	10:20															
TA-St. Louis	DBSA-23-Q-30	F7I250260-009	DB092707*	S	09/23/07	10:45					X					X	X	X	X	X	X
TA-Richland	DBSA-23-Q-30	F8A140153-002	F8A140153	S	09/23/07	10:45															
TA-Richland	DBSA-23-Q-30	F8A140153-007	F8A140153	S	09/23/07	10:45															
TA-Richland	DBSA-23-Q-30	F8B090161-010	F8B090161	S	09/23/07	10:45															
TA-Irvine	DBSA-23-Q-30	IQI2160-07	IQI2160	S	09/23/07	10:45															
TA-St. Louis	DBSA-23-Q-30 (FD)	F7I250260-010	DB092707*	S	09/23/07	10:45					X					X	X	X	X	X	X
TA-Richland	DBSA-23-Q-30 (FD)	F7I250279-003	DB0927RD*	S	09/23/07	10:45															
TA-Richland	DBSA-23-Q-30 (FD)	F8A140153-008	F8A140153	S	09/23/07	10:45															
TA-Richland	DBSA-23-Q-30 (FD)	F8B090161-011	F8B090161	S	09/23/07	10:45															
TA-Irvine	DBSA-23-Q-30 (MS/MSD)	IQI2160-09	IQI2160	S	09/23/07	10:45															
TA-Irvine	DBSA-23-Q-30 (FD)	IQI2160-08	IQI2160	S	09/23/07	10:45															

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-St. Louis	DBSA-23-Q-40	F7I250260-011	DB092707*	S	09/23/07	11:15					X					X	X	X	X	X	X
TA-Richland	DBSA-23-Q-40	F7I250279-004	DB0927RD*	S	09/23/07	11:15															
TA-Richland	DBSA-23-Q-40	F8A140153-009	F8A140153	S	09/23/07	11:15															
TA-Richland	DBSA-23-Q-40	F8B090161-012	F8B090161	S	09/23/07	11:15															
TA-Irvine	DBSA-23-Q-40	IQI2160-10	IQI2160	S	09/23/07	11:15															
TA-St. Louis	DBSA-23-Q-5	F7I250260-006	DB092707*	S	09/23/07	9:50					X									X	
TA-St. Louis	DBSA-23-Q-50	F7I250260-012	DB092707*	S	09/23/07	12:00					X					X	X	X	X	X	X
TA-Richland	DBSA-23-Q-50	F7I250279-005	DB0927RD*	S	09/23/07	12:00															
TA-Richland	DBSA-23-Q-50	F8A140153-010	F8A140153	S	09/23/07	12:00															
TA-Richland	DBSA-23-Q-50	F8B090161-013	F8B090161	S	09/23/07	12:00															
TA-St. Louis	DBSA23-T-140	F7I270301-001	DB092707*	S	09/26/07	8:10	X				X					X	X	X	X	X	X
TA-Richland	DBSA23-T-140	F7I270314-001	DB0927RD*	S	09/26/07	8:10															
TA-Richland	DBSA23-T-140	F8A140153-014	F8A140153	S	09/26/07	8:10															
TA-Richland	DBSA23-T-140	F8B090161-002	F8B090161	S	09/26/07	8:10															
TA-Irvine	DBSA23-T-140	IQI2439-01	IQI2439	S	09/26/07	8:10															
TA-St. Louis	DBSA23-T-150	F7I270301-002	DB092707*	S	09/26/07	8:40					X					X	X	X	X	X	X
TA-Richland	DBSA23-T-150	F7I270314-002	DB0927RD*	S	09/26/07	8:40															
TA-Richland	DBSA23-T-150	F8A140153-015	F8A140153	S	09/26/07	8:40															
TA-Richland	DBSA23-T-150	F8B090161-003	F8B090161	S	09/26/07	8:40															
TA-Irvine	DBSA23-T-150	IQI2439-02	IQI2439	S	09/26/07	8:40															
TA-St. Louis	DBSA-23-TRIP BLANK	F7I250260-015	DB092707*	WQ	09/23/07	--															
TA-St. Louis	DBSA-26 TRIP BLANK	F7I250235-008	DB092507*	WQ	09/21/07	15:30															
TA-St. Louis	DBSA-26-Q-0	F7I250235-001	DB092507*	S	09/21/07	15:30					X										
TA-St. Louis	DBSA-26-Q-10	F7I250235-003	DB092507*	S	09/21/07	16:05					X									X	
TA-Irvine	DBSA-26-Q-100	IQI2147-09	IQI2147	S	09/22/07	10:25															
TA-Irvine	DBSA-26-Q-110	IQI2147-10	IQI2147	S	09/22/07	11:05															
TA-Richland	DBSA-26-Q-150	F7I250173-014	DB0925RD*	S	09/22/07	15:45															
TA-St. Louis	DBSA-26-Q-150	F7I250235-018	DB092507*	S	09/22/07	15:45										X	X	X	X	X	X
TA-Richland	DBSA-26-Q-150	F8A140153-005	F8A140153	S	09/22/07	15:45															
TA-Irvine	DBSA-26-Q-150	IQI2160-04	IQI2160	S	09/22/07	15:45															
TA-St. Louis	DBSA-26-Q-160	F7I250235-019	DB092507*	S	09/22/07	16:20										X	X	X	X	X	X
TA-Richland	DBSA-26-Q-20	F7I250173-001	DB0925RD*	S	09/21/07	16:40															
TA-St. Louis	DBSA-26-Q-20	F7I250235-004	DB092507*	S	09/21/07	16:40					X					X	X	X	X	X	X
TA-Richland	DBSA-26-Q-20	F8B090161-015	F8B090161	S	09/21/07	16:40															

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CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Irvine	DBSA-26-Q-20	IQI2147-01	IQI2147	S	09/21/07	16:40															
TA-Richland	DBSA-26-Q-30	F7I250173-002	DB0925RD*	S	09/21/07	16:55															
TA-St. Louis	DBSA-26-Q-30	F7I250235-005	DB092507*	S	09/21/07	16:55					X					X	X	X	X	X	X
TA-Richland	DBSA-23-Q-30	F7I250279-002	DB0927RD*	S	09/23/07	10:45															
TA-Richland	DBSA-26-Q-30	F8B090161-016	F8B090161	S	09/21/07	16:55															
TA-Irvine	DBSA-26-Q-30	IQI2147-02	IQI2147	S	09/21/07	16:55															
TA-Richland	DBSA-26-Q-40	F7I250173-003	DB0925RD*	S	09/21/07	17:30															
TA-St. Louis	DBSA-26-Q-40	F7I250235-006	DB092507*	S	09/21/07	17:30					X					X	X	X	X	X	X
TA-Richland	DBSA-26-Q-40	F8A140153-003	F8A140153	S	09/21/07	17:30															
TA-Richland	DBSA-26-Q-40	F8B090161-017	F8B090161	S	09/21/07	17:30															
TA-Irvine	DBSA-26-Q-40	IQI2147-03	IQI2147	S	09/21/07	17:30															
TA-St. Louis	DBSA-26-Q-5	F7I250235-002	DB092507*	S	09/21/07	16:00					X									X	
TA-Richland	DBSA-26-Q-50	F7I250173-004	DB0925RD*	S	09/21/07	17:50															
TA-St. Louis	DBSA-26-Q-50	F7I250235-007	DB092507*	S	09/21/07	17:50					X					X	X	X	X	X	X
TA-Richland	DBSA-26-Q-50	F8A140153-004	F8A140153	S	09/21/07	17:50															
TA-Richland	DBSA-26-Q-50	F8B090161-018	F8B090161	S	09/21/07	17:50															
TA-Irvine	DBSA-26-Q-50	IQI2147-04	IQI2147	S	09/21/07	17:50															
TA-Irvine	DBSA-26-Q-60	IQI2147-05	IQI2147	S	09/22/07	8:10															
TA-Irvine	DBSA-26-Q-70	IQI2147-06	IQI2147	S	09/22/07	8:40															
TA-Irvine	DBSA-26-Q-80	IQI2147-07	IQI2147	S	09/22/07	9:05															
TA-Irvine	DBSA-26-Q-90	IQI2147-08	IQI2147	S	09/22/07	10:00															
TA-St. Louis	DBSA-27-Q-0	F7H100305-001	DB081007*	S	08/09/07	7:50					X										
TA-St. Louis	DBSA-27-Q-10	F7H100305-004	DB081007*	S	08/09/07	9:00					X									X	
TA-St. Louis	DBSA-27-Q-10 (PP/GS)	F7H100305-003	DB081007*	S	08/09/07	9:00					X										
TA-St. Louis	DBSA-27-Q-20	F7H100305-005	DB081007*	S	08/09/07	9:20					X					X	X	X	X	X	X
TA-Richland	DBSA-27-Q-20	F7H100325-001	DB0810RD*	S	08/09/07	9:20															
TA-Richland	DBSA-27-Q-20	F8A140148-005	F8A140148	S	08/09/07	9:20															
TA-Richland	DBSA-27-Q-20	F8B090161-019	F8B090161	S	08/09/07	9:20															
TA-Irvine	DBSA-27-Q-20	IQH1104-01	IQH1104	S	08/09/07	9:20															
TA-St. Louis	DBSA-27-Q-20 (FD)	F7H100305-006	DB081007*	S	08/09/07	9:20					X					X	X	X	X	X	X
TA-Richland	DBSA-27-Q-20 (FD)	F7H100325-002	DB0810RD*	S	08/09/07	9:20															
TA-Richland	DBSA-27-Q-20 (FD)	F8A140148-006	F8A140148	S	08/09/07	9:20															
TA-Richland	DBSA-27-Q-20 (FD)	F8B090161-020	F8B090161	S	08/09/07	9:20															
TA-Irvine	DBSA-27-Q-20 (FD)	IQH1104-02	IQH1104	S	08/09/07	9:20															

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CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-St. Louis	DBSA-27-Q-30	F7H100305-007	DB081007*	S	08/09/07	9:55					X					X	X	X	X	X	X
TA-Richland	DBSA-27-Q-30	F7H100325-003	DB0810RD*	S	08/09/07	9:55															
TA-Richland	DBSA-27-Q-30	F8A140148-007	F8A140148	S	08/09/07	9:55															
TA-Richland	DBSA-27-Q-30	F8B090162-001	F8B090162	S	08/09/07	9:55															
TA-Irvine	DBSA-27-Q-30	IQH1104-03	IQH1104	S	08/09/07	9:55															
TA-St. Louis	DBSA-27-Q-40	F7H100305-008	DB081007*	S	08/09/07	10:15					X					X	X	X	X	X	X
TA-Richland	DBSA-27-Q-40	F7H100325-004	DB0810RD*	S	08/09/07	10:15															
TA-Richland	DBSA-27-Q-40	F8A140148-008	F8A140148	S	08/09/07	10:15															
TA-Richland	DBSA-27-Q-40	F8B090162-002	F8B090162	S	08/09/07	10:15															
TA-Irvine	DBSA-27-Q-40	IQH1104-04	IQH1104	S	08/09/07	10:15															
TA-St. Louis	DBSA-27-Q-5	F7H100305-002	DB081007*	S	08/09/07	8:15					X									X	
TA-St. Louis	DBSA-27-Q-50	F7H100305-009	DB081007*	S	08/09/07	11:00					X					X	X	X	X	X	X
TA-Richland	DBSA-27-Q-50	F7H100325-005	DB0810RD*	S	08/09/07	11:00															
TA-Richland	DBSA-27-Q-50	F8A140148-009	F8A140148	S	08/09/07	11:00															
TA-Richland	DBSA-27-Q-50	F8B090162-003	F8B090162	S	08/09/07	11:00															
TA-Irvine	DBSA-27-Q-50	IQH1104-05	IQH1104	S	08/09/07	11:00															
TA-St. Louis	DBSA-27-Q-60	F7H140268-001	DB081607*	S	08/13/07	8:35					X					X	X	X	X	X	X
TA-Richland	DBSA-27-Q-60	F7H140276-001	DB08016RD*	S	08/13/07	8:35															
TA-Richland	DBSA-27-Q-60	F8A140148-010	F8A140148	S	08/13/07	8:35															
TA-Richland	DBSA-27-Q-60	F8B090162-004	F8B090162	S	08/13/07	8:35															
TA-Irvine	DBSA-27-Q-60	IQH1410-01	IQH1410	S	08/13/07	8:35															
TA-St. Louis	DBSA-27-Q-70	F7H140268-002	DB081607*	S	08/13/07	9:00					X					X	X	X	X	X	X
TA-Richland	DBSA-27-Q-70	F7H140276-002	DB08016RD*	S	08/13/07	9:00															
TA-Richland	DBSA-27-Q-70	F8A140148-011	F8A140148	S	08/13/07	9:00															
TA-Irvine	DBSA-27-Q-70	IQH1410-02	IQH1410	S	08/13/07	9:00															
TA-St. Louis	DBSA-27-Q-80	F7H140268-003	DB081607*	S	08/13/07	9:10					X					X	X	X	X	X	X
TA-Richland	DBSA-27-Q-80	F7H140276-003	DB08016RD*	S	08/13/07	9:10															
TA-Richland	DBSA-27-Q-80	F8A140148-012	F8A140148	S	08/13/07	9:10															
TA-Irvine	DBSA-27-Q-80	IQH1410-03	IQH1410	S	08/13/07	9:10															
TA-St. Louis	DBSA-27-Q-90	F7H140268-004	DB081607*	S	08/13/07	9:35					X					X	X	X	X	X	X
TA-Richland	DBSA-27-Q-90	F7H140276-004	DB08016RD*	S	08/13/07	9:35															
TA-Richland	DBSA-27-Q-90	F8A140148-013	F8A140148	S	08/13/07	9:35															
TA-Irvine	DBSA-27-Q-90	IQH1410-04	IQH1410	S	08/13/07	9:35															
TA-Irvine	DBSA-27-T-100	IQH1410-05	IQH1410	S	08/13/07	12:35															

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LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-St. Louis	DBSA-27-T-100	F7H140268-006	DB081607*	S	08/13/07	12:35					X					X	X	X	X	X	X
TA-Richland	DBSA-27-T-100	F8A140148-014	F8A140148	S	08/13/07	12:35															
TA-Richland	DBSA-27-T-100 (MS/MSD)	F7H140276-005	DB08016RD*	S	08/13/07	12:35															
TA-St. Louis	DBSA-27-T-100 (PP/GS)	F7H140268-005	DB081607*	S	08/13/07	10:10					X										
TA-St. Louis	DBSA-29-A-160(FD)	F7I240171-022	DB092207*	S	09/21/07	8:10										X	X	X	X	X	X
TA-Richland	DBSA-29-A-160(FD)	F7I240189-018	DB0922RD*	S	09/21/07	8:10															
TA-St. Louis	DBSA-29-GW	F7I240171-002	DB092207*	W	09/21/07	--	X	X	X	X		X	X	X	X	X	X	X	X	X	X
TA-Richland	DBSA-29-GW	F7I240189-002	DB0922RD*	W	09/21/07	8:30															
Alpha	DBSA-29-GW	ERM07092429-01A	ERM07092429	W	09/21/07	8:30															
TA-Irvine	DBSA-29-GW	IQI2030-01	IQI2030	W	09/21/07	8:30															
TA-St. Louis	DBSA-29-Q-10	F7I240171-004	DB092207*	S	09/20/07	8:05					X									X	
TA-St. Louis	DBSA-29-Q-10-FD	F7I240171-005	DB092207*	S	09/20/07	8:05					X									X	
TA-St. Louis	DBSA-29-Q-150	F7I240171-020	DB092207*	S	09/21/07	7:40										X	X	X	X	X	X
TA-Richland	DBSA-29-Q-150	F7I240189-016	DB0922RD*	S	09/21/07	7:40															
TA-Irvine	DBSA-29-Q-150	IQI2027-01	IQI2028	S	09/21/07	7:40															
TA-St. Louis	DBSA-29-Q-160	F7I240171-021	DB092207*	S	09/21/07	8:10										X	X	X	X	X	X
TA-Richland	DBSA-29-Q-160	F7I240189-017	DB0922RD*	S	09/21/07	8:10															
TA-Irvine	DBSA-29-Q-160	IQI2027-02	IQI2028	S	09/21/07	8:10															
TA-Irvine	DBSA-29-Q-160 (FD)	IQI2027-03	IQI2028	S	09/21/07	8:10															
TA-St. Louis	DBSA-29-Q-20	F7I240171-007	DB092207*	S	09/20/07	8:35					X					X	X	X	X	X	X
TA-Richland	DBSA-29-Q-20	F7I240189-003	DB0922RD*	S	09/20/07	8:35															
TA-Richland	DBSA-29-Q-20	F8A140150-014	F8A140150	S	09/20/07	8:35															
TA-Richland	DBSA-29-Q-20	F8B090162-005	F8B090162	S	09/20/07	8:35															
TA-Irvine	DBSA-29-Q-20	IQI2047-01	IQI2047	S	09/20/07	8:35															
TA-St. Louis	DBSA-29-Q-30	F7I240171-008	DB092207*	S	09/20/07	9:00					X					X	X	X	X	X	X
TA-Richland	DBSA-29-Q-30	F7I240189-004	DB0922RD*	S	09/20/07	9:00															
TA-Richland	DBSA-29-Q-30	F8A140150-015	F8A140150	S	09/20/07	9:00															
TA-Richland	DBSA-29-Q-30	F8B090162-006	F8B090162	S	09/20/07	9:00															
TA-Irvine	DBSA-29-Q-30	IQI2047-02	IQI2047	S	09/20/07	9:00															
TA-St. Louis	DBSA-29-Q-40	F7I240171-009	DB092207*	S	09/20/07	9:30					X					X	X	X	X	X	X
TA-Richland	DBSA-29-Q-40	F7I240189-005	DB0922RD*	S	09/20/07	9:30															
TA-Richland	DBSA-29-Q-40	F8A140150-016	F8A140150	S	09/20/07	9:30															
TA-Richland	DBSA-29-Q-40	F8B090162-007	F8B090162	S	09/20/07	9:30															
TA-Irvine	DBSA-29-Q-40	IQI2047-03	IQI2047	S	09/20/07	9:30															

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-St. Louis	DBSA-29-Q-5	F7I240171-003	DB092207*	S	09/20/07	8:00					X									X	
TA-St. Louis	DBSA-29-Q-50	F7I240171-010	DB092207*	S	09/20/07	9:55					X					X	X	X	X	X	X
TA-Richland	DBSA-29-Q-50	F7I240189-006	DB0922RD*	S	09/20/07	9:55															
TA-Richland	DBSA-29-Q-50	F8A140150-017	F8A140150	S	09/20/07	9:55															
TA-Richland	DBSA-29-Q-50	F8B090162-008	F8B090162	S	09/20/07	9:55															
TA-Irvine	DBSA-29-Q-50	IQI2047-04	IQI2047	S	09/20/07	9:55															
TA-Irvine	DBSA-2B-Q-20	IQI2160-06	IQI2160	S	09/23/07	10:20															
TA-St. Louis	DBSA-2-Q-10	F7H080321-002	DB080807*	S	08/07/07	8:55					X									X	
TA-Irvine	DBSA-2-Q-10	IQH1019-02	IQH1019	S	08/07/07	8:55					X										
TA-St. Louis	DBSA-2-Q-20	F7H080321-003	DB080807*	S	08/07/07	9:45					X					X	X	X	X	X	X
TA-Richland	DBSA-2-Q-20	F7H080330-001	DB0808RD*	S	08/07/07	9:45															
TA-Richland	DBSA-2-Q-20	F8A140146-009	F8A140146	S	08/07/07	9:45															
TA-Richland	DBSA-2-Q-20	F8B090162-009	F8B090162	S	08/07/07	9:45															
TA-Irvine	DBSA-2-Q-20	IQH1019-03	IQH1019	S	08/07/07	9:45					X										
TA-St. Louis	DBSA-2-Q-20 (FD)	F7H080321-004	DB080807*	S	08/07/07	9:45					X					X	X	X	X	X	X
TA-Richland	DBSA-2-Q-20 (FD)	F7H080330-002	DB0808RD*	S	08/07/07	9:45															
TA-Richland	DBSA-2-Q-20 (FD)	F8A140146-010	F8A140146	S	08/07/07	9:45															
TA-Irvine	DBSA-2-Q-20 (FD)	IQH1019-04	IQH1019	S	08/07/07	9:45					X										
TA-Richland	DBSA-2-Q-20 (FD)	F8B090162-010	F8B090162	S	08/07/07	9:45															
TA-St. Louis	DBSA-2-Q-30	F7H080321-005	DB080807*	S	08/07/07	10:05					X					X	X	X	X	X	X
TA-Richland	DBSA-2-Q-30	F7H080330-003	DB0808RD*	S	08/07/07	10:05															
TA-Richland	DBSA-2-Q-30	F8A140146-011	F8A140146	S	08/07/07	10:05															
TA-Richland	DBSA-2-Q-30	F8B090162-011	F8B090162	S	08/07/07	10:05															
TA-Irvine	DBSA-2-Q-30	IQH1019-05	IQH1019	S	08/07/07	10:05					X										
TA-St. Louis	DBSA-2-Q-40	F7H080321-006	DB080807*	S	08/07/07	10:55					X					X	X	X	X	X	X
TA-Richland	DBSA-2-Q-40	F7H080330-004	DB0808RD*	S	08/07/07	10:55															
TA-Richland	DBSA-2-Q-40	F8A140146-012	F8A140146	S	08/07/07	10:55															
TA-Richland	DBSA-2-Q-40	F8B090162-012	F8B090162	S	08/07/07	10:55															
TA-Irvine	DBSA-2-Q-40	IQH1019-06	IQH1019	S	08/07/07	10:55					X										
TA-St. Louis	DBSA-2-Q-5	F7H080321-001	DB080807*	S	08/07/07	8:45					X									X	
TA-Irvine	DBSA-2-Q-5	IQH1019-01	IQH1019	S	08/07/07	8:45					X										
TA-St. Louis	DBSA-2-Q-50	F7H080321-007	DB080807*	S	08/07/07	11:15					X					X	X	X	X	X	X
TA-Richland	DBSA-2-Q-50	F7H080330-005	DB0808RD*	S	08/07/07	11:15															
TA-Richland	DBSA-2-Q-50	F8A140146-013	F8A140146	S	08/07/07	11:15															

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Richland	DBSA-2-Q-50	F8B090162-013	F8B090162	S	08/07/07	11:15															
TA-Irvine	DBSA-2-Q-50	IQH1019-07	IQH1019	S	08/07/07	11:15					X										
TA-St. Louis	DBSA-2-Q-60	F7H080321-007	DB080807*	S	08/07/07	11:40					X					X	X	X	X	X	X
TA-Richland	DBSA-2-Q-60	F7H080330-006	DB0808RD*	S	08/07/07	11:40															
TA-Richland	DBSA-2-Q-60	F8A140146-014	F8A140146	S	08/07/07	11:40															
TA-Richland	DBSA-2-Q-60	F8B090162-014	F8B090162	S	08/07/07	11:40															
TA-Irvine	DBSA-2-Q-60	IQH1019-08	IQH1019	S	08/07/07	11:40					X										
TA-St. Louis	DBSA-2-Q-70	F7H080321-010	DB080807*	S	08/07/07	12:00					X					X	X	X	X	X	X
TA-Richland	DBSA-2-Q-70	F7H080330-008	DB0808RD*	S	08/07/07	12:00															
TA-Richland	DBSA-2-Q-70	F8A140146-015	F8A140146	S	08/07/07	12:00															
TA-Irvine	DBSA-2-Q-70	IQH1019-10	IQH1019	S	08/07/07	12:00					X										
TA-St. Louis	DBSA-2-Q-80	F7H080321-009	DB080807*	S	08/07/07	12:40					X					X	X	X	X	X	X
TA-Richland	DBSA-2-Q-80	F7H080330-007	DB0808RD*	S	08/07/07	12:40															
TA-Richland	DBSA-2-Q-80	F8A140146-016	F8A140146	S	08/07/07	12:40															
TA-Irvine	DBSA-2-Q-80	IQH1019-09	IQH1019	S	08/07/07	12:40					X										
TA-St. Louis	DBSA-30-GW	F7I200305-015	DB092007*	W	09/19/07	7:30					X					X	X	X	X	X	X
TA-Richland	DBSA-30-GW	F7I200323-012	DB0920RD*	W	09/19/07	7:30															
Alpha	DBSA-30-GW	ERM07092056-01A	ERM07092056	W	09/19/07	7:30															
TA-Irvine	DBSA-30-GW	IQI1772-01	IQI1772	W	09/19/07	7:30															
TA-Irvine	DBSA-30-GW	IQI2028-02	IQI2028	W	09/21/07	8:30															
TA-St. Louis	DBSA-30-Q-10	F7I190183-002	DB092007*	S	09/18/07	8:12					X									X	
TA-St. Louis	DBSA-30-Q-100	F7I200305-008	DB092007*	S	09/18/07	14:30					X										
TA-St. Louis	DBSA-30-Q-110	F7I200305-009	DB092007*	S	09/18/07	15:15					X										
TA-St. Louis	DBSA-30-Q-120	F7I200305-010	DB092007*	S	09/18/07	16:10					X										
TA-St. Louis	DBSA-30-Q-130	F7I200305-011	DB092007*	S	09/18/07	16:55					X					X	X	X	X	X	X
TA-Richland	DBSA-30-Q-130	F7I200323-008	DB0920RD*	S	09/18/07	16:55															
TA-Richland	DBSA-30-Q-130	F8A140150-010	F8A140150	S	09/18/07	16:55															
TA-Irvine	DBSA-30-Q-130	IQI1801-05	IQI1801	S	09/18/07	16:55															
TA-St. Louis	DBSA-30-Q-140	F7I200305-012	DB092007*	S	09/19/07	9:35					X					X	X	X	X	X	X
TA-Richland	DBSA-30-Q-140	F7I200323-009	DB0920RD*	S	09/19/07	9:35															
TA-Richland	DBSA-30-Q-140	F8A140150-011	F8A140150	S	09/19/07	9:35															
TA-Irvine	DBSA-30-Q-140	IQI1801-06	IQI1801	S	09/18/07	9:35															
TA-Richland	DBSA-30-Q-150	F8A140150-012	F8A140150	S	09/19/07	10:30															
TA-Richland	DBSA-30-Q-160	F8A140150-013	F8A140150	S	09/19/07	11:00															

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
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LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-St. Louis	DBSA-30-Q-20	F7I190183-003	DB092007*	S	09/18/07	8:50					X					X	X	X	X	X	X
TA-Richland	DBSA-30-Q-20	F7I190249-001	DB0920RD*	S	09/18/07	8:50															
TA-Richland	DBSA-30-Q-20	F8A140150-003	F8A140150	S	09/18/07	8:50															
TA-Richland	DBSA-30-Q-20	F8B090162-015	F8B090162	S	09/18/07	8:50															
TA-Irvine	DBSA-30-Q-20	IQI1639-01	IQI1639	S	09/18/07	8:50															
TA-St. Louis	DBSA-30-Q-30	F7I190183-004	DB092007*	S	09/18/07	9:15					X					X	X	X	X	X	X
TA-Richland	DBSA-30-Q-30	F7I190249-002	DB0920RD*	S	09/18/07	9:15															
TA-Richland	DBSA-30-Q-30	F8A140150-004	F8A140150	S	09/18/07	9:15															
TA-Richland	DBSA-30-Q-30	F8B090162-016	F8B090162	S	09/18/07	9:15															
TA-Irvine	DBSA-30-Q-30	IQI1639-02	IQI1639	S	09/18/07	9:15															
TA-St. Louis	DBSA-30-Q-40	F7I190183-005	DB092007*	S	09/18/07	9:40					X					X	X	X	X	X	X
TA-Richland	DBSA-30-Q-40	F7I190249-003	DB0920RD*	S	09/18/07	9:40															
TA-Richland	DBSA-30-Q-40	F8A140150-005	F8A140150	S	09/18/07	9:40															
TA-Richland	DBSA-30-Q-40	F8B090162-017	F8B090162	S	09/18/07	9:40															
TA-Irvine	DBSA-30-Q-40	IQI1639-03	IQI1639	S	09/18/07	9:40															
TA-St. Louis	DBSA-30-Q-5	F7I190183-001	DB092007*	S	09/18/07	8:10					X									X	
TA-St. Louis	DBSA-30-Q-50	F7I190183-006	DB092007*	S	09/18/07	10:05					X					X	X	X	X	X	X
TA-Richland	DBSA-30-Q-50	F7I190249-004	DB0920RD*	S	09/18/07	10:05															
TA-Richland	DBSA-30-Q-50	F8A140150-006	F8A140150	S	09/18/07	10:05															
TA-Richland	DBSA-30-Q-50	F8B090162-018	F8B090162	S	09/18/07	10:05															
TA-Irvine	DBSA-30-Q-50	IQI1639-04	IQI1639	S	09/18/07	10:05															
TA-St. Louis	DBSA-30-Q-90	F7I200305-007	DB092007*	S	09/18/07	12:40					X										
TA-St. Louis	DBSA-30-T-150	F7I200305-013	DB092007*	S	09/19/07	10:30					X					X	X	X	X	X	X
TA-Richland	DBSA-30-T-150	F7I200323-010	DB0920RD*	S	09/19/07	10:30															
TA-Irvine	DBSA-30-T-150	IQI1801-07	IQI1801	S	09/18/07	10:30															
TA-St. Louis	DBSA-30-T-160	F7I200305-014	DB092007*	S	09/19/07	11:00					X					X	X	X	X	X	X
TA-Richland	DBSA-30-T-160	F7I200323-011	DB0920RD*	S	09/19/07	11:00															
TA-Richland	DBSA-30-T-160	F8B090161-004	F8B090161	S	09/19/07	11:00															
TA-Irvine	DBSA-30-T-160	IQI1801-08	IQI1801	S	09/18/07	11:00															
TA-St. Louis	DBSA-32-GW	F7H150153-011	DB081607*	W	08/14/07	11:30	X	X	X	X		X	X	X	X	X	X	X	X	X	X
TA-Richland	DBSA-32-GW	F7H150340-007	DB08016RD*	W	08/14/07	11:30															
Alpha	DBSA-32-GW	ERM07082029-01A	ERM07082029	W	08/14/07	11:30															
TA-Irvine	DBSA-32-GW	IQH1407-01	IQH1407	W	08/14/07	11:30															
TA-St. Louis	DBSA-32-Q-0	F7H150153-001	DB081607*	S	08/14/07	7:45					X										

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-St. Louis	DBSA-32-Q-10	F7H150153-004	DB081607*	S	08/14/07	8:30					X										
TA-St. Louis	DBSA-32-Q-20	F7H150153-005	DB081607*	S	08/14/07	8:50					X					X	X	X	X	X	X
TA-Richland	DBSA-32-Q-20	F7H150340-001	DB08016RD*	S	08/14/07	8:50															
TA-Richland	DBSA-32-Q-20	F8A140148-015	F8A140148	S	08/14/07	8:50															
TA-Richland	DBSA-32-Q-20	F8B090162-019	F8B090162	S	08/14/07	8:50															
TA-Irvine	DBSA-32-Q-20	IQH1574-06	IQH1574	S	08/14/07	8:50															
TA-St. Louis	DBSA-32-Q-30	F7H150153-006	DB081607*	S	08/14/07	9:10					X					X	X	X	X	X	X
TA-Richland	DBSA-32-Q-30	F7H150340-002	DB08016RD*	S	08/14/07	9:10															
TA-Richland	DBSA-32-Q-30	F8A140148-016	F8A140148	S	08/14/07	9:10															
TA-Richland	DBSA-32-Q-30	F8B090162-020	F8B090162	S	08/14/07	9:10															
TA-Irvine	DBSA-32-Q-30	IQH1574-07	IQH1574	S	08/14/07	9:10															
TA-St. Louis	DBSA-32-Q-40	F7H150153-007	DB081607*	S	08/14/07	9:30					X					X	X	X	X	X	X
TA-Richland	DBSA-32-Q-40	F7H150340-003	DB08016RD*	S	08/14/07	9:30															
TA-Richland	DBSA-32-Q-40	F8A140148-017	F8A140148	S	08/14/07	9:30															
TA-Richland	DBSA-32-Q-40	F8B090163-001	F8B090163	S	08/14/07	9:30															
TA-Irvine	DBSA-32-Q-40	IQH1574-08	IQH1574	S	08/14/07	9:30															
TA-St. Louis	DBSA-32-Q-5	F7H150153-002	DB081607*	S	08/14/07	8:15					X									X	
TA-St. Louis	DBSA-32-Q-5(FD)	F7H150153-003	DB081607*	S	08/14/07	8:15					X									X	
TA-St. Louis	DBSA-32-Q-50	F7H150153-008	DB081607*	S	08/14/07	9:55					X					X	X	X	X	X	X
TA-Richland	DBSA-32-Q-50	F7H150340-004	DB08016RD*	S	08/14/07	9:55															
TA-Richland	DBSA-32-Q-50	F8A140148-018	F8A140148	S	08/14/07	9:55															
TA-Richland	DBSA-32-Q-50	F8B090163-002	F8B090163	S	08/14/07	9:55															
TA-Irvine	DBSA-32-Q-50	IQH1574-01	IQH1574	S	08/14/07	9:55															
TA-St. Louis	DBSA-32-Q-60	F7H150153-009	DB081607*	S	08/14/07	10:30					X					X	X	X	X	X	X
TA-Richland	DBSA-32-Q-60	F7H150340-005	DB08016RD*	S	08/14/07	10:30															
TA-Richland	DBSA-32-Q-60	F8A140148-019	F8A140148	S	08/14/07	10:30															
TA-Richland	DBSA-32-Q-60	F8B090163-003	F8B090163	S	08/14/07	10:30															
TA-Irvine	DBSA-32-Q-60	IQH1574-02	IQH1574	S	08/14/07	10:30															
TA-St. Louis	DBSA-32-Q-70	F7H150153-010	DB081607*	S	08/14/07	11:00					X					X	X	X	X	X	X
TA-Richland	DBSA-32-Q-70	F7H150340-006	DB08016RD*	S	08/14/07	11:00															
TA-Richland	DBSA-32-Q-70	F8A140148-020	F8A140148	S	08/14/07	11:00															
TA-Irvine	DBSA-32-Q-70	IQH1574-03	IQH1574	S	08/14/07	11:00															
TA-St. Louis	DBSA-32-T-80	F7H150153-012	DB081607*	S	08/14/07	13:40					X					X	X	X	X	X	X
TA-Richland	DBSA-32-T-80	F7H150340-008	DB08016RD*	S	08/14/07	13:40															

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2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Richland	DBSA-32-T-80	F8A140150-001	F8A140150	S	08/14/07	13:40															
TA-Richland	DBSA-32-T-80	F8B090161-005	F8B090161	S	08/14/07	13:40															
TA-Irvine	DBSA-32-T-80	IQH1574-04	IQH1574	S	08/14/07	13:40															
TA-St. Louis	DBSA-32-T-95	F7H150153-013	DB081607*	S	08/14/07	14:50					X					X	X	X	X	X	X
TA-Richland	DBSA-32-T-95	F7H150340-009	DB08016RD*	S	08/14/07	14:50															
TA-Richland	DBSA-32-T-95	F8A140150-002	F8A140150	S	08/14/07	14:50															
TA-Richland	DBSA-32-T-95	F8B090161-006	F8B090161	S	08/14/07	14:50															
TA-Irvine	DBSA-32-T-95	IQH1574-05	IQH1574	S	08/14/07	14:50															
TA-St. Louis	DBSA-33-0	F7I200305-001	DB092007*	S	09/17/07	9:55					X										
TA-St. Louis	DBSA-33-10	F7I200305-003	DB092007*	S	09/17/07	15:10					X									X	
TA-St. Louis	DBSA-33-20	F7I200305-004	DB092007*	S	09/17/07	15:40					X					X	X	X	X	X	X
TA-Richland	DBSA-33-20	F7I200323-001	DB0920RD*	S	09/17/07	15:40															
TA-Richland	DBSA-33-20	F8A140150-007	F8A140150	S	09/17/07	15:40															
TA-Richland	DBSA-33-20	F8B090163-004	F8B090163	S	09/17/07	15:40															
TA-Irvine	DBSA-33-20	IQI1682-01	IQI1682	S	09/17/07	15:40															
TA-St. Louis	DBSA-33-20 (FD)	F7I200305-005	DB092007*	S	09/17/07	15:40					X					X	X	X	X	X	X
TA-Richland	DBSA-33-20 (FD)	F7I200323-002	DB0920RD*	S	09/17/07	15:40															
TA-Richland	DBSA-33-20 (FD)	F8A140150-008	F8A140150	S	09/17/07	15:40															
TA-Richland	DBSA-33-20 (FD)	F8B090163-005	F8B090163	S	09/17/07	15:40															
TA-Irvine	DBSA-33-20 (FD)	IQI1682-02	IQI1682	S	09/17/07	15:40															
TA-St. Louis	DBSA-33-5	F7I200305-002	DB092007*	S	09/17/07	15:05					X									X	
TA-St. Louis	DBSA-33-T-30	F7I200305-006	DB092007*	S	09/17/07	16:05					X					X	X	X	X	X	X
TA-Richland	DBSA-33-T-30	F7I200323-003	DB0920RD*	S	09/17/07	16:05															
TA-Richland	DBSA-33-T-30	F8A140150-009	F8A140150	S	09/17/07	16:05															
TA-Richland	DBSA-33-T-30	F8B090161-007	F8B090161	S	09/17/07	16:05															
TA-Irvine	DBSA-33-T-30	IQI1682-03	IQI1682	S	09/17/07	16:05															
TA-St. Louis	DBSA-3-Q-10	F7H090308-002	DB081007*	S	08/08/07	8:10					X									X	
TA-St. Louis	DBSA-3-Q-20	F7H090308-003	DB081007*	S	08/08/07	9:00					X					X	X	X	X	X	X
TA-Richland	DBSA-3-Q-20	F7H090316-001	DB0810RD*	S	08/08/07	9:00															
TA-Richland	DBSA-3-Q-20	F8A140146-017	F8A140146	S	08/08/07	9:00															
TA-Richland	DBSA-3-Q-20	F8B090163-006	F8B090163	S	08/08/07	9:00															
TA-Irvine	DBSA-3-Q-20	IQH1005-01	IQH1005	S	08/08/07	9:00					X										
TA-St. Louis	DBSA-3-Q-20 (FD)	F7H090308-004	DB081007*	S	08/08/07	9:00					X					X	X	X	X	X	X
TA-Richland	DBSA-3-Q-20 (FD)	F7H090316-002	DB0810RD*	S	08/08/07	9:00															

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Richland	DBSA-3-Q-20 (FD)	F8A140146-018	F8A140146	S	08/08/07	9:00															
TA-Richland	DBSA-3-Q-20 (FD)	F8B090163-007	F8B090163	S	08/08/07	9:00															
TA-Irvine	DBSA-3-Q-20 (FD)	IQH1005-02	IQH1005	S	08/08/07	9:00					X										
TA-St. Louis	DBSA-3-Q-30	F7H090308-005	DB081007*	S	08/08/07	9:15					X					X	X	X	X	X	X
TA-Richland	DBSA-3-Q-30	F7H090316-003	DB0810RD*	S	08/08/07	9:15															
TA-Richland	DBSA-3-Q-30	F8A140146-019	F8A140146	S	08/08/07	9:15															
TA-Richland	DBSA-3-Q-30	F8B090163-008	F8B090163	S	08/08/07	9:15															
TA-Irvine	DBSA-3-Q-30	IQH1005-03	IQH1005	S	08/08/07	9:15					X										
TA-St. Louis	DBSA-3-Q-40	F7H090308-006	DB081007*	S	08/08/07	9:30					X					X	X	X	X	X	X
TA-Richland	DBSA-3-Q-40	F7H090316-004	DB0810RD*	S	08/08/07	9:30															
TA-Richland	DBSA-3-Q-40	F8A140146-020	F8A140146	S	08/08/07	9:30															
TA-Richland	DBSA-3-Q-40	F8B090163-009	F8B090163	S	08/08/07	9:30															
TA-Irvine	DBSA-3-Q-40	IQH1005-04	IQH1005	S	08/08/07	9:30					X										
TA-St. Louis	DBSA-3-Q-5	F7H090308-001	DB081007*	S	08/08/07	7:50					X									X	
TA-St. Louis	DBSA-3-Q-50	F7H090308-007	DB081007*	S	08/08/07	9:45					X					X	X	X	X	X	X
TA-Richland	DBSA-3-Q-50	F7H090316-005	DB0810RD*	S	08/08/07	9:45															
TA-Richland	DBSA-3-Q-50	F8A140148-001	F8A140148	S	08/08/07	9:45															
TA-Richland	DBSA-3-Q-50	F8B090163-010	F8B090163	S	08/08/07	9:45															
TA-Irvine	DBSA-3-Q-50	IQH1005-05	IQH1005	S	08/08/07	9:45					X										
TA-St. Louis	DBSA-3-Q-60	F7H090308-008	DB081007*	S	08/08/07	10:00					X					X	X	X	X	X	X
TA-Richland	DBSA-3-Q-60	F7H090316-006	DB0810RD*	S	08/08/07	10:00															
TA-Richland	DBSA-3-Q-60	F8A140148-002	F8A140148	S	08/08/07	10:00															
TA-Richland	DBSA-3-Q-60	F8B090163-011	F8B090163	S	08/08/07	10:00															
TA-Irvine	DBSA-3-Q-60	IQH1005-06	IQH1005	S	08/08/07	10:00					X										
TA-St. Louis	DBSA-3-Q-70	F7H090308-009	DB081007*	S	08/08/07	10:20					X					X	X	X	X	X	X
TA-Richland	DBSA-3-Q-70	F7H090316-007	DB0810RD*	S	08/08/07	10:20															
TA-Richland	DBSA-3-Q-70	F8A140148-003	F8A140148	S	08/08/07	10:20															
TA-Irvine	DBSA-3-Q-70	IQH1005-07	IQH1005	S	08/08/07	10:20					X										
TA-St. Louis	DBSA-3-Q-80	F7H090308-010	DB081007*	S	08/08/07	10:40					X					X	X	X	X	X	X
TA-Richland	DBSA-3-Q-80	F7H090316-008	DB0810RD*	S	08/08/07	10:40															
TA-Richland	DBSA-3-Q-80	F8A140148-004	F8A140148	S	08/08/07	10:40															
TA-Irvine	DBSA-3-Q-80	IQH1005-08	IQH1005	S	08/08/07	10:40					X										
TA-St. Louis	DBSA-4-Q-10	F7J230236-003	DB102307*	S	10/19/07	16:10					X									X	
TA-St. Louis	DBSA-4-Q-20	F7J230236-004	DB102307*	S	10/19/07	16:30					X					X	X	X	X	X	X

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2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Richland	DBSA-4-Q-20	F7J230250-001	DB1023RD*	S	10/19/07	16:30															
TA-Richland	DBSA-4-Q-20	F8A150224-018	F8A150224	S	10/19/07	16:30															
TA-Richland	DBSA-4-Q-20	F8B090163-012	F8B090163	S	10/19/07	16:30															
TA-Irvine	DBSA-4-Q-20	IQJ2384-01	IQJ2384	S	10/19/07	16:30															
TA-St. Louis	DBSA-4-Q-20-FD	F7J230236-005	DB102307*	S	10/19/07	16:30					X					X	X	X	X	X	X
TA-Richland	DBSA-4-Q-20-FD	F7J230250-002	DB1023RD*	S	10/19/07	16:30															
TA-Richland	DBSA-4-Q-20-FD	F8A150224-019	F8A150224	S	10/19/07	16:30															
TA-Richland	DBSA-4-Q-20-FD	F8B090163-013	F8B090163	S	10/19/07	16:30															
TA-Irvine	DBSA-4-Q-20-FD	IQJ2384-02	IQJ2384	S	10/19/07	16:30															
TA-St. Louis	DBSA-4-Q-30	F7J230236-006	DB102307*	S	10/19/07	16:45					X					X	X	X	X	X	X
TA-Richland	DBSA-4-Q-30	F7J230250-003	DB1023RD*	S	10/19/07	16:45															
TA-Richland	DBSA-4-Q-30	F8A150224-020	F8A150224	S	10/19/07	16:45															
TA-Richland	DBSA-4-Q-30	F8B090163-014	F8B090163	S	10/19/07	16:45															
TA-Irvine	DBSA-4-Q-30	IQJ2384-03	IQJ2384	S	10/19/07	16:45															
TA-St. Louis	DBSA-4-Q-40	F7J230236-007	DB102307*	S	10/19/07	17:00					X					X	X	X	X	X	X
TA-Richland	DBSA-4-Q-40	F7J230250-004	DB1023RD*	S	10/19/07	17:00															
TA-Richland	DBSA-4-Q-40	F8A150237-001	F8A150237	S	10/19/07	17:00															
TA-Richland	DBSA-4-Q-40	F8B090163-015	F8B090163	S	10/19/07	17:00															
TA-Irvine	DBSA-4-Q-40	IQJ2384-04	IQJ2384	S	10/19/07	17:00															
TA-St. Louis	DBSA-4-Q-5	F7J230236-002	DB102307*	S	10/19/07	16:05					X									X	
TA-St. Louis	DBSA-4-Q-50	F7J230236-008	DB102307*	S	10/19/07	17:30					X					X	X	X	X	X	X
TA-Richland	DBSA-4-Q-50	F7J230250-005	DB1023RD*	S	10/19/07	17:30															
TA-Richland	DBSA-4-Q-50	F8A150237-002	F8A150237	S	10/19/07	17:30															
TA-Richland	DBSA-4-Q-50	F8B090163-016	F8B090163	S	10/19/07	17:30															
TA-Irvine	DBSA-4-Q-50	IQJ2384-05	IQJ2384	S	10/19/07	17:30															
TA-St. Louis	DBSA-4-Q-50-FD	F7J230236-009	DB102307*	S	10/19/07	17:30					X					X	X	X	X	X	X
TA-Richland	DBSA-4-Q-50-FD	F7J230250-006	DB1023RD*	S	10/19/07	17:30															
TA-Richland	DBSA-4-Q-50-FD	F8A150237-003	F8A150237	S	10/19/07	17:30															
TA-Richland	DBSA-4-Q-50-FD	F8B090163-017	F8B090163	S	10/19/07	17:30															
TA-Irvine	DBSA-4-Q-50-FD	IQJ2384-06	IQJ2384	S	10/19/07	17:30															
TA-St. Louis	DBSA-8-Q-10	F7J190206-003	DB101907*	S	10/17/07	14:00					X									X	
TA-St. Louis	DBSA-8-Q-20	F7J190206-004	DB101907*	S	10/17/07	14:30					X					X	X	X	X	X	X
TA-Richland	DBSA-8-Q-20	F7J190236-001	DB1019RD*	S	10/17/07	14:30															
TA-Richland	DBSA-8-Q-20	F8A150224-003	F8A150224	S	10/17/07	14:30															

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LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-Richland	DBSA-8-Q-20	F8B090163-018	F8B090163	S	10/17/07	14:30															
TA-Irvine	DBSA-8-Q-20	IQJ2192-01	IQJ2192	S	10/17/07	14:30															
TA-St. Louis	DBSA-8-Q-20-FD	F7J190206-005	DB101907*	S	10/17/07	14:30					X					X	X	X	X	X	X
TA-Richland	DBSA-8-Q-20-FD	F7J190236-002	DB1019RD*	S	10/17/07	14:30															
TA-Richland	DBSA-8-Q-20-FD	F8A150224-004	F8A150224	S	10/17/07	14:30															
TA-Richland	DBSA-8-Q-20-FD	F8B090163-019	F8B090163	S	10/17/07	14:30															
TA-Irvine	DBSA-8-Q-20-FD	IQJ2192-02	IQJ2192	S	10/17/07	14:30															
TA-St. Louis	DBSA-8-Q-30	F7J190206-006	DB101907*	S	10/17/07	14:50					X					X	X	X	X	X	X
TA-Richland	DBSA-8-Q-30	F7J190236-003	DB1019RD*	S	10/17/07	14:50															
TA-Richland	DBSA-8-Q-30	F8A150224-005	F8A150224	S	10/17/07	14:50															
TA-Richland	DBSA-8-Q-30	F8B090163-020	F8B090163	S	10/17/07	14:50															
TA-Irvine	DBSA-8-Q-30	IQJ2192-03	IQJ2192	S	10/17/07	14:50															
TA-St. Louis	DBSA-8-Q-40	F7J190206-007	DB101907*	S	10/17/07	15:15					X					X	X	X	X	X	X
TA-Richland	DBSA-8-Q-40	F7J190236-004	DB1019RD*	S	10/17/07	15:15															
TA-Richland	DBSA-8-Q-40	F8A150224-006	F8A150224	S	10/17/07	15:15															
TA-Richland	DBSA-8-Q-40	F8B0910165-001	F8B090165	S	10/17/07	15:15															
TA-Irvine	DBSA-8-Q-40	IQJ2192-04	IQJ2192	S	10/17/07	15:15															
TA-St. Louis	DBSA-8-Q-5	F7J190206-002	DB101907*	S	10/17/07	13:50					X									X	
TA-St. Louis	DBSA-8-Q-50	F7J190206-008	DB101907*	S	10/17/07	15:40					X					X	X	X	X	X	X
TA-Richland	DBSA-8-Q-50	F7J190236-005	DB1019RD*	S	10/17/07	15:40															
TA-Richland	DBSA-8-Q-50	F8A150224-007	F8A150224	S	10/17/07	15:40															
TA-Richland	DBSA-8-Q-50	F8B0910165-002	F8B090165	S	10/17/07	15:40															
TA-Irvine	DBSA-8-Q-50	IQJ2192-05	IQJ2192	S	10/17/07	15:40															
TA-St. Louis	DBSA-8-Q-50-FD	F7J190206-009	DB101907*	S	10/17/07	15:40					X					X	X	X	X	X	X
TA-Richland	DBSA-8-Q-50-FD	F7J190236-006	DB1019RD*	S	10/17/07	15:40															
TA-Richland	DBSA-8-Q-50-FD	F8A150224-008	F8A150224	S	10/17/07	15:40															
TA-Richland	DBSA-8-Q-50-FD	F8B0910165-003	F8B090165	S	10/17/07	15:40															
TA-Irvine	DBSA-8-Q-50-FD	IQJ2192-06	IQJ2192	S	10/17/07	15:40															
TA-St. Louis	DBSA-9-Q-10	F7J170181-004	DB101707*	S	10/15/07	8:00					X									X	
TA-Irvine	DBSA-9-Q-160	IQJ1813-18	IQJ1813	S	10/15/07	7:50															
TA-St. Louis	DBSA-9-Q-20	F7J170181-005	DB101707*	S	10/15/07	8:30					X					X	X	X	X	X	X
TA-Richland	DBSA-9-Q-20	F7J170219-002	DB1017RD*	S	10/15/07	8:30															
TA-Richland	DBSA-9-Q-20	F8A150214-010	F8A150214	S	10/15/07	8:30															
TA-Richland	DBSA-9-Q-20	F8B0910165-004	F8B090165	S	10/15/07	8:30															

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TA-Irvine	DBSA-9-Q-20	IQJ1813-01	IQJ1813	S	10/15/07	8:30															
TA-St. Louis	DBSA-9-Q-20-FD	F7J170181-006	DB101707*	S	10/15/07	8:30					X					X	X	X	X	X	X
TA-Richland	DBSA-9-Q-20-FD	F7J170219-003	DB1017RD*	S	10/15/07	8:30															
TA-Richland	DBSA-9-Q-20-FD	F8A150214-011	F8A150214	S	10/15/07	8:30															
TA-Richland	DBSA-9-Q-20-FD	F8B0910165-005	F8B090165	S	10/15/07	8:30															
TA-Irvine	DBSA-9-Q-20-FD	IQJ1813-02	IQJ1813	S	10/15/07	8:30															
TA-St. Louis	DBSA-9-Q-30	F7J170181-007	DB101707*	S	10/15/07	9:15					X					X	X	X	X	X	X
TA-Richland	DBSA-9-Q-30	F7J170219-004	DB1017RD*	S	10/15/07	9:15															
TA-Richland	DBSA-9-Q-30	F8A150214-012	F8A150214	S	10/15/07	9:15															
TA-Richland	DBSA-9-Q-30	F8B0910165-006	F8B090165	S	10/15/07	9:15															
TA-Irvine	DBSA-9-Q-30	IQJ1813-03	IQJ1813	S	10/15/07	9:15															
TA-St. Louis	DBSA-9-Q-40	F7J170181-008	DB101707*	S	10/15/07	9:35					X					X	X	X	X	X	X
TA-Richland	DBSA-9-Q-40	F7J170219-005	DB1017RD*	S	10/15/07	9:35															
TA-Richland	DBSA-9-Q-40	F8A150214-013	F8A150214	S	10/15/07	9:35															
TA-Richland	DBSA-9-Q-40	F8B0910165-007	F8B090165	S	10/15/07	9:35															
TA-Irvine	DBSA-9-Q-40	IQJ1813-04	IQJ1813	S	10/15/07	9:35															
TA-St. Louis	DBSA-9-Q-5	F7J170181-003	DB101707*	S	10/15/07	7:55					X									X	
TA-St. Louis	DBSA-9-Q-50	F7J170181-009	DB101707*	S	10/15/07	9:55					X					X	X	X	X	X	X
TA-Richland	DBSA-9-Q-50	F7J170219-006	DB1017RD*	S	10/15/07	9:55															
TA-Richland	DBSA-9-Q-50	F8A150214-014	F8A150214	S	10/15/07	9:55															
TA-Richland	DBSA-9-Q-50	F8B0910165-008	F8B090165	S	10/15/07	9:55															
TA-Irvine	DBSA-9-Q-50	IQJ1813-05	IQJ1813	S	10/15/07	9:55															
TA-St. Louis	DBSA-9-Q-50-FD	F7J170181-010	DB101707*	S	10/15/07	9:55					X					X	X	X	X	X	X
TA-Richland	DBSA-9-Q-50-FD	F7J170219-007	DB1017RD*	S	10/15/07	9:55															
TA-Richland	DBSA-9-Q-50-FD	F8A150214-015	F8A150214	S	10/15/07	9:55															
TA-Richland	DBSA-9-Q-50-FD	F8B0910165-009	F8B090165	S	10/15/07	9:55															
TA-Irvine	DBSA-9-Q-50-FD	IQJ1813-06	IQJ1813	S	10/15/07	9:55															
TA-St. Louis	DBSA-9-T-160	F7J170181-022	DB101707*	S	10/16/07	7:50					X					X	X	X	X	X	X
TA-Richland	DBSA-9-T-160	F7J170219-019	DB1017RD*	S	10/16/07	7:50															
TA-Richland	DBSA-9-T-160	F8A150214-016	F8A150214	S	10/16/07	7:50															
TA-Richland	DBSA-9-T-160	F8B090161-008	F8B090161	S	10/16/07	7:50															
TA-Irvine	RINSATE 3	IQH1543-01	IQH1543	WQ	08/15/07	14:00															
TA-Richland	RINSATE 3	F7H160221-001	DB08016RD*	WQ	08/15/07	14:00															
TA-St. Louis	RINSATE 3	F7H160211-001	DB081607*	WQ	08/15/07	14:00										X	X	X	X	X	X

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-St. Louis	RINSATE 3	F7I190183-010	DB092007*	WQ	09/18/07	12:10										X	X	X	X	X	X
TA-Richland	RINSATE 3	F7I190249-008	DB0920RD*	WQ	09/18/07	12:10															
TA-Irvine	RINSATE 3	IQI1639-08	IQI1639	WQ	09/18/07	12:10															
TA-St. Louis	RINSATE 4	F7I240171-001	DB092207*	WQ	09/21/07	--	X		X	X		X	X	X	X	X	X	X	X	X	X
TA-Richland	RINSATE 4	F7I240189-001	DB0922RD*	WQ	09/21/07	7:20															
TA-Irvine	RINSATE 4	IQI2028-01	IQI2028	WQ	09/21/07	7:20															
TA-St. Louis	RINSATE 5	F7I250260-016	DB092707*	WQ	09/24/07	9:00										X			X	X	X
TA-Richland	RINSATE 5	F7I250279-008	DB0927RD*	WQ	09/24/07	9:00															
TA-Irvine	RINSATE 5	IQI2147-11	IQI2147	WQ	09/24/07	9:00															
TA-St. Louis	RINSATE 6	F7J100176-012	DB101007*	WQ	10/08/07	7:45	X	X	X	X		X	X	X	X	X	X	X	X	X	X
TA-Richland	RINSATE 6	F7J100192-012	DB1010RD*	WQ	10/08/07	7:45															
TA-Irvine	RINSATE 6	IQJ1059-01	IQJ1059	WQ	10/09/07	7:45															
TA-St. Louis	RINSATE 7	F7J170181-001	DB101707*	WQ	10/16/07	10:30	X	X	X	X		X	X	X	X	X	X	X	X	X	X
TA-Richland	RINSATE 7	F7J170219-001	DB1017RD*	WQ	10/16/07	10:30															
TA-St. Louis	RINSATE 8	F7J190206-015	DB101907*	WQ	10/18/07	5:00	X	X	X	X		X	X	X	X	X	X	X	X	X	X
TA-Richland	RINSATE 8	F7J190236-012	DB1019RD*	WQ	10/18/07	5:00															
TA-St. Louis	RINSATE-1-8-6-07	F7H070367-006	DB080807*	WQ	08/06/07	12:00											X	X	X	X	
TA-Richland	RINSATE-1-8-6-07	F7H070375-003	DB0808RD*	WQ	08/06/07	12:00															
TA-Irvine	RINSATE-1-8-6-07	IQH1020-06	IQH1020	WQ	08/06/07	12:00															
TA-St. Louis	RINSATE-2-8-8-07	F7H090308-011	DB081007*	WQ	08/08/07	11:30										X	X	X	X	X	X
TA-Richland	RINSATE-2-8-8-07	F7H090316-009	DB0810RD*	WQ	08/08/07	11:30															
TA-Irvine	RINSATE-7	IQJ1772-01	IQJ1772	W	10/16/07	10:30															
TA-Irvine	RINSATE-8	IQJ2098-01	IQJ2098	W	10/18/07	5:00															
TA-St. Louis	TRIP BLANK	F7H070367-013	DB080807*	WQ	08/06/07	--															
TA-St. Louis	TRIP BLANK	F7H080321-011	DB080807*	WQ	08/07/07	--															
TA-St. Louis	TRIP BLANK	F7H090308-012	DB081007*	WQ	08/08/07	--															
TA-St. Louis	TRIP BLANK	F7H150153-014	DB081607*	WQ	08/14/07	--															
TA-St. Louis	TRIP BLANK	F7H160211-002	DB081607*	WQ	08/15/07	--															
TA-St. Louis	TRIP BLANK	F7I190183-011	DB092007*	WQ	09/18/07	--															
TA-St. Louis	TRIP BLANK	F7I240171-006	DB092207*	WQ	09/20/07	--															
TA-St. Louis	TRIP BLANK	F7J040245-014	DB100507*	WQ	10/02/07	--															
TA-St. Louis	TRIP BLANK	F7J060109-006	DB100807*	WQ	10/04/07	17:55															
TA-St. Louis	TRIP BLANK	F7J170181-002	DB101707*	WQ	10/15/07	7:45															
TA-St. Louis	TRIP BLANK	F7J180242-001	DB101807*	WQ	10/16/07	13:00															

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Conductivity	Hardness	Total dissolved solids	Total suspended solids	Total Solids	Alkalinity	Bicarbonate	Carbonate	Hydroxide	NH3/TKN	pH	TOC	Anions	Perchlorate	Metals
TA-St. Louis	TRIP BLANK	F7J190206-001	DB101907*	WQ	10/17/07	13:30															
TA-St. Louis	TRIP BLANK	F7J200153-001	DB102007*	WQ	10/18/07	15:00															
TA-St. Louis	TRIP BLANK	F7J230236-001	DB102307*	WQ	10/19/07	15:55															
TA-Irvine	TRIP BLANK	IQI2030-02	IQI2030	WQ	09/21/07	--															
TA-St. Louis	TRIP BLANK 1	F7J040245-015	DB100507*	WQ	10/02/07	--															
TA-St. Louis	TRIP BLANK FOR DBSA-11	F7J090254-001	DB100907*	WQ	10/07/07	15:55															
TA-St. Louis	TRIP BLANK FOR DBSA-15 SOILS	F7J090244-001	DB100907*	WQ	10/06/07	10:00															
TA-St. Louis	TRIP BLANK FOR DBSA-17-GW	F7J090279-014	DB100807*	WQ	10/05/07	--															
TA-St. Louis	TRIP BLANK SOIL	F7J050251-013	DB100507*	WQ	10/03/07	13:50															
TA-St. Louis	TRIP BLANK SOIL	F7J110226-001	DB101107*	WQ	10/09/07	9:50															
TA-St. Louis	TRIP BLANK W/RINSATE	F7I200305-016	DB092007*	WQ	09/18/07	--															
TA-St. Louis	TRIP BLANK WATER	F7J050251-015	DB100507*	WQ	10/04/07	10:00															
TA-St. Louis	TRIP BLANK WITH DBSA-33-0	F7I200305-017	DB092007*	WQ	09/18/07	--															
TA-St. Louis	TRIP BLANK WITH DBSA-33-Q-90	F7I200305-018	DB092007*	WQ	09/18/07	--															

Notes:
*- TA-St. Louis references SDGs as "DB(date)RD" and "DB(date)"
NH3- Ammonia
TKN-Total Kjeldahl Nitrogen
SVOCs - Semivolatile Organic Compounds
TOC- Total Organic Carbon
OCPs- Organochlorine Pesticides
SVOCs - Semivolatile Organic Compounds
VOCs - Volatile Organic Compounds
S-Soil
WQ - Water quality
DUP- Duplicate
FD- Field duplicate

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
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CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Irvine	DBSA 11-Q-20	IQJ0948-01	IQJ0948	S	10/07/07	16:20														X	
TA-Irvine	DBSA 11-Q-30	IQJ0948-02	IQJ0948	S	10/07/07	16:40														X	
TA-Irvine	DBSA 11-Q-40	IQJ0948-03	IQJ0948	S	10/07/07	17:00														X	
TA-Irvine	DBSA 11-Q-40-FD	IQJ0948-04	IQJ0948	S	10/07/07	17:00														X	
TA-Irvine	DBSA 11-Q-50	IQJ0948-05	IQJ0948	S	10/07/07	17:20														X	
TA-Irvine	DBSA 11-Q-60	IQJ0948-06	IQJ0948	S	10/07/07	17:45														X	
TA-Irvine	DBSA 11-T-150	IQJ1106-01	IQJ1106	S	10/08/07	15:10														X	
TA-Irvine	DBSA 11-T-160	IQJ1106-02	IQJ1106	S	10/08/07	15:40														X	
TA-Irvine	DBSA 14-Q-150	IQJ1215-01	IQJ1215	S	10/10/07	8:00														X	
TA-Irvine	DBSA 14-Q-160	IQJ1215-02	IQJ1215	S	10/10/07	8:20														X	
TA-Irvine	DBSA 14-Q-160FD	IQJ1215-03	IQJ1215	S	10/10/07	8:20														X	
TA-St. Louis	DBSA 15 TRIP BLANK	F7J090259-001	DB101007*	WQ	10/07/07	6:45								X							
TA-St. Louis	DBSA 15-Q-120	F7J090259-002	DB101007*	S	10/07/07	6:50	X	X								X					
TA-Richland	DBSA 15-Q-120	F7J090264-001	DB1010RD*	S	10/07/07	6:50						X									
TA-Irvine	DBSA 17-T-130	IQJ0952-01	IQJ0952	S	10/05/07	14:20														X	
TA-Irvine	DBSA 17-T-140	IQJ0952-02	IQJ0952	S	10/05/07	15:15														X	
TA-Irvine	DBSA 17-T-150	IQJ0952-03	IQJ0952	S	10/05/07	15:30														X	
TA-Irvine	DBSA 21-Q-20	IQJ0456-01	IQJ0456	S	10/02/07	12:55														X	
TA-Irvine	DBSA 21-Q-20 DUP	IQJ0456-02	IQJ0456	S	10/02/07	12:55														X	
TA-Irvine	DBSA 21-Q-30	IQJ0456-03	IQJ0456	S	10/02/07	13:30														X	
TA-Irvine	DBSA 21-Q-40	IQJ0456-04	IQJ0456	S	10/02/07	13:50														X	
TA-Irvine	DBSA 21-Q-50	IQJ0456-05	IQJ0456	S	10/02/07	14:15														X	
TA-St. Louis	DBSA-10-Q-10	F7J180242-003	DB101807*	S	10/16/07	13:15								X		X					
TA-St. Louis	DBSA-10-Q-20	F7J180242-004	DB101807*	S	10/16/07	13:30	X	X								X					
TA-Richland	DBSA-10-Q-20	F7J180263-001	DB1018RD*	S	10/16/07	13:30						X									
TA-Richland	DBSA-10-Q-20	F8A150214-017	F8A150214	S	10/16/07	13:30						X									
TA-Richland	DBSA-10-Q-20	F8B080335-001	F8B080335	S	10/16/07	13:30						X									
TA-Irvine	DBSA-10-Q-20	IQJ1944-01	IQJ1944	S	10/16/07	13:30														X	
TA-St. Louis	DBSA-10-Q-20-FD	F7J180242-005	DB101807*	S	10/16/07	13:30	X	X								X					
TA-Richland	DBSA-10-Q-20-FD	F7J180263-002	DB1018RD*	S	10/16/07	13:30						X									
TA-Richland	DBSA-10-Q-20-FD	F8A150214-018	F8A150214	S	10/16/07	13:30						X									
TA-Richland	DBSA-10-Q-20-FD	F8B080335-002	F8B080335	S	10/16/07	13:30						X									
TA-Irvine	DBSA-10-Q-20-FD	IQJ1944-02	IQJ1944	S	10/16/07	13:30														X	
TA-St. Louis	DBSA-10-Q-30	F7J180242-006	DB101807*	S	10/16/07	13:50	X	X								X					

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 29 of 54)

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Richland	DBSA-10-Q-30	F7J180263-003	DB1018RD*	S	10/16/07	13:50						X									
TA-Richland	DBSA-10-Q-30	F8A150214-019	F8A150214	S	10/16/07	13:50						X									
TA-Richland	DBSA-10-Q-30	F8B080335-003	F8B080335	S	10/16/07	13:50						X									
TA-Irvine	DBSA-10-Q-30	IQJ1944-03	IQJ1944	S	10/16/07	13:50														X	
TA-St. Louis	DBSA-10-Q-40	F7J180242-007	DB101807*	S	10/16/07	14:05	X	X								X					
TA-Richland	DBSA-10-Q-40	F7J180263-004	DB1018RD*	S	10/16/07	14:05						X									
TA-Richland	DBSA-10-Q-40	F8A150214-020	F8A150214	S	10/16/07	14:05						X									
TA-Richland	DBSA-10-Q-40	F8B080335-004	F8B080335	S	10/16/07	14:05						X									
TA-Irvine	DBSA-10-Q-40	IQJ1944-04	IQJ1944	S	10/16/07	14:05														X	
TA-St. Louis	DBSA-10-Q-5	F7J180242-002	DB101807*	S	10/16/07	13:10								X		X					
TA-St. Louis	DBSA-10-Q-50	F7J180242-008	DB101807*	S	10/16/07	14:30	X	X								X					
TA-Richland	DBSA-10-Q-50	F7J180263-005	DB1018RD*	S	10/16/07	14:30						X									
TA-Richland	DBSA-10-Q-50	F8A150224-001	F8A150224	S	10/16/07	14:30						X									
TA-Richland	DBSA-10-Q-50	F8B080335-005	F8B080335	S	10/16/07	14:30						X									
TA-Irvine	DBSA-10-Q-50	IQJ1944-05	IQJ1944	S	10/16/07	14:30														X	
TA-St. Louis	DBSA-10-Q-50-FD	F7J180242-009	DB101807*	S	10/16/07	14:30	X	X								X					
TA-Richland	DBSA-10-Q-50-FD	F7J180263-006	DB1018RD*	S	10/16/07	14:30						X									
TA-Richland	DBSA-10-Q-50-FD	F8A150224-002	F8A150224	S	10/16/07	14:30						X									
TA-Richland	DBSA-10-Q-50-FD	F8B080335-006	F8B080335	S	10/16/07	14:30						X									
TA-Irvine	DBSA-10-Q-50-FD	IQJ1944-06	IQJ1944	S	10/16/07	14:30														X	
TA-St. Louis	DBSA-11-Q-10	F7J090254-003	DB100907*	S	10/07/07	16:05								X		X					
TA-St. Louis	DBSA-11-Q-120	F7J100176-006	DB101007*	S	10/08/07	11:45	X	X								X					
TA-Richland	DBSA-11-Q-120	F7J100192-006	DB1010RD*	S	10/08/07	11:45						X									
TA-Richland	DBSA-11-Q-120	F8A150205-016	F8A150205	S	10/08/07	11:45						X									
TA-St. Louis	DBSA-11-Q-120-FD	F7J100176-007	DB101007*	S	10/08/07	11:45										X					
TA-St. Louis	DBSA-11-Q-20	F7J090254-004	DB100907**	S	10/07/07	16:20	X	X								X					
TA-Richland	DBSA-11-Q-20	F7J090257-001	DB1009RD*	S	10/07/07	16:20						X									
TA-Richland	DBSA-11-Q-20	F8A150205-007	F8A150205	S	10/07/07	16:20						X									
TA-Richland	DBSA-11-Q-20	F8B080335-007	F8B080335	S	10/07/07	16:20						X									
TA-Irvine	DBSA-11-Q-20	IQJ1814-01	IQJ1814	S	10/08/07	16:20														X	
TA-St. Louis	DBSA-11-Q-30	F7J090254-005	DB100907*	S	10/07/07	16:40	X	X								X					
TA-Richland	DBSA-11-Q-30	F7J090257-002	DB1009RD*	S	10/07/07	16:40						X									
TA-Richland	DBSA-11-Q-30	F8A150205-008	F8A150205	S	10/07/07	16:40						X									
TA-Richland	DBSA-11-Q-30	F8B080335-008	F8B080335	S	10/07/07	16:40						X									

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LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Irvine	DBSA-11-Q-30	IQJ1814-02	IQJ1814	S	10/08/07	16:40														X	
TA-St. Louis	DBSA-11-Q-40	F7J090254-006	DB100907*	S	10/07/07	17:00	X	X								X					
TA-Richland	DBSA-11-Q-40	F7J090257-003	DB1009RD*	S	10/07/07	17:00						X									
TA-Richland	DBSA-11-Q-40	F8A150205-009	F8A150205	S	10/07/07	17:00						X									
TA-Richland	DBSA-11-Q-40	F8B080335-009	F8B080335	S	10/07/07	17:00						X									
TA-Irvine	DBSA-11-Q-40	IQJ1814-03	IQJ1814	S	10/08/07	17:00														X	
TA-St. Louis	DBSA-11-Q-40FD	F7J090254-007	DB100907*	S	10/07/07	17:00	X	X								X					
TA-Richland	DBSA-11-Q-40FD	F7J090257-004	DB1009RD*	S	10/07/07	17:00						X									
TA-Richland	DBSA-11-Q-40FD	F8A150205-010	F8A150205	S	10/07/07	17:00						X									
TA-Richland	DBSA-11-Q-40FD	F8B080335-010	F8B080335	S	10/07/07	17:00						X									
TA-Irvine	DBSA-11-Q-40FD	IQJ1814-04	IQJ1814	S	10/08/07	17:00														X	
TA-St. Louis	DBSA-11-Q-5	F7J090254-002	DB100907*	S	10/07/07	16:00								X		X					
TA-St. Louis	DBSA-11-Q-50	F7J090254-008	DB100907*	S	10/07/07	17:20	X	X								X					
TA-Richland	DBSA-11-Q-50	F7J090257-005	DB1009RD*	S	10/07/07	17:20						X									
TA-Richland	DBSA-11-Q-50	F8A150205-011	F8A150205	S	10/07/07	17:20						X									
TA-Richland	DBSA-11-Q-50	F8B080335-011	F8B080335	S	10/07/07	17:20						X									
TA-Irvine	DBSA-11-Q-50	IQJ1814-05	IQJ1814	S	10/08/07	17:20														X	
TA-St. Louis	DBSA-11-Q-60	F7J090254-009	DB100907*	S	10/07/07	17:45	X	X								X					
TA-Richland	DBSA-11-Q-60	F7J090257-006	DB1009RD*	S	10/07/07	17:45						X									
TA-Richland	DBSA-11-Q-60	F8A150205-012	F8A150205	S	10/07/07	17:45						X									
TA-Richland	DBSA-11-Q-60	F8B080335-012	F8B080335	S	10/07/07	17:45						X									
TA-Irvine	DBSA-11-Q-60	IQJ1814-06	IQJ1814	S	10/08/07	17:45														X	
TA-St. Louis	DBSA-11-T-150	F7J100176-010	DB101007*	S	10/08/07	15:10	X	X								X					
TA-Richland	DBSA-11-T-150	F7J100192-010	DB1010RD*	S	10/08/07	15:10						X									
TA-Richland	DBSA-11-T-150	F8A150205-018	F8A150205	S	10/08/07	15:10						X									
TA-Richland	DBSA-11-T-150	F8B090159-013	F8B090159	S	10/08/07	15:10						X									
TA-St. Louis	DBSA-11-T-160	F7J100176-011	DB101007*	S	10/08/07	15:40	X	X								X					
TA-Richland	DBSA-11-T-160	F7J100192-011	DB1010RD*	S	10/08/07	15:40						X									
TA-Richland	DBSA-11-T-160	F8A150205-019	F8A150205	S	10/08/07	15:40						X									
TA-St. Louis	DBSA-13-Q-10	F7J200153-003	DB102007*	S	10/18/07	15:10								X		X					
TA-St. Louis	DBSA-13-Q-20	F7J200153-004	DB102007*	S	10/18/07	15:25	X	X								X					
TA-Richland	DBSA-13-Q-20	F7J200157-001	DB102RD*	S	10/18/07	15:25						X									
TA-Richland	DBSA-13-Q-20	F8A150224-009	F8A150224	S	10/18/07	15:25						X									
TA-Richland	DBSA-13-Q-20	F8B080335-013	F8B080335	S	10/18/07	15:25						X									

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CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Irvine	DBSA-13-Q-20	IQJ2234-01	IQJ2234	S	10/18/07	15:25														X	
TA-St. Louis	DBSA-13-Q-20-FD	F7J200153-005	DB102007*	S	10/18/07	15:25	X	X								X					
TA-Richland	DBSA-13-Q-20-FD	F7J200157-002	DB102RD*	S	10/18/07	15:25						X									
TA-Richland	DBSA-13-Q-20-FD	F8A150224-010	F8A150224	S	10/18/07	15:25						X									
TA-Richland	DBSA-13-Q-20-FD	F8B080335-014	F8B080335	S	10/18/07	15:25						X									
TA-Irvine	DBSA-13-Q-20-FD	IQJ2234-02	IQJ2234	S	10/18/07	15:25														X	
TA-St. Louis	DBSA-13-Q-30	F7J200153-006	DB102007*	S	10/18/07	15:40	X	X								X					
TA-Richland	DBSA-13-Q-30	F7J200157-003	DB102RD*	S	10/18/07	15:40						X									
TA-Richland	DBSA-13-Q-30	F8A150224-011	F8A150224	S	10/18/07	15:40						X									
TA-Richland	DBSA-13-Q-30	F8B080335-015	F8B080335	S	10/18/07	15:40						X									
TA-Irvine	DBSA-13-Q-30	IQJ2234-03	IQJ2234	S	10/18/07	15:40														X	
TA-St. Louis	DBSA-13-Q-40	F7J200153-007	DB102007*	S	10/18/07	16:00	X	X								X					
TA-Richland	DBSA-13-Q-40	F7J200157-004	DB102RD*	S	10/18/07	16:00						X									
TA-Richland	DBSA-13-Q-40	F8A150224-012	F8A150224	S	10/18/07	16:00						X									
TA-Richland	DBSA-13-Q-40	F8B080335-016	F8B080335	S	10/18/07	16:00						X									
TA-Irvine	DBSA-13-Q-40	IQJ2234-04	IQJ2234	S	10/18/07	16:00														X	
TA-St. Louis	DBSA-13-Q-5	F7J200153-002	DB102007*	S	10/18/07	15:00								X		X					
TA-St. Louis	DBSA-13-Q-50	F7J200153-008	DB102007*	S	10/18/07	16:25	X	X								X					
TA-Richland	DBSA-13-Q-50	F7J200157-005	DB102RD*	S	10/18/07	16:25						X									
TA-Richland	DBSA-13-Q-50	F8A150224-013	F8A150224	S	10/18/07	16:25						X									
TA-Richland	DBSA-13-Q-50	F8B080335-017	F8B080335	S	10/18/07	16:25						X									
TA-Irvine	DBSA-13-Q-50	IQJ2234-05	IQJ2234	S	10/18/07	16:25														X	
TA-St. Louis	DBSA-13-Q-50-FD	F7J200153-019	DB102007*	S	10/18/07	16:25	X	X								X					
TA-Richland	DBSA-13-Q-50-FD	F7J200157-006	DB102RD*	S	10/18/07	16:25						X									
TA-Richland	DBSA-13-Q-50-FD	F8A150224-014	F8A150224	S	10/18/07	16:25						X									
TA-Richland	DBSA-13-Q-50-FD	F8B080335-018	F8B080335	S	10/18/07	16:25						X									
TA-Irvine	DBSA-13-Q-50-FD	IQJ2234-06	IQJ2234	S	10/18/07	16:25														X	
TA-St. Louis	DBSA-13-Q-60	F7J200153-009	DB102007*	S	10/18/07	16:45	X	X								X					
TA-Richland	DBSA-13-Q-60	F7J200157-007	DB102RD*	S	10/18/07	16:45						X									
TA-Richland	DBSA-13-Q-60	F8A150224-015	F8A150224	S	10/18/07	16:45						X									
TA-Richland	DBSA-13-Q-60	F8B080335-019	F8B080335	S	10/18/07	16:45						X									
TA-Irvine	DBSA-13-Q-60	IQJ2234-07	IQJ2234	S	10/18/07	16:45														X	
TA-St. Louis	DBSA-13-Q-70	F7J200153-010	DB102007*	S	10/18/07	17:10	X	X								X					
TA-Richland	DBSA-13-Q-70	F7J200157-008	DB102RD*	S	10/18/07	17:10						X									

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Richland	DBSA-13-Q-70	F8A150224-016	F8A150224	S	10/18/07	17:10						X									
TA-Irvine	DBSA-13-Q-70	IQJ2234-08	IQJ2234	S	10/18/07	17:10														X	
TA-St. Louis	DBSA-13-Q-80	F7J200153-011	DB102007*	S	10/18/07	17:40	X	X								X					
TA-Richland	DBSA-13-Q-80	F7J200157-009	DB102RD*	S	10/18/07	17:40						X									
TA-Richland	DBSA-13-Q-80	F8A150224-017	F8A150224	S	10/18/07	17:40						X									
TA-Irvine	DBSA-13-Q-80	IQJ2234-09	IQJ2234	S	10/18/07	17:40														X	
TA-St. Louis	DBSA-14-Q-10	F7J110226-003	DB101107*	S	10/09/07	10:55								X							
TA-St. Louis	DBSA-14-Q-140	F7J110226-018	DB101107*	S	10/10/07	17:55	X	X								X					
TA-Richland	DBSA-14-Q-140	F7J110245-015	DB1011RD*	S	10/10/07	17:55						X									
TA-Irvine	DBSA-14-Q-140	IQJ1216-15	IQJ1216	S	10/09/07	17:55														X	
TA-St. Louis	DBSA-14-Q-20	F7J110226-004	DB101107*	S	10/09/07	11:15	X	X								X					
TA-Richland	DBSA-14-Q-20	F7J110245-001	DB1011RD*	S	10/09/07	11:15						X									
TA-Richland	DBSA-14-Q-20	F8A150205-020	F8A150205	S	10/09/07	11:15						X									
TA-Richland	DBSA-14-Q-20	F8A150214-006	F8A150214	S	10/09/07	11:15						X									
TA-Richland	DBSA-14-Q-20	F8B080335-020	F8B080335	S	10/09/07	11:15						X									
TA-Irvine	DBSA-14-Q-20	IQJ1216-01	IQJ1216	S	10/09/07	11:15														X	
TA-St. Louis	DBSA-14-Q-20 FD	F7J110226-005	DB101107*	S	10/09/07	11:15	X	X								X					
TA-Richland	DBSA-14-Q-20 FD	F7J110245-002	DB1011RD*	S	10/09/07	11:15						X									
TA-Richland	DBSA-14-Q-20 FD	F8A150214-001	F8A150214	S	10/09/07	11:15						X									
TA-Irvine	DBSA-14-Q-20 FD	IQJ1216-02	IQJ1216	S	10/09/07	11:15														X	
TA-Richland	DBSA-14-Q-20-FD	F8B090125-001	F8B090125	S	10/09/07	11:15						X									
TA-St. Louis	DBSA-14-Q-30	F7J110226-006	DB101107*	S	10/09/07	11:40	X	X								X					
TA-Richland	DBSA-14-Q-30	F7J110245-003	DB1011RD*	S	10/09/07	11:40						X									
TA-Richland	DBSA-14-Q-30	F8A150214-002	F8A150214	S	10/09/07	11:40						X									
TA-Richland	DBSA-14-Q-30	F8B090125-002	F8B090125	S	10/09/07	11:40						X									
TA-Irvine	DBSA-14-Q-30	IQJ1216-03	IQJ1216	S	10/09/07	11:40														X	
TA-St. Louis	DBSA-14-Q-40	F7J110226-007	DB101107*	S	10/09/07	12:05	X	X								X					
TA-Richland	DBSA-14-Q-40	F7J110245-004	DB1011RD*	S	10/09/07	12:05						X									
TA-Richland	DBSA-14-Q-40	F8A150214-003	F8A150214	S	10/09/07	12:05						X									
TA-Richland	DBSA-14-Q-40	F8B090125-003	F8B090125	S	10/09/07	12:05						X									
TA-Irvine	DBSA-14-Q-40	IQJ1216-04	IQJ1216	S	10/09/07	12:05														X	
TA-St. Louis	DBSA-14-Q-5	F7J110226-002	DB101107*	S	10/09/07	10:45								X							
TA-St. Louis	DBSA-14-Q-50	F7J110226-008	DB101107*	S	10/09/07	12:30	X	X								X					
TA-Richland	DBSA-14-Q-50	F7J110245-005	DB1011RD*	S	10/09/07	12:30						X									

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 33 of 54)

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Richland	DBSA-14-Q-50	F8A150214-004	F8A150214	S	10/09/07	12:30						X									
TA-Richland	DBSA-14-Q-50	F8B090125-004	F8B090125	S	10/09/07	12:30						X									
TA-Irvine	DBSA-14-Q-50	IQJ1216-05	IQJ1216	S	10/09/07	12:30														X	
TA-St. Louis	DBSA-14-Q-50 FD	F7J110226-009	DB101107*	S	10/09/07	12:30	X	X								X					
TA-Richland	DBSA-14-Q-50 FD	F7J110245-006	DB1011RD*	S	10/09/07	12:30						X									
TA-Richland	DBSA-14-Q-50 FD	F8A150214-005	F8A150214	S	10/09/07	12:30						X									
TA-Richland	DBSA-14-Q-50 FD	F8B090125-005	F8B090125	S	10/09/07	12:30						X									
TA-Irvine	DBSA-14-Q-50 FD	IQJ1216-06	IQJ1216	S	10/09/07	12:30														X	
TA-St. Louis	DBSA-14-Q-60	F7J110226-010	DB101107*	S	10/09/07	13:40															
TA-St. Louis	DBSA-15-Q-10	F7J090244-003	DB100907*	S	10/06/07	10:40								X							
TA-St. Louis	DBSA-15-Q-150	F7J090259-006	DB101007*	S	10/07/07	9:45	X	X								X					
TA-Richland	DBSA-15-Q-150	F7J090264-005	DB1010RD*	S	10/07/07	9:45						X									
TA-Irvine	DBSA-15-Q-150	IQJ0945-06	IQJ0945	S	10/07/07	9:45														X	
TA-St. Louis	DBSA-15-Q-160	F7J090259-007	DB101007*	S	10/07/07	10:05	X	X								X					
TA-Richland	DBSA-15-Q-160	F7J090264-006	DB1010RD*	S	10/07/07	10:05						X									
TA-Irvine	DBSA-15-Q-160	IQJ0945-07	IQJ0945	S	10/07/07	10:05														X	
TA-St. Louis	DBSA-15-Q-20	F7J090244-004	DB100907*	S	10/06/07	11:25	X	X								X					
TA-Richland	DBSA-15-Q-20	F7J090251-001	DB1009RD*	S	10/06/07	11:25						X									
TA-Richland	DBSA-15-Q-20	F8A140155-016	F8A140155	S	10/06/07	11:25						X									
TA-Richland	DBSA-15-Q-20	F8B090125-006	F8B090125	S	10/06/07	11:25						X									
TA-Irvine	DBSA-15-Q-20	IQJ0935-01	IQJ0935	S	10/06/07	11:25														X	
TA-St. Louis	DBSA-15-Q-20 FD	F7J090244-005	DB100907*	S	10/06/07	11:25	X	X								X					
TA-Richland	DBSA-15-Q-20 FD	F7J090251-002	DB1009RD*	S	10/06/07	11:25						X									
TA-Richland	DBSA-15-Q-20 FD	F8A140155-017	F8A140155	S	10/06/07	11:25						X									
TA-Richland	DBSA-15-Q-20 FD	F8B090125-007	F8B090125	S	10/06/07	11:25						X									
TA-Irvine	DBSA-15-Q-20 FD	IQJ0935-02	IQJ0935	S	10/06/07	11:25														X	
TA-St. Louis	DBSA-15-Q-30	F7J090244-006	DB100907*	S	10/06/07	12:00	X	X								X					
TA-Richland	DBSA-15-Q-30	F7J090251-003	DB1009RD*	S	10/06/07	12:00						X									
TA-Richland	DBSA-15-Q-30	F8A140155-018	F8A140155	S	10/06/07	12:00						X									
TA-Richland	DBSA-15-Q-30	F8B090125-008	F8B090125	S	10/06/07	12:00						X									
TA-Irvine	DBSA-15-Q-30	IQJ0935-03	IQJ0935	S	10/06/07	12:00														X	
TA-St. Louis	DBSA-15-Q-40	F7J090244-007	DB100907*	S	10/06/07	12:40	X	X								X					
TA-Richland	DBSA-15-Q-40	F7J090251-004	DB1009RD*	S	10/06/07	12:40						X									
TA-Richland	DBSA-15-Q-40	F8A140155-019	F8A140155	S	10/06/07	12:40						X									

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Richland	DBSA-15-Q-40	F8B090125-009	F8B090125	S	10/06/07	12:40						X									
TA-Irvine	DBSA-15-Q-40	IQJ0935-04	IQJ0935	S	10/06/07	12:40														X	
TA-St. Louis	DBSA-15-Q-5	F7J090244-002	DB100907*	S	10/06/07	10:35								X							
TA-St. Louis	DBSA-15-Q-50	F7J090244-008	DB100907*	S	10/06/07	14:20	X	X								X					
TA-Richland	DBSA-15-Q-50	F7J090251-005	DB1009RD*	S	10/06/07	14:20						X									
TA-Richland	DBSA-15-Q-50	F8A140155-020	F8A140155	S	10/06/07	14:20						X									
TA-Richland	DBSA-15-Q-50	F8B090125-010	F8B090125	S	10/06/07	14:20						X									
TA-Irvine	DBSA-15-Q-50	IQJ0935-05	IQJ0935	S	10/06/07	14:20														X	
TA-St. Louis	DBSA-17-GW	F7J090279-013	DB100807*	W	10/05/07	16:30	X	X		X	X			X							
TA-Richland	DBSA-17-GW	F7J090293-013	DB1008RD*	W	10/05/07	16:30						X									
Alpha	DBSA-17-GW	ERM07100951-01	ERM07100951	W	10/05/07	16:30											X				
TA-Irvine	DBSA-17-GW	IQJ0901-01	IQJ0901	W	10/05/07	16:30												X	X	X	X
TA-St. Louis	DBSA-17-Q-10	F7J060109-002	DB100807*	S	10/04/07	16:50								X		X					
TA-St. Louis	DBSA-17-Q-100	F7J090279-007	DB100807*	S	10/05/07	10:30	X	X								X					
TA-Richland	DBSA-17-Q-100	F7J090293-007	DB1008RD*	S	10/05/07	10:30						X									
TA-St. Louis	DBSA-17-Q-110	F7J090279-008	DB100807*	S	10/05/07	11:40	X	X								X					
TA-Richland	DBSA-17-Q-110	F7J090293-008	DB1008RD*	S	10/05/07	11:40						X									
TA-St. Louis	DBSA-17-Q-120	F7J090279-009	DB100807*	S	10/05/07	12:10	X	X								X					
TA-Richland	DBSA-17-Q-120	F7J090293-009	DB1008RD*	S	10/05/07	12:10						X									
TA-Irvine	DBSA17-Q-20	IQJ0761-01	IQJ0761	S	10/04/07	17:15														X	
TA-St. Louis	DBSA-17-Q-20	F7J060109-003	DB100807*	S	10/04/07	17:00	X	X						X		X					
TA-Richland	DBSA-17-Q-20	F7J060111-001	DB1008RD*	S	10/04/07	17:00						X									
TA-Richland	DBSA-17-Q-20	F8B090125-012	F8B090125	S	10/04/07	17:00						X									
TA-Irvine	DBSA-17-Q-30	IQJ0761-02	IQJ0761	S	10/04/07	17:35														X	
TA-St. Louis	DBSA-17-Q-30	F7J060109-004	DB100807*	S	10/04/07	17:15	X	X							X	X					
TA-Richland	DBSA-17-Q-30	F7J060111-002	DB1008RD*	S	10/04/07	17:15						X									
TA-Richland	DBSA-17-Q-30	F8B090125-013	F8B090125	S	10/04/07	17:15						X									
TA-Irvine	DBSA-17-Q-40	IQJ0761-03	IQJ0761	S	10/04/07	17:55														X	
TA-St. Louis	DBSA-17-Q-40	F7J060109-005	DB100807*	S	10/04/07	17:35	X	X								X					
TA-Richland	DBSA-17-Q-40	F7J060111-003	DB1008RD*	S	10/04/07	17:35						X									
TA-Richland	DBSA-17-Q-40	F8B090125-014	F8B090125	S	10/04/07	17:35						X									
TA-St. Louis	DBSA-17-Q-5	F7J060109-001	DB100807*	S	10/04/07	16:45								X							
TA-St. Louis	DBSA-17-Q-50	F7J090279-001	DB100807*	S	10/05/07	7:45	X	X								X					
TA-Richland	DBSA-17-Q-50	F7J090293-001	DB1008RD*	S	10/05/07	7:45						X									

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Richland	DBSA-17-Q-50	F8B090125-015	F8B090125	S	10/05/07	7:45						X									
TA-St. Louis	DBSA-17-Q-60	F7J090279-002	DB100807*	S	10/05/07	8:15	X	X								X					
TA-Richland	DBSA-17-Q-60	F7J090293-002	DB1008RD*	S	10/05/07	8:15						X									
TA-Richland	DBSA-17-Q-60	F8B090125-016	F8B090125	S	10/05/07	8:15						X									
TA-St. Louis	DBSA-17-Q-70	F7J090279-003	DB100807*	S	10/05/07	8:45	X	X								X					
TA-Richland	DBSA-17-Q-70	F7J090293-003	DB1008RD*	S	10/05/07	8:45						X									
TA-St. Louis	DBSA-17-Q-80	F7J090279-004	DB100807*	S	10/05/07	9:30	X	X								X					
TA-Richland	DBSA-17-Q-80	F7J090293-004	DB1008RD*	S	10/05/07	9:30						X									
TA-St. Louis	DBSA-17-Q-80-DUP	F7J090279-005	DB100807*	S	10/05/07	9:30	X	X								X					
TA-Richland	DBSA-17-Q-80-DUP	F7J090293-005	DB1008RD*	S	10/05/07	9:30						X									
TA-St. Louis	DBSA-17-Q-90	F7J090279-006	DB100807*	S	10/05/07	10:00	X	X								X					
TA-Richland	DBSA-17-Q-90	F7J090293-006	DB1008RD*	S	10/05/07	10:00						X									
TA-St. Louis	DBSA-17-T-130	F7J090279-010	DB100807*	S	10/05/07	14:20	X	X								X					
TA-Richland	DBSA-17-T-130	F7J090293-010	DB1008RD*	S	10/05/07	14:20						X									
TA-Richland	DBSA-17-T-130	F8B090159-014	F8B090159	S	10/05/07	14:20						X									
TA-St. Louis	DBSA-17-T-140	F7J090279-011	DB100807*	S	10/05/07	15:15	X	X							X	X					
TA-Richland	DBSA-17-T-140	F7J090293-011	DB1008RD*	S	10/05/07	15:15						X									
TA-Richland	DBSA-17-T-140	F8B090159-015	F8B090159	S	10/05/07	15:15						X									
TA-St. Louis	DBSA-17-T-150	F7J090279-012	DB100807*	S	10/05/07	15:30	X	X								X					
TA-Richland	DBSA-17-T-150	F7J090293-012	DB1008RD*	S	10/05/07	15:30						X									
TA-Richland	DBSA-17-T-150	F8A150205-015	F8A150205	S	10/05/07	15:30						X									
TA-Richland	DBSA-17-T-150	F8B090159-016	F8B090159	S	10/05/07	15:30						X									
TA-St. Louis	DBSA-1-Q-0	F7H070367-001	DB080807*	S	08/06/07	8:00					X					X					
TA-Irvine	DBSA-1-Q-0	IQH1020-01	IQH1020	S	08/06/07	8:00														X	
TA-St. Louis	DBSA-1-Q-10	F7H070367-003	DB080807*	S	08/06/07	10:30	X						X	X		X					
TA-Irvine	DBSA-1-Q-10	IQH1020-03	IQH1020	S	08/06/07	10:30													X	X	
TA-St. Louis	DBSA-1-Q-20	F7H070367-004	DB080807*	S	08/06/07	10:55	X	X								X					
TA-Richland	DBSA-1-Q-20	F7H070375-001	DB0808RD*	S	08/06/07	10:55						X									
TA-Richland	DBSA-1-Q-20	F8A140146-001	F8A140146	S	08/06/07	10:55						X									
TA-Richland	DBSA-1-Q-20	F8B090125-017	F8B090125	S	08/06/07	10:55						X									
TA-Irvine	DBSA-1-Q-20	IQH1020-04	IQH1020	S	08/06/07	10:55														X	
TA-St. Louis	DBSA-1-Q-30	F7H070367-005	DB080807*	S	08/06/07	11:40	X	X								X					
TA-Richland	DBSA-1-Q-30	F7H070375-002	DB0808RD*	S	08/06/07	11:40						X									
TA-Richland	DBSA-1-Q-30	F8A140146-002	F8A140146	S	08/06/07	11:40						X									

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Richland	DBSA-1-Q-30	F8B090125-018	F8B090125	S	08/06/07	11:40						X									
TA-Irvine	DBSA-1-Q-30	IQH1020-05	IQH1020	S	08/06/07	11:40														X	
TA-St. Louis	DBSA-1-Q-40	F7H070367-007	DB080807*	S	08/06/07	12:15	X	X								X					
TA-Richland	DBSA-1-Q-40	F7H070375-004	DB0808RD*	S	08/06/07	12:15						X									
TA-Richland	DBSA-1-Q-40	F8A140146-003	F8A140146	S	08/06/07	12:15						X									
TA-Richland	DBSA-1-Q-40	F8B090125-019	F8B090125	S	08/06/07	12:15						X									
TA-Irvine	DBSA-1-Q-40	IQH1020-07	IQH1020	S	08/06/07	12:15														X	
TA-St. Louis	DBSA-1-Q-5	F7H070367-002	DB080807*	S	08/06/07	10:00							X	X		X					
TA-Irvine	DBSA-1-Q-5	IQH1020-02	IQH1020	S	08/06/07	10:00													X	X	
TA-St. Louis	DBSA-1-Q-50	F7H070367-008	DB080807*	S	08/06/07	12:40	X	X								X					
TA-Richland	DBSA-1-Q-50	F7H070375-005	DB0808RD*	S	08/06/07	12:40						X									
TA-Richland	DBSA-1-Q-50	F8A140146-004	F8A140146	S	08/06/07	12:40						X									
TA-Richland	DBSA-1-Q-50	F8B090125-020	F8B090125	S	08/06/07	12:40						X									
TA-Irvine	DBSA-1-Q-50	IQH1020-08	IQH1020	S	08/06/07	12:40														X	
TA-St. Louis	DBSA-1-Q-60	F7H070367-009	DB080807*	S	08/06/07	13:00	X	X								X					
TA-Richland	DBSA-1-Q-60	F7H070375-006	DB0808RD*	S	08/06/07	13:00						X									
TA-Richland	DBSA-1-Q-60	F8A140146-005	F8A140146	S	08/06/07	13:00						X									
TA-Richland	DBSA-1-Q-60	F8B090159-001	F8B090159	S	08/06/07	13:00						X									
TA-Irvine	DBSA-1-Q-60	IQH1020-09	IQH1020	S	08/06/07	13:00														X	
TA-St. Louis	DBSA-1-Q-70	F7H070367-010	DB080807*	S	08/06/07	13:30	X	X								X					
TA-Richland	DBSA-1-Q-70	F7H070375-007	DB0808RD*	S	08/06/07	13:30						X									
TA-Richland	DBSA-1-Q-70	F8A140146-006	F8A140146	S	08/06/07	13:30						X									
TA-Irvine	DBSA-1-Q-70	IQH1020-10	IQH1020	S	08/06/07	13:30														X	
TA-St. Louis	DBSA-1-Q-80	F7H070367-011	DB080807*	S	08/06/07	14:10	X	X								X					
TA-Richland	DBSA-1-Q-80	F7H070375-008	DB0808RD*	S	08/06/07	14:10						X									
TA-Richland	DBSA-1-Q-80	F8A140146-007	F8A140146	S	08/06/07	14:10						X									
TA-Irvine	DBSA-1-Q-80	IQH1020-11	IQH1020	S	08/06/07	14:10														X	
TA-St. Louis	DBSA-1-Q-90	F7H070367-012	DB080807*	S	08/06/07	14:40	X	X								X					
TA-Richland	DBSA-1-Q-90	F7H070375-009	DB0808RD*	S	08/06/07	14:40						X									
TA-Richland	DBSA-1-Q-90	F8A140146-008	F8A140146	S	08/06/07	14:40						X									
TA-Irvine	DBSA-1-Q-90	IQH1020-12	IQH1020	S	08/06/07	14:40														X	
TA-St. Louis	DBSA-20-GW	F7J050251-014	DB100507*	W	10/04/07	10:00	X	X	X	X	X			X		X					
TA-Richland	DBSA-20-GW	F7J050268-011	DB1005RD*	W	10/04/07	10:00						X									
Alpha	DBSA-20-GW	ERM07100532-01A	ERM07100532	W	10/04/07	10:00											X				

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2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Irvine	DBSA-20-GW	IQJ0573-01	IQJ0573	W	10/04/07	10:00												X			
TA-Irvine	DBSA-20-GW	IQJ0610-01	IQJ0610	W	10/04/07	10:00													X	X	X
TA-St. Louis	DBSA-20-Q-10	F7J050251-002	DB100507*	S	10/03/07	14:00								X		X					
TA-St. Louis	DBSA-20-Q-20	F7J050251-003	DB100507*	S	10/03/07	14:20	X	X								X					
TA-Richland	DBSA-20-Q-20	F7J050268-001	DB1005RD*	S	10/03/07	14:20						X									
TA-Richland	DBSA-20-Q-20	F8A140155-006	F8A140155	S	10/03/07	14:20						X									
TA-Richland	DBSA-20-Q-20	F8B090159-002	F8B090159	S	10/03/07	14:20						X									
TA-Irvine	DBSA-20-Q-20	IQJ0623-01	IQJ0623	S	10/03/07	14:20														X	
TA-St. Louis	DBSA-20-Q-30	F7J050251-004	DB100507*	S	10/03/07	15:00	X	X								X					
TA-Richland	DBSA-20-Q-30	F7J050268-002	DB1005RD*	S	10/03/07	15:00						X									
TA-Richland	DBSA-20-Q-30	F8A140155-007	F8A140155	S	10/03/07	15:00						X									
TA-Richland	DBSA-20-Q-30	F8B090159-003	F8B090159	S	10/03/07	15:00						X									
TA-Irvine	DBSA-20-Q-30	IQJ0623-02	IQJ0623	S	10/03/07	15:00														X	
TA-St. Louis	DBSA-20-Q-40	F7J050251-005	DB100507*	S	10/03/07	16:00	X	X								X					
TA-Richland	DBSA-20-Q-40	F7J050268-003	DB1005RD*	S	10/03/07	16:00						X									
TA-Richland	DBSA-20-Q-40	F8A140155-008	F8A140155	S	10/03/07	16:00						X									
TA-Richland	DBSA-20-Q-40	F8B090159-004	F8B090159	S	10/03/07	16:00						X									
TA-Irvine	DBSA-20-Q-40	IQJ0623-03	IQJ0623	S	10/03/07	16:00														X	
TA-St. Louis	DBSA-20-Q-5	F7J050251-001	DB100507*	S	10/03/07	13:55								X		X					
TA-St. Louis	DBSA-20-Q-50	F7J050251-006	DB100507*	S	10/03/07	16:30	X	X								X					
TA-Richland	DBSA-20-Q-50	F7J050268-004	DB1005RD*	S	10/03/07	16:30						X									
TA-Richland	DBSA-20-Q-50	F8A140155-009	F8A140155	S	10/03/07	16:30						X									
TA-Richland	DBSA-20-Q-50	F8B090159-005	F8B090159	S	10/03/07	16:30						X									
TA-Irvine	DBSA-20-Q-50	IQJ0623-04	IQJ0623	S	10/03/07	16:30														X	
TA-St. Louis	DBSA-20-Q-60	F7J050251-007	DB100507*	S	10/03/07	17:00										X					
TA-St. Louis	DBSA-20-Q-70	F7J050251-008	DB100507*	S	10/03/07	17:35	X	X								X					
TA-Richland	DBSA-20-Q-70	F7J050268-006	DB1005RD*	S	10/03/07	17:35						X									
TA-Richland	DBSA-20-Q-70	F8A140155-011	F8A140155	S	10/03/07	17:35						X									
TA-Irvine	DBSA-20-Q-70	IQJ0623-06	IQJ0623	S	10/03/07	17:35														X	
TA-St. Louis	DBSA-20-Q-80	F7J050251-009	DB100507*	S	10/03/07	18:00	X	X								X					
TA-Richland	DBSA-20-Q-80	F7J050268-007	DB1005RD*	S	10/03/07	18:00						X									
TA-Richland	DBSA-20-Q-80	F8A140155-012	F8A140155	S	10/03/07	18:00						X									
TA-Irvine	DBSA-20-Q-80	IQJ0623-07	IQJ0623	S	10/03/07	18:00														X	
TA-St. Louis	DBSA-20-T-100	F7J050251-012	DB100507*	S	10/04/07	9:30	X	X								X					

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LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Richland	DBSA-20-T-100	F8A140155-015	F8A140155	S	10/04/07	9:30						X									
TA-Richland	DBSA-20-T-100	F8B090159-017	F8B090159	S	10/04/07	9:30						X									
TA-Irvine	DBSA-20-T-100	IQJ0625-03	IQJ0625	S	10/04/07	9:30														X	
TA-St. Louis	DBSA-20-T-90	F7J050251-010	DB100507*	S	10/04/07	9:15	X	X								X					
TA-Richland	DBSA-20-T-90	F7J050268-008	DB1005RD*	S	10/04/07	9:15						X				X					
TA-Richland	DBSA-20-T-90	F8A140155-013	F8A140155	S	10/04/07	9:15						X									
TA-Richland	DBSA-20-T-90	F8B090159-018	F8B090159	S	10/04/07	9:15						X									
TA-Irvine	DBSA-20-T-90	IQJ0625-01	IQJ0625	S	10/04/07	9:15														X	
TA-Irvine	DBSA-20-T-90 DUP	IQJ0625-02	IQJ0625	S	10/04/07	9:15														X	
TA-St. Louis	DBSA-20-T-90-DUP	F7J050251-011	DB100507*	S	10/04/07	9:15	X	X								X					
TA-Richland	DBSA-20-T-90-DUP	F7J050268-009	DB1005RD*	S	10/04/07	9:15						X				X					
TA-Richland	DBSA-20-T-90-DUP	F8A140155-014	F8A140155	S	10/04/07	9:15						X									
TA-Richland	DBSA-20-T-90-DUP	F8B090159-019	F8B090159	S	10/04/07	9:15						X									
TA-St. Louis	DBSA-21-GW	F7J040245-013	DB100507*	W	10/02/07	7:30	X	X		X	X		X	X		X					
TA-Richland	DBSA-21-GW	F7J040280-011	DB1005RD*	W	10/02/07	7:30						X									
Alpha	DBSA-21-GW	ERM07100430-01A	ERM07100430	W	10/03/07	7:30											X				
TA-Irvine	DBSA-21-GW	IQJ0414-01	IQJ0414	W	10/03/07	7:30												X			
TA-Irvine	DBSA-21-GW	IQJ0430-01	IQJ0430	W	10/03/07	7:30													X	X	X
TA-St. Louis	DBSA-21-Q-10	F7J040245-002	DB100507*	S	10/02/07	12:30								X	X	X					
TA-St. Louis	DBSA-21-Q-20	F7J040245-003	DB100507*	S	10/02/07	12:55	X	X								X					
TA-Richland	DBSA-21-Q-20	F7J040280-001	DB1005RD*	S	10/02/07	12:55						X									
TA-Richland	DBSA-21-Q-20	F8A140153-016	F8A140153	S	10/02/07	12:55						X									
TA-Richland	DBSA-21-Q-20	F8B090159-007	F8B090159	S	10/02/07	12:55						X									
TA-St. Louis	DBSA-21-Q-20-DUP	F7J040245-004	DB100507*	S	10/02/07	12:55	X	X								X					
TA-Richland	DBSA-21-Q-20-DUP	F7J040280-002	DB1005RD*	S	10/02/07	12:55						X									
TA-Richland	DBSA-21-Q-20-DUP	F8A140153-017	F8A140153	S	10/02/07	12:55						X									
TA-Richland	DBSA-21-Q-20-DUP	F8B090159-008	F8B090159	S	10/02/07	12:55						X									
TA-St. Louis	DBSA-21-Q-30	F7J040245-005	DB100507*	S	10/02/07	13:30	X	X								X					
TA-Richland	DBSA-21-Q-30	F7J040280-003	DB1005RD*	S	10/02/07	13:30						X									
TA-Richland	DBSA-21-Q-30	F8A140153-018	F8A140153	S	10/02/07	13:30						X									
TA-Richland	DBSA-21-Q-30	F8B090159-009	F8B090159	S	10/02/07	13:30						X									
TA-St. Louis	DBSA-21-Q-40	F7J040245-006	DB100507*	S	10/02/07	13:50	X	X								X					
TA-Richland	DBSA-21-Q-40	F7J040280-004	DB1005RD*	S	10/02/07	13:50						X									
TA-Richland	DBSA-21-Q-40	F8A140153-019	F8A140153	S	10/02/07	13:50						X									

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LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Richland	DBSA-21-Q-40	F8B090159-010	F8B090159	S	10/02/07	13:50						X									
TA-St. Louis	DBSA-21-Q-5	F7J040245-001	DB100507*	S	10/02/07	12:25								X		X					
TA-St. Louis	DBSA-21-Q-50	F7J040245-007	DB100507*	S	10/02/07	14:15	X	X								X					
TA-Richland	DBSA-21-Q-50	F7J040280-005	DB1005RD*	S	10/02/07	14:15						X									
TA-Richland	DBSA-21-Q-50	F8A140153-020	F8A140153	S	10/02/07	14:15						X									
TA-Richland	DBSA-21-Q-50	F8B090159-005	F8B090159	S	10/02/07	14:15						X									
TA-St. Louis	DBSA-21-Q-70	F7J040245-009	DB100507*	S	10/02/07	16:00	X	X								X					
TA-St. Louis	DBSA-21-T-80	F7J040245-011	DB100507*	S	10/02/07	16:30	X	X								X					
TA-Richland	DBSA-21-T-80	F7J040280-009	DB1005RD*	S	10/02/07	16:30						X									
TA-Richland	DBSA-21-T-80	F8A140155-004	F8A140155	S	10/02/07	16:30						X									
TA-Richland	DBSA-21-T-80	F8B090159-020	F8B090159	S	10/02/07	16:30						X									
TA-Irvine	DBSA-21-T-80	IQJ0456-09	IQJ0456	S	10/02/07	16:30														X	
TA-St. Louis	DBSA-21-T-90	F7J040245-012	DB100507*	S	10/02/07	17:05	X	X								X					
TA-Richland	DBSA-21-T-90	F7J040280-010	DB1005RD*	S	10/02/07	17:05						X									
TA-Richland	DBSA-21-T-90	F8A140155-005	F8A140155	S	10/02/07	17:05						X									
TA-Richland	DBSA-21-T-90	F8B090161-001	F8B090161	S	10/02/07	17:05						X									
TA-Irvine	DBSA-21-T-90	IQJ0456-10	IQJ0456	S	10/02/07	17:05														X	
TA-St. Louis	DBSA-23-Q-10	F7I250260-007	DB092707*	S	09/23/07	9:55								X							
TA-St. Louis	DBSA-23-Q-20	F7I250260-008	DB092707*	S	09/23/07	10:20	X	X								X					
TA-Richland	DBSA-23-Q-20	F7I250279-001	DB0927RD*	S	09/23/07	10:20						X									
TA-Richland	DBSA-23-Q-20	F8A140153-001	F8A140153	S	09/23/07	10:20						X									
TA-Richland	DBSA-23-Q-20	F8A140153-006	F8A140153	S	09/23/07	10:20						X									
TA-Richland	DBSA-23-Q-20	F8B090161-009	F8B090161	S	09/23/07	10:20						X									
TA-St. Louis	DBSA-23-Q-30	F7I250260-009	DB092707*	S	09/23/07	10:45	X	X								X					
TA-Richland	DBSA-23-Q-30	F8A140153-002	F8A140153	S	09/23/07	10:45						X									
TA-Richland	DBSA-23-Q-30	F8A140153-007	F8A140153	S	09/23/07	10:45						X									
TA-Richland	DBSA-23-Q-30	F8B090161-010	F8B090161	S	09/23/07	10:45						X									
TA-Irvine	DBSA-23-Q-30	IQI2160-07	IQI2160	S	09/23/07	10:45														X	
TA-St. Louis	DBSA-23-Q-30 (FD)	F7I250260-010	DB092707*	S	09/23/07	10:45	X	X								X					
TA-Richland	DBSA-23-Q-30 (FD)	F7I250279-003	DB0927RD*	S	09/23/07	10:45						X									
TA-Richland	DBSA-23-Q-30 (FD)	F8A140153-008	F8A140153	S	09/23/07	10:45						X									
TA-Richland	DBSA-23-Q-30 (FD)	F8B090161-011	F8B090161	S	09/23/07	10:45						X									
TA-Irvine	DBSA-23-Q-30 (MS/MSD)	IQI2160-09	IQI2160	S	09/23/07	10:45														X	
TA-Irvine	DBSA-23-Q-30 (FD)	IQI2160-08	IQI2160	S	09/23/07	10:45														X	

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-St. Louis	DBSA-23-Q-40	F7I250260-011	DB092707*	S	09/23/07	11:15	X	X								X					
TA-Richland	DBSA-23-Q-40	F7I250279-004	DB0927RD*	S	09/23/07	11:15						X									
TA-Richland	DBSA-23-Q-40	F8A140153-009	F8A140153	S	09/23/07	11:15						X									
TA-Richland	DBSA-23-Q-40	F8B090161-012	F8B090161	S	09/23/07	11:15						X									
TA-Irvine	DBSA-23-Q-40	IQI2160-10	IQI2160	S	09/23/07	11:15														X	
TA-St. Louis	DBSA-23-Q-5	F7I250260-006	DB092707*	S	09/23/07	9:50								X							
TA-St. Louis	DBSA-23-Q-50	F7I250260-012	DB092707*	S	09/23/07	12:00	X	X								X					
TA-Richland	DBSA-23-Q-50	F7I250279-005	DB0927RD*	S	09/23/07	12:00						X									
TA-Richland	DBSA-23-Q-50	F8A140153-010	F8A140153	S	09/23/07	12:00						X									
TA-Richland	DBSA-23-Q-50	F8B090161-013	F8B090161	S	09/23/07	12:00						X									
TA-St. Louis	DBSA23-T-140	F7I270301-001	DB092707*	S	09/26/07	8:10	X	X							X	X					
TA-Richland	DBSA23-T-140	F7I270314-001	DB0927RD*	S	09/26/07	8:10						X									
TA-Richland	DBSA23-T-140	F8A140153-014	F8A140153	S	09/26/07	8:10						X									
TA-Richland	DBSA23-T-140	F8B090161-002	F8B090161	S	09/26/07	8:10						X									
TA-Irvine	DBSA23-T-140	IQI2439-01	IQI2439	S	09/26/07	8:10														X	
TA-St. Louis	DBSA23-T-150	F7I270301-002	DB092707*	S	09/26/07	8:40	X	X								X					
TA-Richland	DBSA23-T-150	F7I270314-002	DB0927RD*	S	09/26/07	8:40						X									
TA-Richland	DBSA23-T-150	F8A140153-015	F8A140153	S	09/26/07	8:40						X									
TA-Richland	DBSA23-T-150	F8B090161-003	F8B090161	S	09/26/07	8:40						X									
TA-Irvine	DBSA23-T-150	IQI2439-02	IQI2439	S	09/26/07	8:40														X	
TA-St. Louis	DBSA-23-TRIP BLANK	F7I250260-015	DB092707*	WQ	09/23/07	--								X							
TA-St. Louis	DBSA-26 TRIP BLANK	F7I250235-008	DB092507*	WQ	09/21/07	15:30								X							
TA-St. Louis	DBSA-26-Q-0	F7I250235-001	DB092507*	S	09/21/07	15:30					X					X					
TA-St. Louis	DBSA-26-Q-10	F7I250235-003	DB092507*	S	09/21/07	16:05								X		X					
TA-Irvine	DBSA-26-Q-100	IQI2147-09	IQI2147	S	09/22/07	10:25														X	
TA-Irvine	DBSA-26-Q-110	IQI2147-10	IQI2147	S	09/22/07	11:05														X	
TA-Richland	DBSA-26-Q-150	F7I250173-014	DB0925RD*	S	09/22/07	15:45						X									
TA-St. Louis	DBSA-26-Q-150	F7I250235-018	DB092507*	S	09/22/07	15:45	X	X								X					
TA-Richland	DBSA-26-Q-150	F8A140153-005	F8A140153	S	09/22/07	15:45						X									
TA-Irvine	DBSA-26-Q-150	IQI2160-04	IQI2160	S	09/22/07	15:45														X	
TA-St. Louis	DBSA-26-Q-160	F7I250235-019	DB092507*	S	09/22/07	16:20	X	X								X					
TA-Richland	DBSA-26-Q-20	F7I250173-001	DB0925RD*	S	09/21/07	16:40						X									
TA-St. Louis	DBSA-26-Q-20	F7I250235-004	DB092507*	S	09/21/07	16:40	X	X								X					
TA-Richland	DBSA-26-Q-20	F8B090161-015	F8B090161	S	09/21/07	16:40						X									

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Irvine	DBSA-26-Q-20	IQI2147-01	IQI2147	S	09/21/07	16:40														X	
TA-Richland	DBSA-26-Q-30	F7I250173-002	DB0925RD*	S	09/21/07	16:55						X									
TA-St. Louis	DBSA-26-Q-30	F7I250235-005	DB092507*	S	09/21/07	16:55	X	X								X					
TA-Richland	DBSA-23-Q-30	F7I250279-002	DB0927RD*	S	09/23/07	10:45						X									
TA-Richland	DBSA-26-Q-30	F8B090161-016	F8B090161	S	09/21/07	16:55						X									
TA-Irvine	DBSA-26-Q-30	IQI2147-02	IQI2147	S	09/21/07	16:55														X	
TA-Richland	DBSA-26-Q-40	F7I250173-003	DB0925RD*	S	09/21/07	17:30						X									
TA-St. Louis	DBSA-26-Q-40	F7I250235-006	DB092507*	S	09/21/07	17:30	X	X								X					
TA-Richland	DBSA-26-Q-40	F8A140153-003	F8A140153	S	09/21/07	17:30						X									
TA-Richland	DBSA-26-Q-40	F8B090161-017	F8B090161	S	09/21/07	17:30						X									
TA-Irvine	DBSA-26-Q-40	IQI2147-03	IQI2147	S	09/21/07	17:30														X	
TA-St. Louis	DBSA-26-Q-5	F7I250235-002	DB092507*	S	09/21/07	16:00								X		X					
TA-Richland	DBSA-26-Q-50	F7I250173-004	DB0925RD*	S	09/21/07	17:50						X									
TA-St. Louis	DBSA-26-Q-50	F7I250235-007	DB092507*	S	09/21/07	17:50	X	X								X					
TA-Richland	DBSA-26-Q-50	F8A140153-004	F8A140153	S	09/21/07	17:50						X									
TA-Richland	DBSA-26-Q-50	F8B090161-018	F8B090161	S	09/21/07	17:50						X									
TA-Irvine	DBSA-26-Q-50	IQI2147-04	IQI2147	S	09/21/07	17:50														X	
TA-Irvine	DBSA-26-Q-60	IQI2147-05	IQI2147	S	09/22/07	8:10														X	
TA-Irvine	DBSA-26-Q-70	IQI2147-06	IQI2147	S	09/22/07	8:40														X	
TA-Irvine	DBSA-26-Q-80	IQI2147-07	IQI2147	S	09/22/07	9:05														X	
TA-Irvine	DBSA-26-Q-90	IQI2147-08	IQI2147	S	09/22/07	10:00														X	
TA-St. Louis	DBSA-27-Q-0	F7H100305-001	DB081007*	S	08/09/07	7:50					X					X					
TA-St. Louis	DBSA-27-Q-10	F7H100305-004	DB081007*	S	08/09/07	9:00								X		X					
TA-St. Louis	DBSA-27-Q-10 (PP/GS)	F7H100305-003	DB081007*	S	08/09/07	9:00									X	X					
TA-St. Louis	DBSA-27-Q-20	F7H100305-005	DB081007*	S	08/09/07	9:20	X	X								X					
TA-Richland	DBSA-27-Q-20	F7H100325-001	DB0810RD*	S	08/09/07	9:20						X									
TA-Richland	DBSA-27-Q-20	F8A140148-005	F8A140148	S	08/09/07	9:20						X									
TA-Richland	DBSA-27-Q-20	F8B090161-019	F8B090161	S	08/09/07	9:20						X									
TA-Irvine	DBSA-27-Q-20	IQH1104-01	IQH1104	S	08/09/07	9:20														X	
TA-St. Louis	DBSA-27-Q-20 (FD)	F7H100305-006	DB081007*	S	08/09/07	9:20	X	X								X					
TA-Richland	DBSA-27-Q-20 (FD)	F7H100325-002	DB0810RD*	S	08/09/07	9:20						X									
TA-Richland	DBSA-27-Q-20 (FD)	F8A140148-006	F8A140148	S	08/09/07	9:20						X									
TA-Richland	DBSA-27-Q-20 (FD)	F8B090161-020	F8B090161	S	08/09/07	9:20						X									
TA-Irvine	DBSA-27-Q-20 (FD)	IQH1104-02	IQH1104	S	08/09/07	9:20														X	

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2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-St. Louis	DBSA-27-Q-30	F7H100305-007	DB081007*	S	08/09/07	9:55	X	X								X					
TA-Richland	DBSA-27-Q-30	F7H100325-003	DB0810RD*	S	08/09/07	9:55						X									
TA-Richland	DBSA-27-Q-30	F8A140148-007	F8A140148	S	08/09/07	9:55						X									
TA-Richland	DBSA-27-Q-30	F8B090162-001	F8B090162	S	08/09/07	9:55						X									
TA-Irvine	DBSA-27-Q-30	IQH1104-03	IQH1104	S	08/09/07	9:55														X	
TA-St. Louis	DBSA-27-Q-40	F7H100305-008	DB081007*	S	08/09/07	10:15	X	X								X					
TA-Richland	DBSA-27-Q-40	F7H100325-004	DB0810RD*	S	08/09/07	10:15						X									
TA-Richland	DBSA-27-Q-40	F8A140148-008	F8A140148	S	08/09/07	10:15						X									
TA-Richland	DBSA-27-Q-40	F8B090162-002	F8B090162	S	08/09/07	10:15						X									
TA-Irvine	DBSA-27-Q-40	IQH1104-04	IQH1104	S	08/09/07	10:15														X	
TA-St. Louis	DBSA-27-Q-5	F7H100305-002	DB081007*	S	08/09/07	8:15								X		X					
TA-St. Louis	DBSA-27-Q-50	F7H100305-009	DB081007*	S	08/09/07	11:00	X	X								X					
TA-Richland	DBSA-27-Q-50	F7H100325-005	DB0810RD*	S	08/09/07	11:00						X									
TA-Richland	DBSA-27-Q-50	F8A140148-009	F8A140148	S	08/09/07	11:00						X									
TA-Richland	DBSA-27-Q-50	F8B090162-003	F8B090162	S	08/09/07	11:00						X									
TA-Irvine	DBSA-27-Q-50	IQH1104-05	IQH1104	S	08/09/07	11:00														X	
TA-St. Louis	DBSA-27-Q-60	F7H140268-001	DB081607*	S	08/13/07	8:35	X	X								X					
TA-Richland	DBSA-27-Q-60	F7H140276-001	DB08016RD*	S	08/13/07	8:35						X									
TA-Richland	DBSA-27-Q-60	F8A140148-010	F8A140148	S	08/13/07	8:35						X									
TA-Richland	DBSA-27-Q-60	F8B090162-004	F8B090162	S	08/13/07	8:35						X									
TA-Irvine	DBSA-27-Q-60	IQH1410-01	IQH1410	S	08/13/07	8:35														X	
TA-St. Louis	DBSA-27-Q-70	F7H140268-002	DB081607*	S	08/13/07	9:00	X	X								X					
TA-Richland	DBSA-27-Q-70	F7H140276-002	DB08016RD*	S	08/13/07	9:00						X									
TA-Richland	DBSA-27-Q-70	F8A140148-011	F8A140148	S	08/13/07	9:00						X									
TA-Irvine	DBSA-27-Q-70	IQH1410-02	IQH1410	S	08/13/07	9:00														X	
TA-St. Louis	DBSA-27-Q-80	F7H140268-003	DB081607*	S	08/13/07	9:10	X	X								X					
TA-Richland	DBSA-27-Q-80	F7H140276-003	DB08016RD*	S	08/13/07	9:10						X									
TA-Richland	DBSA-27-Q-80	F8A140148-012	F8A140148	S	08/13/07	9:10						X									
TA-Irvine	DBSA-27-Q-80	IQH1410-03	IQH1410	S	08/13/07	9:10														X	
TA-St. Louis	DBSA-27-Q-90	F7H140268-004	DB081607*	S	08/13/07	9:35	X	X								X					
TA-Richland	DBSA-27-Q-90	F7H140276-004	DB08016RD*	S	08/13/07	9:35						X									
TA-Richland	DBSA-27-Q-90	F8A140148-013	F8A140148	S	08/13/07	9:35						X									
TA-Irvine	DBSA-27-Q-90	IQH1410-04	IQH1410	S	08/13/07	9:35														X	
TA-Irvine	DBSA-27-T-100	IQH1410-05	IQH1410	S	08/13/07	12:35														X	

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2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-St. Louis	DBSA-27-T-100	F7H140268-006	DB081607*	S	08/13/07	12:35	X	X								X					
TA-Richland	DBSA-27-T-100	F8A140148-014	F8A140148	S	08/13/07	12:35						X									
TA-Richland	DBSA-27-T-100 (MS/MSD)	F7H140276-005	DB08016RD*	S	08/13/07	12:35						X									
TA-St. Louis	DBSA-27-T-100 (PP/GS)	F7H140268-005	DB081607*	S	08/13/07	10:10									X						
TA-St. Louis	DBSA-29-A-160(FD)	F7I240171-022	DB092207*	S	09/21/07	8:10	X	X						X		X					
TA-Richland	DBSA-29-A-160(FD)	F7I240189-018	DB0922RD*	S	09/21/07	8:10						X									
TA-St. Louis	DBSA-29-GW	F7I240171-002	DB092207*	W	09/21/07	--	X	X	X	X	X		X	X							
TA-Richland	DBSA-29-GW	F7I240189-002	DB0922RD*	W	09/21/07	8:30						X									
Alpha	DBSA-29-GW	ERM07092429-01A	ERM07092429	W	09/21/07	8:30											X				
TA-Irvine	DBSA-29-GW	IQI2030-01	IQI2030	W	09/21/07	8:30												X			
TA-St. Louis	DBSA-29-Q-10	F7I240171-004	DB092207*	S	09/20/07	8:05								X		X					
TA-St. Louis	DBSA-29-Q-10-FD	F7I240171-005	DB092207*	S	09/20/07	8:05								X		X					
TA-St. Louis	DBSA-29-Q-150	F7I240171-020	DB092207*	S	09/21/07	7:40	X	X						X		X					
TA-Richland	DBSA-29-Q-150	F7I240189-016	DB0922RD*	S	09/21/07	7:40						X									
TA-Irvine	DBSA-29-Q-150	IQI2027-01	IQI2028	S	09/21/07	7:40														X	
TA-St. Louis	DBSA-29-Q-160	F7I240171-021	DB092207*	S	09/21/07	8:10	X	X						X		X					
TA-Richland	DBSA-29-Q-160	F7I240189-017	DB0922RD*	S	09/21/07	8:10						X									
TA-Irvine	DBSA-29-Q-160	IQI2027-02	IQI2028	S	09/21/07	8:10														X	
TA-Irvine	DBSA-29-Q-160 (FD)	IQI2027-03	IQI2028	S	09/21/07	8:10														X	
TA-St. Louis	DBSA-29-Q-20	F7I240171-007	DB092207*	S	09/20/07	8:35	X	X								X					
TA-Richland	DBSA-29-Q-20	F7I240189-003	DB0922RD*	S	09/20/07	8:35						X									
TA-Richland	DBSA-29-Q-20	F8A140150-014	F8A140150	S	09/20/07	8:35						X									
TA-Richland	DBSA-29-Q-20	F8B090162-005	F8B090162	S	09/20/07	8:35						X									
TA-Irvine	DBSA-29-Q-20	IQI2047-01	IQI2047	S	09/20/07	8:35														X	
TA-St. Louis	DBSA-29-Q-30	F7I240171-008	DB092207*	S	09/20/07	9:00	X	X								X					
TA-Richland	DBSA-29-Q-30	F7I240189-004	DB0922RD*	S	09/20/07	9:00						X									
TA-Richland	DBSA-29-Q-30	F8A140150-015	F8A140150	S	09/20/07	9:00						X									
TA-Richland	DBSA-29-Q-30	F8B090162-006	F8B090162	S	09/20/07	9:00						X									
TA-Irvine	DBSA-29-Q-30	IQI2047-02	IQI2047	S	09/20/07	9:00														X	
TA-St. Louis	DBSA-29-Q-40	F7I240171-009	DB092207*	S	09/20/07	9:30	X	X								X					
TA-Richland	DBSA-29-Q-40	F7I240189-005	DB0922RD*	S	09/20/07	9:30						X									
TA-Richland	DBSA-29-Q-40	F8A140150-016	F8A140150	S	09/20/07	9:30						X									
TA-Richland	DBSA-29-Q-40	F8B090162-007	F8B090162	S	09/20/07	9:30						X									
TA-Irvine	DBSA-29-Q-40	IQI2047-03	IQI2047	S	09/20/07	9:30														X	

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CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-St. Louis	DBSA-29-Q-5	F7I240171-003	DB092207*	S	09/20/07	8:00								X		X					
TA-St. Louis	DBSA-29-Q-50	F7I240171-010	DB092207*	S	09/20/07	9:55	X	X								X					
TA-Richland	DBSA-29-Q-50	F7I240189-006	DB0922RD*	S	09/20/07	9:55						X									
TA-Richland	DBSA-29-Q-50	F8A140150-017	F8A140150	S	09/20/07	9:55						X									
TA-Richland	DBSA-29-Q-50	F8B090162-008	F8B090162	S	09/20/07	9:55						X									
TA-Irvine	DBSA-29-Q-50	IQI2047-04	IQI2047	S	09/20/07	9:55														X	
TA-Irvine	DBSA-2B-Q-20	IQI2160-06	IQI2160	S	09/23/07	10:20														X	
TA-St. Louis	DBSA-2-Q-10	F7H080321-002	DB080807*	S	08/07/07	8:55							X	X							
TA-Irvine	DBSA-2-Q-10	IQH1019-02	IQH1019	S	08/07/07	8:55													X		
TA-St. Louis	DBSA-2-Q-20	F7H080321-003	DB080807*	S	08/07/07	9:45	X	X								X					
TA-Richland	DBSA-2-Q-20	F7H080330-001	DB0808RD*	S	08/07/07	9:45						X									
TA-Richland	DBSA-2-Q-20	F8A140146-009	F8A140146	S	08/07/07	9:45						X									
TA-Richland	DBSA-2-Q-20	F8B090162-009	F8B090162	S	08/07/07	9:45						X									
TA-Irvine	DBSA-2-Q-20	IQH1019-03	IQH1019	S	08/07/07	9:45														X	
TA-St. Louis	DBSA-2-Q-20 (FD)	F7H080321-004	DB080807*	S	08/07/07	9:45	X	X								X					
TA-Richland	DBSA-2-Q-20 (FD)	F7H080330-002	DB0808RD*	S	08/07/07	9:45						X									
TA-Richland	DBSA-2-Q-20 (FD)	F8A140146-010	F8A140146	S	08/07/07	9:45						X									
TA-Irvine	DBSA-2-Q-20 (FD)	IQH1019-04	IQH1019	S	08/07/07	9:45														X	
TA-Richland	DBSA-2-Q-20 (FD)	F8B090162-010	F8B090162	S	08/07/07	9:45						X									
TA-St. Louis	DBSA-2-Q-30	F7H080321-005	DB080807*	S	08/07/07	10:05	X	X								X					
TA-Richland	DBSA-2-Q-30	F7H080330-003	DB0808RD*	S	08/07/07	10:05						X									
TA-Richland	DBSA-2-Q-30	F8A140146-011	F8A140146	S	08/07/07	10:05						X									
TA-Richland	DBSA-2-Q-30	F8B090162-011	F8B090162	S	08/07/07	10:05						X									
TA-Irvine	DBSA-2-Q-30	IQH1019-05	IQH1019	S	08/07/07	10:05														X	
TA-St. Louis	DBSA-2-Q-40	F7H080321-006	DB080807*	S	08/07/07	10:55	X	X								X					
TA-Richland	DBSA-2-Q-40	F7H080330-004	DB0808RD*	S	08/07/07	10:55						X									
TA-Richland	DBSA-2-Q-40	F8A140146-012	F8A140146	S	08/07/07	10:55						X									
TA-Richland	DBSA-2-Q-40	F8B090162-012	F8B090162	S	08/07/07	10:55						X									
TA-Irvine	DBSA-2-Q-40	IQH1019-06	IQH1019	S	08/07/07	10:55														X	
TA-St. Louis	DBSA-2-Q-5	F7H080321-001	DB080807*	S	08/07/07	8:45							X	X							
TA-Irvine	DBSA-2-Q-5	IQH1019-01	IQH1019	S	08/07/07	8:45													X		
TA-St. Louis	DBSA-2-Q-50	F7H080321-007	DB080807*	S	08/07/07	11:15	X	X								X					
TA-Richland	DBSA-2-Q-50	F7H080330-005	DB0808RD*	S	08/07/07	11:15						X									
TA-Richland	DBSA-2-Q-50	F8A140146-013	F8A140146	S	08/07/07	11:15						X									

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Richland	DBSA-2-Q-50	F8B090162-013	F8B090162	S	08/07/07	11:15						X									
TA-Irvine	DBSA-2-Q-50	IQH1019-07	IQH1019	S	08/07/07	11:15														X	
TA-St. Louis	DBSA-2-Q-60	F7H080321-007	DB080807*	S	08/07/07	11:40	X	X								X					
TA-Richland	DBSA-2-Q-60	F7H080330-006	DB0808RD*	S	08/07/07	11:40						X									
TA-Richland	DBSA-2-Q-60	F8A140146-014	F8A140146	S	08/07/07	11:40						X									
TA-Richland	DBSA-2-Q-60	F8B090162-014	F8B090162	S	08/07/07	11:40						X									
TA-Irvine	DBSA-2-Q-60	IQH1019-08	IQH1019	S	08/07/07	11:40														X	
TA-St. Louis	DBSA-2-Q-70	F7H080321-010	DB080807*	S	08/07/07	12:00	X	X								X					
TA-Richland	DBSA-2-Q-70	F7H080330-008	DB0808RD*	S	08/07/07	12:00						X									
TA-Richland	DBSA-2-Q-70	F8A140146-015	F8A140146	S	08/07/07	12:00						X									
TA-Irvine	DBSA-2-Q-70	IQH1019-10	IQH1019	S	08/07/07	12:00														X	
TA-St. Louis	DBSA-2-Q-80	F7H080321-009	DB080807*	S	08/07/07	12:40	X	X								X					
TA-Richland	DBSA-2-Q-80	F7H080330-007	DB0808RD*	S	08/07/07	12:40						X									
TA-Richland	DBSA-2-Q-80	F8A140146-016	F8A140146	S	08/07/07	12:40						X									
TA-Irvine	DBSA-2-Q-80	IQH1019-09	IQH1019	S	08/07/07	12:40														X	
TA-St. Louis	DBSA-30-GW	F7I200305-015	DB092007*	W	09/19/07	7:30	X	X					X								
TA-Richland	DBSA-30-GW	F7I200323-012	DB0920RD*	W	09/19/07	7:30						X									
Alpha	DBSA-30-GW	ERM07092056-01A	ERM07092056	W	09/19/07	7:30											X				
TA-Irvine	DBSA-30-GW	IQI1772-01	IQI1772	W	09/19/07	7:30												X	X	X	X
TA-Irvine	DBSA-30-GW	IQI2028-02	IQI2028	W	09/21/07	8:30													X	X	X
TA-St. Louis	DBSA-30-Q-10	F7I190183-002	DB092007*	S	09/18/07	8:12								X		X					
TA-St. Louis	DBSA-30-Q-100	F7I200305-008	DB092007*	S	09/18/07	14:30															
TA-St. Louis	DBSA-30-Q-110	F7I200305-009	DB092007*	S	09/18/07	15:15															
TA-St. Louis	DBSA-30-Q-120	F7I200305-010	DB092007*	S	09/18/07	16:10															
TA-St. Louis	DBSA-30-Q-130	F7I200305-011	DB092007*	S	09/18/07	16:55	X	X													
TA-Richland	DBSA-30-Q-130	F7I200323-008	DB0920RD*	S	09/18/07	16:55						X									
TA-Richland	DBSA-30-Q-130	F8A140150-010	F8A140150	S	09/18/07	16:55						X									
TA-Irvine	DBSA-30-Q-130	IQI1801-05	IQI1801	S	09/18/07	16:55														X	
TA-St. Louis	DBSA-30-Q-140	F7I200305-012	DB092007*	S	09/19/07	9:35	X	X													
TA-Richland	DBSA-30-Q-140	F7I200323-009	DB0920RD*	S	09/19/07	9:35						X									
TA-Richland	DBSA-30-Q-140	F8A140150-011	F8A140150	S	09/19/07	9:35						X									
TA-Irvine	DBSA-30-Q-140	IQI1801-06	IQI1801	S	09/18/07	9:35														X	
TA-Richland	DBSA-30-Q-150	F8A140150-012	F8A140150	S	09/19/07	10:30						X									
TA-Richland	DBSA-30-Q-160	F8A140150-013	F8A140150	S	09/19/07	11:00						X									

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2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-St. Louis	DBSA-30-Q-20	F7I190183-003	DB092007*	S	09/18/07	8:50	X	X						X		X					
TA-Richland	DBSA-30-Q-20	F7I190249-001	DB0920RD*	S	09/18/07	8:50						X									
TA-Richland	DBSA-30-Q-20	F8A140150-003	F8A140150	S	09/18/07	8:50						X									
TA-Richland	DBSA-30-Q-20	F8B090162-015	F8B090162	S	09/18/07	8:50						X									
TA-Irvine	DBSA-30-Q-20	IQI1639-01	IQI1639	S	09/18/07	8:50														X	
TA-St. Louis	DBSA-30-Q-30	F7I190183-004	DB092007*	S	09/18/07	9:15	X	X								X					
TA-Richland	DBSA-30-Q-30	F7I190249-002	DB0920RD*	S	09/18/07	9:15						X									
TA-Richland	DBSA-30-Q-30	F8A140150-004	F8A140150	S	09/18/07	9:15						X									
TA-Richland	DBSA-30-Q-30	F8B090162-016	F8B090162	S	09/18/07	9:15						X									
TA-Irvine	DBSA-30-Q-30	IQI1639-02	IQI1639	S	09/18/07	9:15														X	
TA-St. Louis	DBSA-30-Q-40	F7I190183-005	DB092007*	S	09/18/07	9:40	X	X								X					
TA-Richland	DBSA-30-Q-40	F7I190249-003	DB0920RD*	S	09/18/07	9:40						X									
TA-Richland	DBSA-30-Q-40	F8A140150-005	F8A140150	S	09/18/07	9:40						X									
TA-Richland	DBSA-30-Q-40	F8B090162-017	F8B090162	S	09/18/07	9:40						X									
TA-Irvine	DBSA-30-Q-40	IQI1639-03	IQI1639	S	09/18/07	9:40														X	
TA-St. Louis	DBSA-30-Q-5	F7I190183-001	DB092007*	S	09/18/07	8:10								X		X					
TA-St. Louis	DBSA-30-Q-50	F7I190183-006	DB092007*	S	09/18/07	10:05	X	X								X					
TA-Richland	DBSA-30-Q-50	F7I190249-004	DB0920RD*	S	09/18/07	10:05						X									
TA-Richland	DBSA-30-Q-50	F8A140150-006	F8A140150	S	09/18/07	10:05						X									
TA-Richland	DBSA-30-Q-50	F8B090162-018	F8B090162	S	09/18/07	10:05						X									
TA-Irvine	DBSA-30-Q-50	IQI1639-04	IQI1639	S	09/18/07	10:05														X	
TA-St. Louis	DBSA-30-Q-90	F7I200305-007	DB092007*	S	09/18/07	12:40															
TA-St. Louis	DBSA-30-T-150	F7I200305-013	DB092007*	S	09/19/07	10:30	X	X													
TA-Richland	DBSA-30-T-150	F7I200323-010	DB0920RD*	S	09/19/07	10:30						X									
TA-Irvine	DBSA-30-T-150	IQI1801-07	IQI1801	S	09/18/07	10:30														X	
TA-St. Louis	DBSA-30-T-160	F7I200305-014	DB092007*	S	09/19/07	11:00	X	X													
TA-Richland	DBSA-30-T-160	F7I200323-011	DB0920RD*	S	09/19/07	11:00						X									
TA-Richland	DBSA-30-T-160	F8B090161-004	F8B090161	S	09/19/07	11:00						X									
TA-Irvine	DBSA-30-T-160	IQI1801-08	IQI1801	S	09/18/07	11:00														X	
TA-St. Louis	DBSA-32-GW	F7H150153-011	DB081607*	W	08/14/07	11:30	X	X	X	X			X	X							
TA-Richland	DBSA-32-GW	F7H150340-007	DB08016RD*	W	08/14/07	11:30						X									
Alpha	DBSA-32-GW	ERM07082029-01A	ERM07082029	W	08/14/07	11:30											X				
TA-Irvine	DBSA-32-GW	IQH1407-01	IQH1407	W	08/14/07	11:30												X	X	X	
TA-St. Louis	DBSA-32-Q-0	F7H150153-001	DB081607*	S	08/14/07	7:45					X					X					

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-St. Louis	DBSA-32-Q-10	F7H150153-004	DB081607*	S	08/14/07	8:30								X		X					
TA-St. Louis	DBSA-32-Q-20	F7H150153-005	DB081607*	S	08/14/07	8:50	X	X								X					
TA-Richland	DBSA-32-Q-20	F7H150340-001	DB08016RD*	S	08/14/07	8:50						X									
TA-Richland	DBSA-32-Q-20	F8A140148-015	F8A140148	S	08/14/07	8:50						X									
TA-Richland	DBSA-32-Q-20	F8B090162-019	F8B090162	S	08/14/07	8:50						X									
TA-Irvine	DBSA-32-Q-20	IQH1574-06	IQH1574	S	08/14/07	8:50														X	
TA-St. Louis	DBSA-32-Q-30	F7H150153-006	DB081607*	S	08/14/07	9:10	X	X								X					
TA-Richland	DBSA-32-Q-30	F7H150340-002	DB08016RD*	S	08/14/07	9:10						X									
TA-Richland	DBSA-32-Q-30	F8A140148-016	F8A140148	S	08/14/07	9:10						X									
TA-Richland	DBSA-32-Q-30	F8B090162-020	F8B090162	S	08/14/07	9:10						X									
TA-Irvine	DBSA-32-Q-30	IQH1574-07	IQH1574	S	08/14/07	9:10														X	
TA-St. Louis	DBSA-32-Q-40	F7H150153-007	DB081607*	S	08/14/07	9:30	X	X								X					
TA-Richland	DBSA-32-Q-40	F7H150340-003	DB08016RD*	S	08/14/07	9:30						X									
TA-Richland	DBSA-32-Q-40	F8A140148-017	F8A140148	S	08/14/07	9:30						X									
TA-Richland	DBSA-32-Q-40	F8B090163-001	F8B090163	S	08/14/07	9:30						X									
TA-Irvine	DBSA-32-Q-40	IQH1574-08	IQH1574	S	08/14/07	9:30														X	
TA-St. Louis	DBSA-32-Q-5	F7H150153-002	DB081607*	S	08/14/07	8:15								X		X					
TA-St. Louis	DBSA-32-Q-5(FD)	F7H150153-003	DB081607*	S	08/14/07	8:15								X		X					
TA-St. Louis	DBSA-32-Q-50	F7H150153-008	DB081607*	S	08/14/07	9:55	X	X								X					
TA-Richland	DBSA-32-Q-50	F7H150340-004	DB08016RD*	S	08/14/07	9:55						X									
TA-Richland	DBSA-32-Q-50	F8A140148-018	F8A140148	S	08/14/07	9:55						X									
TA-Richland	DBSA-32-Q-50	F8B090163-002	F8B090163	S	08/14/07	9:55						X									
TA-Irvine	DBSA-32-Q-50	IQH1574-01	IQH1574	S	08/14/07	9:55														X	
TA-St. Louis	DBSA-32-Q-60	F7H150153-009	DB081607*	S	08/14/07	10:30	X	X								X					
TA-Richland	DBSA-32-Q-60	F7H150340-005	DB08016RD*	S	08/14/07	10:30						X									
TA-Richland	DBSA-32-Q-60	F8A140148-019	F8A140148	S	08/14/07	10:30						X									
TA-Richland	DBSA-32-Q-60	F8B090163-003	F8B090163	S	08/14/07	10:30						X									
TA-Irvine	DBSA-32-Q-60	IQH1574-02	IQH1574	S	08/14/07	10:30														X	
TA-St. Louis	DBSA-32-Q-70	F7H150153-010	DB081607*	S	08/14/07	11:00	X	X								X					
TA-Richland	DBSA-32-Q-70	F7H150340-006	DB08016RD*	S	08/14/07	11:00						X									
TA-Richland	DBSA-32-Q-70	F8A140148-020	F8A140148	S	08/14/07	11:00						X									
TA-Irvine	DBSA-32-Q-70	IQH1574-03	IQH1574	S	08/14/07	11:00														X	
TA-St. Louis	DBSA-32-T-80	F7H150153-012	DB081607*	S	08/14/07	13:40	X	X								X					
TA-Richland	DBSA-32-T-80	F7H150340-008	DB08016RD*	S	08/14/07	13:40						X									

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CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Richland	DBSA-32-T-80	F8A140150-001	F8A140150	S	08/14/07	13:40						X									
TA-Richland	DBSA-32-T-80	F8B090161-005	F8B090161	S	08/14/07	13:40						X									
TA-Irvine	DBSA-32-T-80	IQH1574-04	IQH1574	S	08/14/07	13:40														X	
TA-St. Louis	DBSA-32-T-95	F7H150153-013	DB081607*	S	08/14/07	14:50	X	X								X					
TA-Richland	DBSA-32-T-95	F7H150340-009	DB08016RD*	S	08/14/07	14:50						X									
TA-Richland	DBSA-32-T-95	F8A140150-002	F8A140150	S	08/14/07	14:50						X									
TA-Richland	DBSA-32-T-95	F8B090161-006	F8B090161	S	08/14/07	14:50						X									
TA-Irvine	DBSA-32-T-95	IQH1574-05	IQH1574	S	08/14/07	14:50														X	
TA-St. Louis	DBSA-33-0	F7I200305-001	DB092007*	S	09/17/07	9:55					X					X					
TA-St. Louis	DBSA-33-10	F7I200305-003	DB092007*	S	09/17/07	15:10								X		X					
TA-St. Louis	DBSA-33-20	F7I200305-004	DB092007*	S	09/17/07	15:40	X	X								X					
TA-Richland	DBSA-33-20	F7I200323-001	DB0920RD*	S	09/17/07	15:40						X									
TA-Richland	DBSA-33-20	F8A140150-007	F8A140150	S	09/17/07	15:40						X									
TA-Richland	DBSA-33-20	F8B090163-004	F8B090163	S	09/17/07	15:40						X									
TA-Irvine	DBSA-33-20	IQI1682-01	IQI1682	S	09/17/07	15:40														X	
TA-St. Louis	DBSA-33-20 (FD)	F7I200305-005	DB092007*	S	09/17/07	15:40	X	X								X					
TA-Richland	DBSA-33-20 (FD)	F7I200323-002	DB0920RD*	S	09/17/07	15:40						X									
TA-Richland	DBSA-33-20 (FD)	F8A140150-008	F8A140150	S	09/17/07	15:40						X									
TA-Richland	DBSA-33-20 (FD)	F8B090163-005	F8B090163	S	09/17/07	15:40						X									
TA-Irvine	DBSA-33-20 (FD)	IQI1682-02	IQI1682	S	09/17/07	15:40														X	
TA-St. Louis	DBSA-33-5	F7I200305-002	DB092007*	S	09/17/07	15:05								X		X					
TA-St. Louis	DBSA-33-T-30	F7I200305-006	DB092007*	S	09/17/07	16:05	X	X								X					
TA-Richland	DBSA-33-T-30	F7I200323-003	DB0920RD*	S	09/17/07	16:05						X									
TA-Richland	DBSA-33-T-30	F8A140150-009	F8A140150	S	09/17/07	16:05						X									
TA-Richland	DBSA-33-T-30	F8B090161-007	F8B090161	S	09/17/07	16:05						X									
TA-Irvine	DBSA-33-T-30	IQI1682-03	IQI1682	S	09/17/07	16:05														X	
TA-St. Louis	DBSA-3-Q-10	F7H090308-002	DB081007*	S	08/08/07	8:10								X		X					
TA-St. Louis	DBSA-3-Q-20	F7H090308-003	DB081007*	S	08/08/07	9:00	X	X								X					
TA-Richland	DBSA-3-Q-20	F7H090316-001	DB0810RD*	S	08/08/07	9:00						X									
TA-Richland	DBSA-3-Q-20	F8A140146-017	F8A140146	S	08/08/07	9:00						X									
TA-Richland	DBSA-3-Q-20	F8B090163-006	F8B090163	S	08/08/07	9:00						X									
TA-Irvine	DBSA-3-Q-20	IQH1005-01	IQH1005	S	08/08/07	9:00														X	
TA-St. Louis	DBSA-3-Q-20 (FD)	F7H090308-004	DB081007*	S	08/08/07	9:00	X	X								X					
TA-Richland	DBSA-3-Q-20 (FD)	F7H090316-002	DB0810RD*	S	08/08/07	9:00						X									

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Richland	DBSA-3-Q-20 (FD)	F8A140146-018	F8A140146	S	08/08/07	9:00						X									
TA-Richland	DBSA-3-Q-20 (FD)	F8B090163-007	F8B090163	S	08/08/07	9:00						X									
TA-Irvine	DBSA-3-Q-20 (FD)	IQH1005-02	IQH1005	S	08/08/07	9:00														X	
TA-St. Louis	DBSA-3-Q-30	F7H090308-005	DB081007*	S	08/08/07	9:15	X	X								X					
TA-Richland	DBSA-3-Q-30	F7H090316-003	DB0810RD*	S	08/08/07	9:15						X									
TA-Richland	DBSA-3-Q-30	F8A140146-019	F8A140146	S	08/08/07	9:15						X									
TA-Richland	DBSA-3-Q-30	F8B090163-008	F8B090163	S	08/08/07	9:15						X									
TA-Irvine	DBSA-3-Q-30	IQH1005-03	IQH1005	S	08/08/07	9:15														X	
TA-St. Louis	DBSA-3-Q-40	F7H090308-006	DB081007*	S	08/08/07	9:30	X	X								X					
TA-Richland	DBSA-3-Q-40	F7H090316-004	DB0810RD*	S	08/08/07	9:30						X									
TA-Richland	DBSA-3-Q-40	F8A140146-020	F8A140146	S	08/08/07	9:30						X									
TA-Richland	DBSA-3-Q-40	F8B090163-009	F8B090163	S	08/08/07	9:30						X									
TA-Irvine	DBSA-3-Q-40	IQH1005-04	IQH1005	S	08/08/07	9:30														X	
TA-St. Louis	DBSA-3-Q-5	F7H090308-001	DB081007*	S	08/08/07	7:50								X		X					
TA-St. Louis	DBSA-3-Q-50	F7H090308-007	DB081007*	S	08/08/07	9:45	X	X								X					
TA-Richland	DBSA-3-Q-50	F7H090316-005	DB0810RD*	S	08/08/07	9:45						X									
TA-Richland	DBSA-3-Q-50	F8A140148-001	F8A140148	S	08/08/07	9:45						X									
TA-Richland	DBSA-3-Q-50	F8B090163-010	F8B090163	S	08/08/07	9:45						X									
TA-Irvine	DBSA-3-Q-50	IQH1005-05	IQH1005	S	08/08/07	9:45														X	
TA-St. Louis	DBSA-3-Q-60	F7H090308-008	DB081007*	S	08/08/07	10:00	X	X								X					
TA-Richland	DBSA-3-Q-60	F7H090316-006	DB0810RD*	S	08/08/07	10:00						X									
TA-Richland	DBSA-3-Q-60	F8A140148-002	F8A140148	S	08/08/07	10:00						X									
TA-Richland	DBSA-3-Q-60	F8B090163-011	F8B090163	S	08/08/07	10:00						X									
TA-Irvine	DBSA-3-Q-60	IQH1005-06	IQH1005	S	08/08/07	10:00														X	
TA-St. Louis	DBSA-3-Q-70	F7H090308-009	DB081007*	S	08/08/07	10:20	X	X								X					
TA-Richland	DBSA-3-Q-70	F7H090316-007	DB0810RD*	S	08/08/07	10:20						X									
TA-Richland	DBSA-3-Q-70	F8A140148-003	F8A140148	S	08/08/07	10:20						X									
TA-Irvine	DBSA-3-Q-70	IQH1005-07	IQH1005	S	08/08/07	10:20														X	
TA-St. Louis	DBSA-3-Q-80	F7H090308-010	DB081007*	S	08/08/07	10:40	X	X								X					
TA-Richland	DBSA-3-Q-80	F7H090316-008	DB0810RD*	S	08/08/07	10:40						X									
TA-Richland	DBSA-3-Q-80	F8A140148-004	F8A140148	S	08/08/07	10:40						X									
TA-Irvine	DBSA-3-Q-80	IQH1005-08	IQH1005	S	08/08/07	10:40														X	
TA-St. Louis	DBSA-4-Q-10	F7J230236-003	DB102307*	S	10/19/07	16:10								X	X	X					
TA-St. Louis	DBSA-4-Q-20	F7J230236-004	DB102307*	S	10/19/07	16:30	X	X								X					

TABLE D-1
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2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Richland	DBSA-4-Q-20	F7J230250-001	DB1023RD*	S	10/19/07	16:30						X									
TA-Richland	DBSA-4-Q-20	F8A150224-018	F8A150224	S	10/19/07	16:30						X									
TA-Richland	DBSA-4-Q-20	F8B090163-012	F8B090163	S	10/19/07	16:30						X									
TA-Irvine	DBSA-4-Q-20	IQJ2384-01	IQJ2384	S	10/19/07	16:30														X	
TA-St. Louis	DBSA-4-Q-20-FD	F7J230236-005	DB102307*	S	10/19/07	16:30	X	X								X					
TA-Richland	DBSA-4-Q-20-FD	F7J230250-002	DB1023RD*	S	10/19/07	16:30						X									
TA-Richland	DBSA-4-Q-20-FD	F8A150224-019	F8A150224	S	10/19/07	16:30						X									
TA-Richland	DBSA-4-Q-20-FD	F8B090163-013	F8B090163	S	10/19/07	16:30						X									
TA-Irvine	DBSA-4-Q-20-FD	IQJ2384-02	IQJ2384	S	10/19/07	16:30														X	
TA-St. Louis	DBSA-4-Q-30	F7J230236-006	DB102307*	S	10/19/07	16:45	X	X								X					
TA-Richland	DBSA-4-Q-30	F7J230250-003	DB1023RD*	S	10/19/07	16:45						X									
TA-Richland	DBSA-4-Q-30	F8A150224-020	F8A150224	S	10/19/07	16:45						X									
TA-Richland	DBSA-4-Q-30	F8B090163-014	F8B090163	S	10/19/07	16:45						X									
TA-Irvine	DBSA-4-Q-30	IQJ2384-03	IQJ2384	S	10/19/07	16:45														X	
TA-St. Louis	DBSA-4-Q-40	F7J230236-007	DB102307*	S	10/19/07	17:00	X	X								X					
TA-Richland	DBSA-4-Q-40	F7J230250-004	DB1023RD*	S	10/19/07	17:00						X									
TA-Richland	DBSA-4-Q-40	F8A150237-001	F8A150237	S	10/19/07	17:00						X									
TA-Richland	DBSA-4-Q-40	F8B090163-015	F8B090163	S	10/19/07	17:00						X									
TA-Irvine	DBSA-4-Q-40	IQJ2384-04	IQJ2384	S	10/19/07	17:00														X	
TA-St. Louis	DBSA-4-Q-5	F7J230236-002	DB102307*	S	10/19/07	16:05								X		X					
TA-St. Louis	DBSA-4-Q-50	F7J230236-008	DB102307*	S	10/19/07	17:30	X	X								X					
TA-Richland	DBSA-4-Q-50	F7J230250-005	DB1023RD*	S	10/19/07	17:30						X									
TA-Richland	DBSA-4-Q-50	F8A150237-002	F8A150237	S	10/19/07	17:30						X									
TA-Richland	DBSA-4-Q-50	F8B090163-016	F8B090163	S	10/19/07	17:30						X									
TA-Irvine	DBSA-4-Q-50	IQJ2384-05	IQJ2384	S	10/19/07	17:30														X	
TA-St. Louis	DBSA-4-Q-50-FD	F7J230236-009	DB102307*	S	10/19/07	17:30	X	X								X					
TA-Richland	DBSA-4-Q-50-FD	F7J230250-006	DB1023RD*	S	10/19/07	17:30						X									
TA-Richland	DBSA-4-Q-50-FD	F8A150237-003	F8A150237	S	10/19/07	17:30						X									
TA-Richland	DBSA-4-Q-50-FD	F8B090163-017	F8B090163	S	10/19/07	17:30						X									
TA-Irvine	DBSA-4-Q-50-FD	IQJ2384-06	IQJ2384	S	10/19/07	17:30														X	
TA-St. Louis	DBSA-8-Q-10	F7J190206-003	DB101907*	S	10/17/07	14:00								X	X	X					
TA-St. Louis	DBSA-8-Q-20	F7J190206-004	DB101907*	S	10/17/07	14:30	X	X								X					
TA-Richland	DBSA-8-Q-20	F7J190236-001	DB1019RD*	S	10/17/07	14:30						X									
TA-Richland	DBSA-8-Q-20	F8A150224-003	F8A150224	S	10/17/07	14:30						X									

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CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Richland	DBSA-8-Q-20	F8B090163-018	F8B090163	S	10/17/07	14:30						X									
TA-Irvine	DBSA-8-Q-20	IQJ2192-01	IQJ2192	S	10/17/07	14:30														X	
TA-St. Louis	DBSA-8-Q-20-FD	F7J190206-005	DB101907*	S	10/17/07	14:30	X	X								X					
TA-Richland	DBSA-8-Q-20-FD	F7J190236-002	DB1019RD*	S	10/17/07	14:30						X									
TA-Richland	DBSA-8-Q-20-FD	F8A150224-004	F8A150224	S	10/17/07	14:30						X									
TA-Richland	DBSA-8-Q-20-FD	F8B090163-019	F8B090163	S	10/17/07	14:30						X									
TA-Irvine	DBSA-8-Q-20-FD	IQJ2192-02	IQJ2192	S	10/17/07	14:30														X	
TA-St. Louis	DBSA-8-Q-30	F7J190206-006	DB101907*	S	10/17/07	14:50	X	X								X					
TA-Richland	DBSA-8-Q-30	F7J190236-003	DB1019RD*	S	10/17/07	14:50						X									
TA-Richland	DBSA-8-Q-30	F8A150224-005	F8A150224	S	10/17/07	14:50						X									
TA-Richland	DBSA-8-Q-30	F8B090163-020	F8B090163	S	10/17/07	14:50						X									
TA-Irvine	DBSA-8-Q-30	IQJ2192-03	IQJ2192	S	10/17/07	14:50														X	
TA-St. Louis	DBSA-8-Q-40	F7J190206-007	DB101907*	S	10/17/07	15:15	X	X								X					
TA-Richland	DBSA-8-Q-40	F7J190236-004	DB1019RD*	S	10/17/07	15:15						X									
TA-Richland	DBSA-8-Q-40	F8A150224-006	F8A150224	S	10/17/07	15:15						X									
TA-Richland	DBSA-8-Q-40	F8B0910165-001	F8B090165	S	10/17/07	15:15						X									
TA-Irvine	DBSA-8-Q-40	IQJ2192-04	IQJ2192	S	10/17/07	15:15														X	
TA-St. Louis	DBSA-8-Q-5	F7J190206-002	DB101907*	S	10/17/07	13:50								X		X					
TA-St. Louis	DBSA-8-Q-50	F7J190206-008	DB101907*	S	10/17/07	15:40	X	X								X					
TA-Richland	DBSA-8-Q-50	F7J190236-005	DB1019RD*	S	10/17/07	15:40						X									
TA-Richland	DBSA-8-Q-50	F8A150224-007	F8A150224	S	10/17/07	15:40						X									
TA-Richland	DBSA-8-Q-50	F8B0910165-002	F8B090165	S	10/17/07	15:40						X									
TA-Irvine	DBSA-8-Q-50	IQJ2192-05	IQJ2192	S	10/17/07	15:40														X	
TA-St. Louis	DBSA-8-Q-50-FD	F7J190206-009	DB101907*	S	10/17/07	15:40	X	X								X					
TA-Richland	DBSA-8-Q-50-FD	F7J190236-006	DB1019RD*	S	10/17/07	15:40						X									
TA-Richland	DBSA-8-Q-50-FD	F8A150224-008	F8A150224	S	10/17/07	15:40						X									
TA-Richland	DBSA-8-Q-50-FD	F8B0910165-003	F8B090165	S	10/17/07	15:40						X									
TA-Irvine	DBSA-8-Q-50-FD	IQJ2192-06	IQJ2192	S	10/17/07	15:40														X	
TA-St. Louis	DBSA-9-Q-10	F7J170181-004	DB101707*	S	10/15/07	8:00								X		X					
TA-Irvine	DBSA-9-Q-160	IQJ1813-18	IQJ1813	S	10/15/07	7:50														X	
TA-St. Louis	DBSA-9-Q-20	F7J170181-005	DB101707*	S	10/15/07	8:30	X	X								X					
TA-Richland	DBSA-9-Q-20	F7J170219-002	DB1017RD*	S	10/15/07	8:30						X									
TA-Richland	DBSA-9-Q-20	F8A150214-010	F8A150214	S	10/15/07	8:30						X									
TA-Richland	DBSA-9-Q-20	F8B0910165-004	F8B090165	S	10/15/07	8:30						X									

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LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-Irvine	DBSA-9-Q-20	IQJ1813-01	IQJ1813	S	10/15/07	8:30														X	
TA-St. Louis	DBSA-9-Q-20-FD	F7J170181-006	DB101707*	S	10/15/07	8:30	X	X								X					
TA-Richland	DBSA-9-Q-20-FD	F7J170219-003	DB1017RD*	S	10/15/07	8:30						X									
TA-Richland	DBSA-9-Q-20-FD	F8A150214-011	F8A150214	S	10/15/07	8:30						X									
TA-Richland	DBSA-9-Q-20-FD	F8B0910165-005	F8B090165	S	10/15/07	8:30						X									
TA-Irvine	DBSA-9-Q-20-FD	IQJ1813-02	IQJ1813	S	10/15/07	8:30														X	
TA-St. Louis	DBSA-9-Q-30	F7J170181-007	DB101707*	S	10/15/07	9:15	X	X								X					
TA-Richland	DBSA-9-Q-30	F7J170219-004	DB1017RD*	S	10/15/07	9:15						X									
TA-Richland	DBSA-9-Q-30	F8A150214-012	F8A150214	S	10/15/07	9:15						X									
TA-Richland	DBSA-9-Q-30	F8B0910165-006	F8B090165	S	10/15/07	9:15						X									
TA-Irvine	DBSA-9-Q-30	IQJ1813-03	IQJ1813	S	10/15/07	9:15														X	
TA-St. Louis	DBSA-9-Q-40	F7J170181-008	DB101707*	S	10/15/07	9:35	X	X								X					
TA-Richland	DBSA-9-Q-40	F7J170219-005	DB1017RD*	S	10/15/07	9:35						X									
TA-Richland	DBSA-9-Q-40	F8A150214-013	F8A150214	S	10/15/07	9:35						X									
TA-Richland	DBSA-9-Q-40	F8B0910165-007	F8B090165	S	10/15/07	9:35						X									
TA-Irvine	DBSA-9-Q-40	IQJ1813-04	IQJ1813	S	10/15/07	9:35														X	
TA-St. Louis	DBSA-9-Q-5	F7J170181-003	DB101707*	S	10/15/07	7:55								X		X					
TA-St. Louis	DBSA-9-Q-50	F7J170181-009	DB101707*	S	10/15/07	9:55	X	X								X					
TA-Richland	DBSA-9-Q-50	F7J170219-006	DB1017RD*	S	10/15/07	9:55						X									
TA-Richland	DBSA-9-Q-50	F8A150214-014	F8A150214	S	10/15/07	9:55						X									
TA-Richland	DBSA-9-Q-50	F8B0910165-008	F8B090165	S	10/15/07	9:55						X									
TA-Irvine	DBSA-9-Q-50	IQJ1813-05	IQJ1813	S	10/15/07	9:55														X	
TA-St. Louis	DBSA-9-Q-50-FD	F7J170181-010	DB101707*	S	10/15/07	9:55	X	X								X					
TA-Richland	DBSA-9-Q-50-FD	F7J170219-007	DB1017RD*	S	10/15/07	9:55						X									
TA-Richland	DBSA-9-Q-50-FD	F8A150214-015	F8A150214	S	10/15/07	9:55						X									
TA-Richland	DBSA-9-Q-50-FD	F8B0910165-009	F8B090165	S	10/15/07	9:55						X									
TA-Irvine	DBSA-9-Q-50-FD	IQJ1813-06	IQJ1813	S	10/15/07	9:55														X	
TA-St. Louis	DBSA-9-T-160	F7J170181-022	DB101707*	S	10/16/07	7:50	X	X								X					
TA-Richland	DBSA-9-T-160	F7J170219-019	DB1017RD*	S	10/16/07	7:50						X									
TA-Richland	DBSA-9-T-160	F8A150214-016	F8A150214	S	10/16/07	7:50						X									
TA-Richland	DBSA-9-T-160	F8B090161-008	F8B090161	S	10/16/07	7:50						X									
TA-Irvine	RINSATE 3	IQH1543-01	IQH1543	WQ	08/15/07	14:00														X	
TA-Richland	RINSATE 3	F7H160221-001	DB08016RD*	WQ	08/15/07	14:00						X									
TA-St. Louis	RINSATE 3	F7H160211-001	DB081607*	WQ	08/15/07	14:00	X	X						X							

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TA-St. Louis	RINSATE 3	F7I190183-010	DB092007*	WQ	09/18/07	12:10	X	X						X							
TA-Richland	RINSATE 3	F7I190249-008	DB0920RD*	WQ	09/18/07	12:10						X									
TA-Irvine	RINSATE 3	IQI1639-08	IQI1639	WQ	09/18/07	12:10														X	
TA-St. Louis	RINSATE 4	F7I240171-001	DB092207*	WQ	09/21/07	--	X	X						X							
TA-Richland	RINSATE 4	F7I240189-001	DB0922RD*	WQ	09/21/07	7:20						X									
TA-Irvine	RINSATE 4	IQI2028-01	IQI2028	WQ	09/21/07	7:20														X	
TA-St. Louis	RINSATE 5	F7I250260-016	DB092707*	WQ	09/24/07	9:00	X	X			X										
TA-Richland	RINSATE 5	F7I250279-008	DB0927RD*	WQ	09/24/07	9:00						X									
TA-Irvine	RINSATE 5	IQI2147-11	IQI2147	WQ	09/24/07	9:00														X	
TA-St. Louis	RINSATE 6	F7J100176-012	DB101007*	WQ	10/08/07	7:45	X	X													
TA-Richland	RINSATE 6	F7J100192-012	DB1010RD*	WQ	10/08/07	7:45						X									
TA-Irvine	RINSATE 6	IQJ1059-01	IQJ1059	WQ	10/09/07	7:45														X	
TA-St. Louis	RINSATE 7	F7J170181-001	DB101707*	WQ	10/16/07	10:30	X	X	X						X						
TA-Richland	RINSATE 7	F7J170219-001	DB1017RD*	WQ	10/16/07	10:30						X									
TA-St. Louis	RINSATE 8	F7J190206-015	DB101907*	WQ	10/18/07	5:00	X	X	X												
TA-Richland	RINSATE 8	F7J190236-012	DB1019RD*	WQ	10/18/07	5:00						X									
TA-St. Louis	RINSATE-1-8-6-07	F7H070367-006	DB080807*	WQ	08/06/07	12:00	X	X			X		X	X							
TA-Richland	RINSATE-1-8-6-07	F7H070375-003	DB0808RD*	WQ	08/06/07	12:00						X									
TA-Irvine	RINSATE-1-8-6-07	IQH1020-06	IQH1020	WQ	08/06/07	12:00													X		
TA-St. Louis	RINSATE-2-8-8-07	F7H090308-011	DB081007*	WQ	08/08/07	11:30	X	X			X			X							
TA-Richland	RINSATE-2-8-8-07	F7H090316-009	DB0810RD*	WQ	08/08/07	11:30						X									
TA-Irvine	RINSATE-7	IQJ1772-01	IQJ1772	W	10/16/07	10:30														X	
TA-Irvine	RINSATE-8	IQJ2098-01	IQJ2098	W	10/18/07	5:00														X	
TA-St. Louis	TRIP BLANK	F7H070367-013	DB080807*	WQ	08/06/07	--								X							
TA-St. Louis	TRIP BLANK	F7H080321-011	DB080807*	WQ	08/07/07	--								X							
TA-St. Louis	TRIP BLANK	F7H090308-012	DB081007*	WQ	08/08/07	--								X							
TA-St. Louis	TRIP BLANK	F7H150153-014	DB081607*	WQ	08/14/07	--								X							
TA-St. Louis	TRIP BLANK	F7H160211-002	DB081607*	WQ	08/15/07	--								X							
TA-St. Louis	TRIP BLANK	F7I190183-011	DB092007*	WQ	09/18/07	--								X							
TA-St. Louis	TRIP BLANK	F7I240171-006	DB092207*	WQ	09/20/07	--								X							
TA-St. Louis	TRIP BLANK	F7J040245-014	DB100507*	WQ	10/02/07	--								X							
TA-St. Louis	TRIP BLANK	F7J060109-006	DB100807*	WQ	10/04/07	17:55								X							
TA-St. Louis	TRIP BLANK	F7J170181-002	DB101707*	WQ	10/15/07	7:45								X							
TA-St. Louis	TRIP BLANK	F7J180242-001	DB101807*	WQ	10/16/07	13:00								X							

TABLE D-1
DETAILED SAMPLE ANALYSIS SUMMARY TABLE
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

LAB	Field Sample ID	Lab Sample ID	SDG	MATRIX	SAMPLE DATE	SAMPLE TIME	Cyanide	Sulfide	Dissolved Gases	OP Pesticides	OCPs	Radionuclides	SVOCs	VOCs	Physical Parameters	Percent Moisture	Organic Acids	Aldehydes	Dichlorobenzil	Hexavalent Chromium	Chlorite
TA-St. Louis	TRIP BLANK	F7J190206-001	DB101907*	WQ	10/17/07	13:30								X							
TA-St. Louis	TRIP BLANK	F7J200153-001	DB102007*	WQ	10/18/07	15:00								X							
TA-St. Louis	TRIP BLANK	F7J230236-001	DB102307*	WQ	10/19/07	15:55								X							
TA-Irvine	TRIP BLANK	IQI2030-02	IQI2030	WQ	09/21/07	--												X			
TA-St. Louis	TRIP BLANK 1	F7J040245-015	DB100507*	WQ	10/02/07	--								X							
TA-St. Louis	TRIP BLANK FOR DBSA-11	F7J090254-001	DB100907*	WQ	10/07/07	15:55								X							
TA-St. Louis	TRIP BLANK FOR DBSA-15 SOILS	F7J090244-001	DB100907*	WQ	10/06/07	10:00								X							
TA-St. Louis	TRIP BLANK FOR DBSA-17-GW	F7J090279-014	DB100807*	WQ	10/05/07	--								X							
TA-St. Louis	TRIP BLANK SOIL	F7J050251-013	DB100507*	WQ	10/03/07	13:50								X							
TA-St. Louis	TRIP BLANK SOIL	F7J110226-001	DB101107*	WQ	10/09/07	9:50								X							
TA-St. Louis	TRIP BLANK W/RINSATE	F7I200305-016	DB092007*	WQ	09/18/07	--				X	X			X							
TA-St. Louis	TRIP BLANK WATER	F7J050251-015	DB100507*	WQ	10/04/07	10:00								X							
TA-St. Louis	TRIP BLANK WITH DBSA-33-0	F7I200305-017	DB092007*	WQ	09/18/07	--								X							
TA-St. Louis	TRIP BLANK WITH DBSA-33-Q-90	F7I200305-018	DB092007*	WQ	09/18/07	--								X							

Notes:
*- TA-St. Louis references SDGs as "DB(date)RD" and "DB(date)"
NH3- Ammonia
TKN-Total Kjeldahl Nitrogen
SVOCs - Semivolatile Organic Compounds
TOC- Total Organic Carbon
OCPs- Organochlorine Pesticides
SVOCs - Semivolatile Organic Compounds
VOCs - Volatile Organic Compounds
S-Soil
WQ - Water quality
DUP- Duplicate
FD- Field duplicate

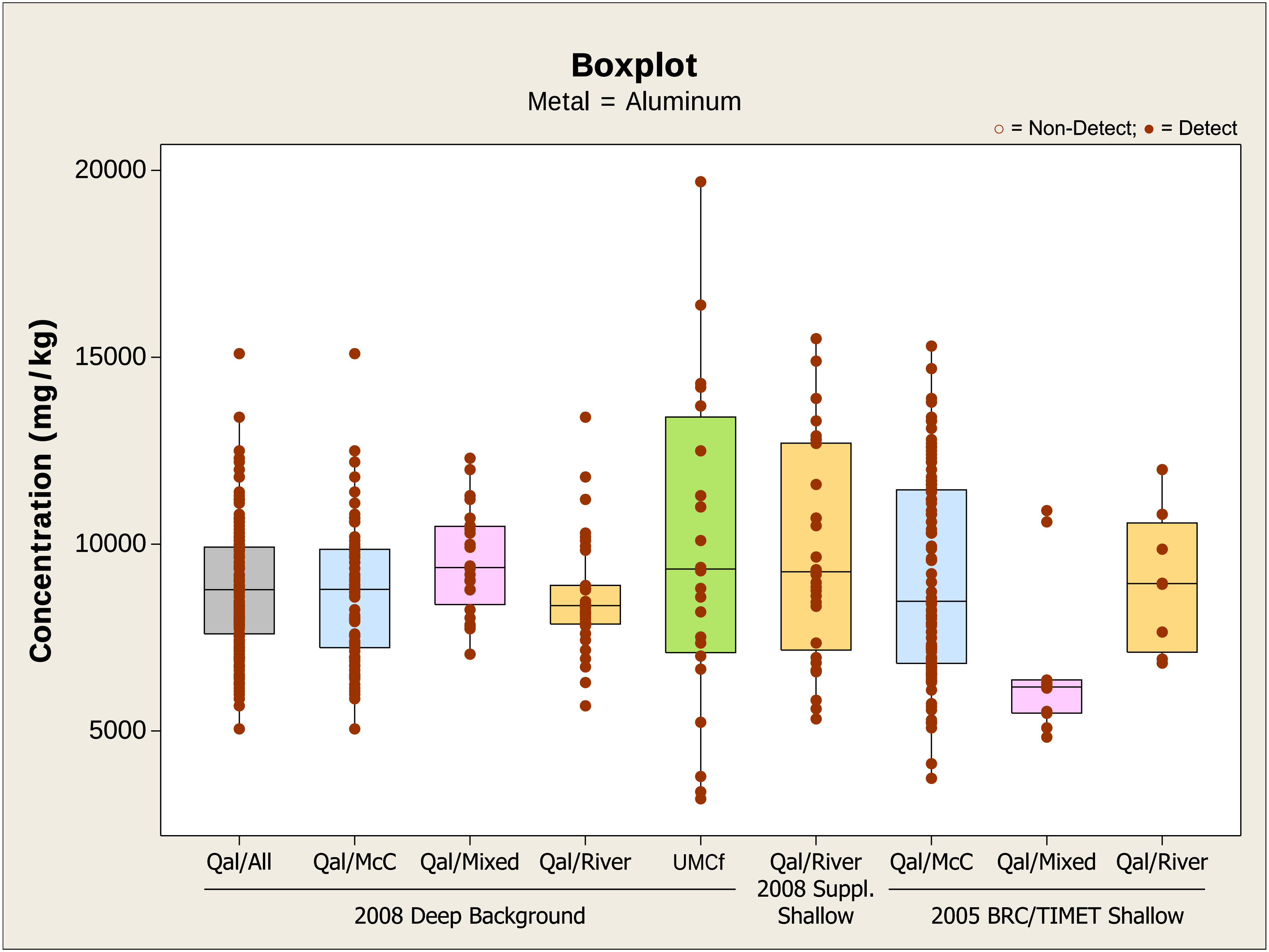
APPENDIX E

DATA USABILITY TABLES (ON CD)

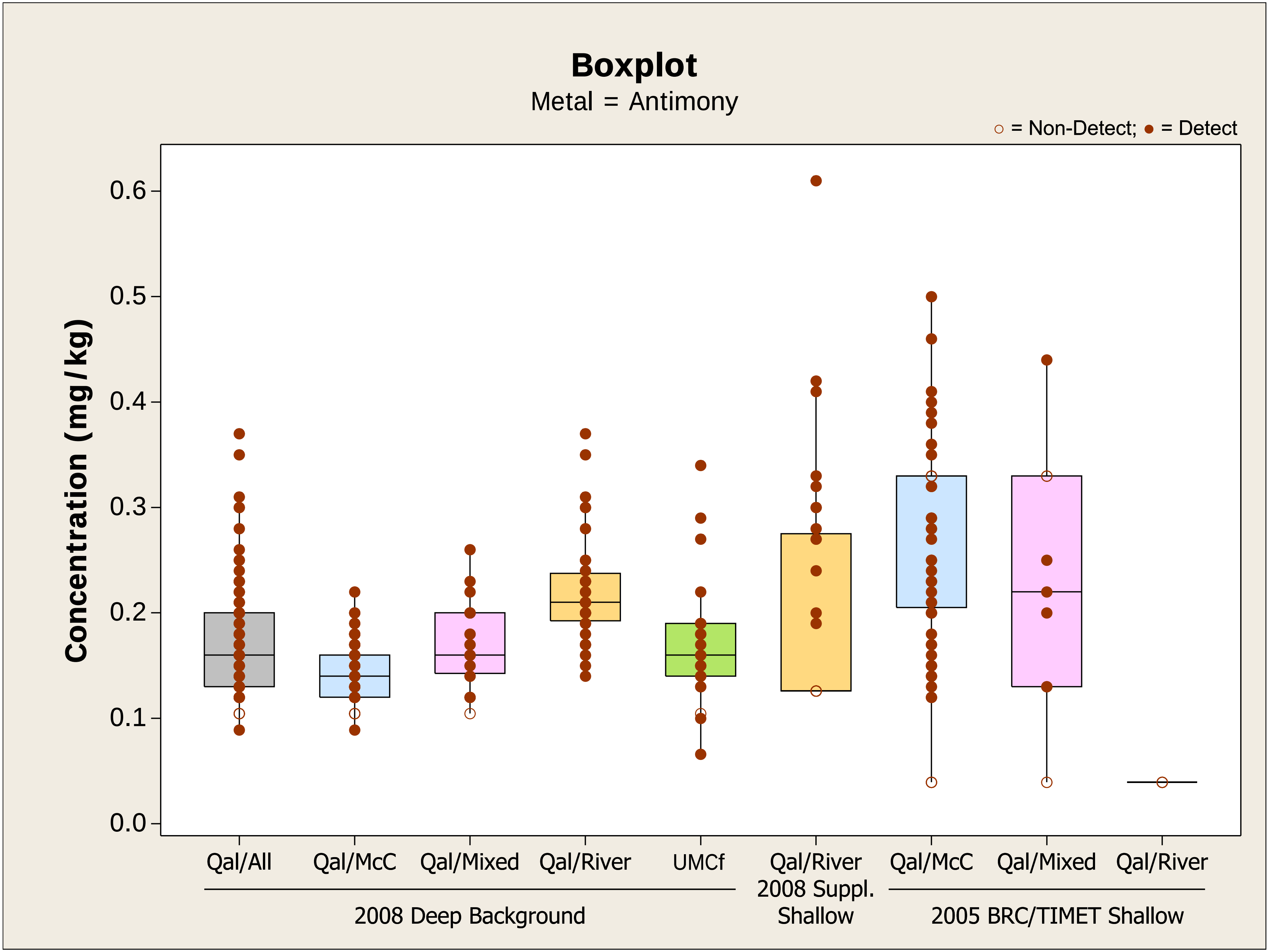
APPENDIX F

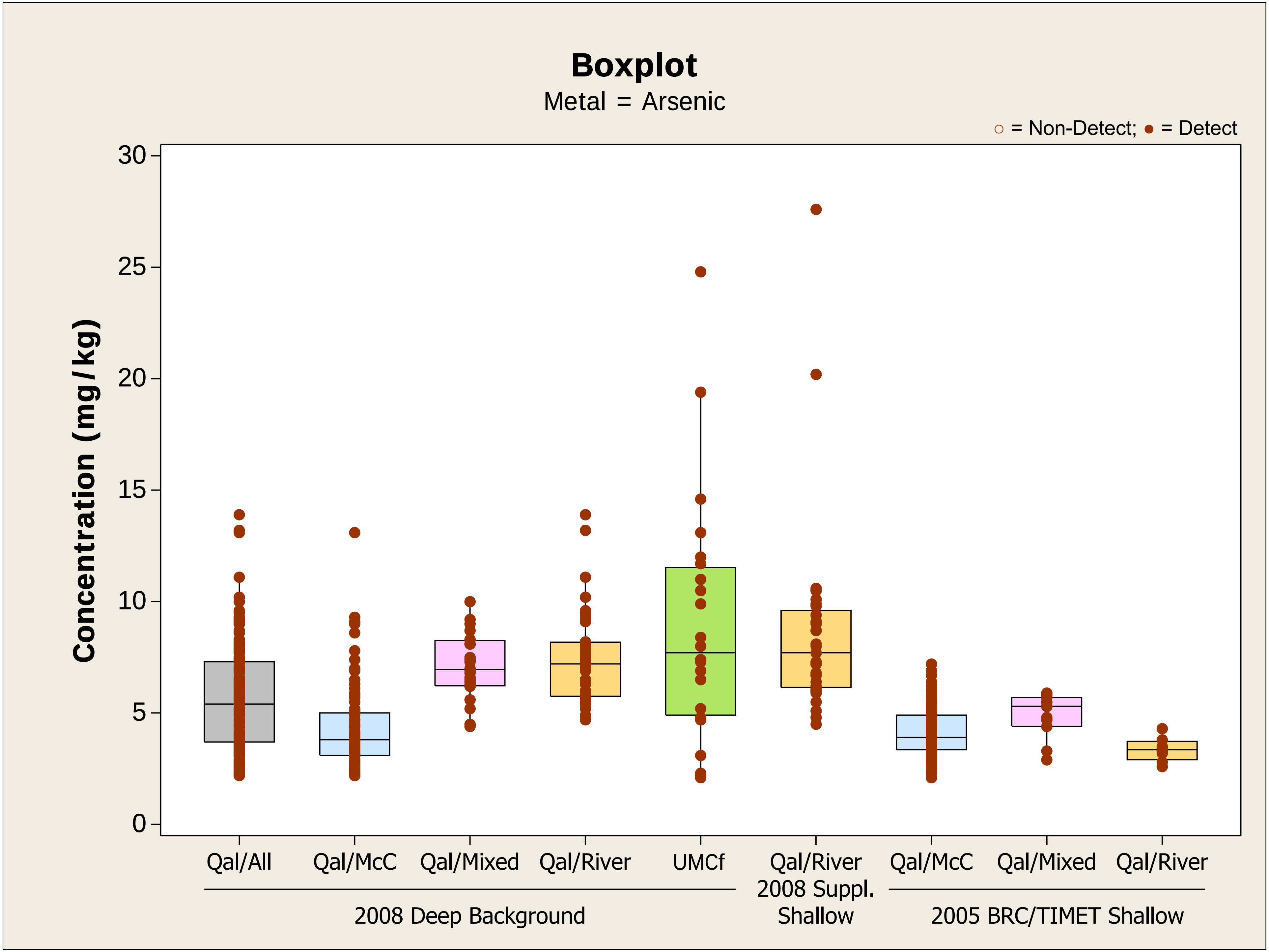
STATISTICAL PLOTS

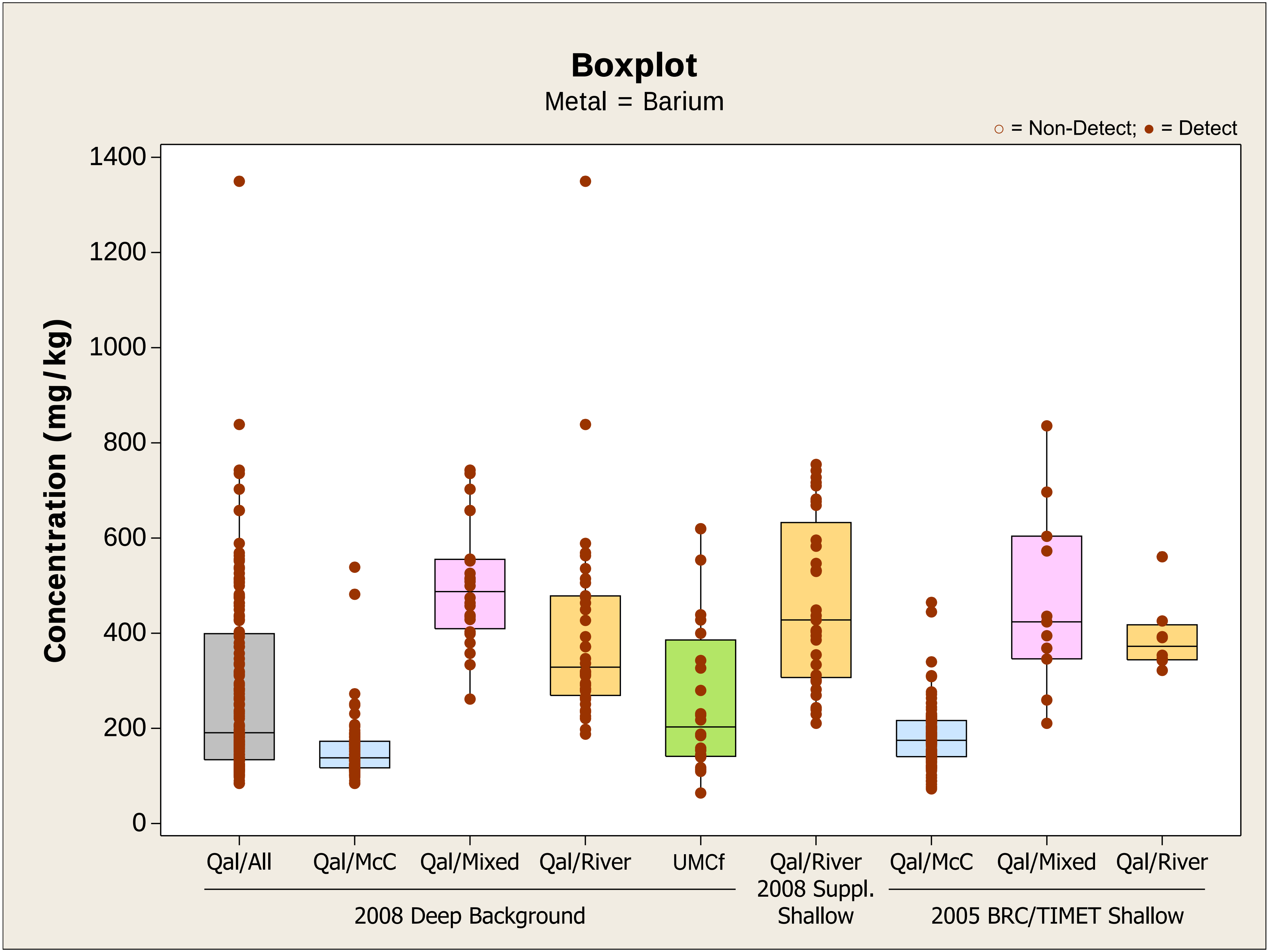
BOXPLOTS (ALL DATASETS)



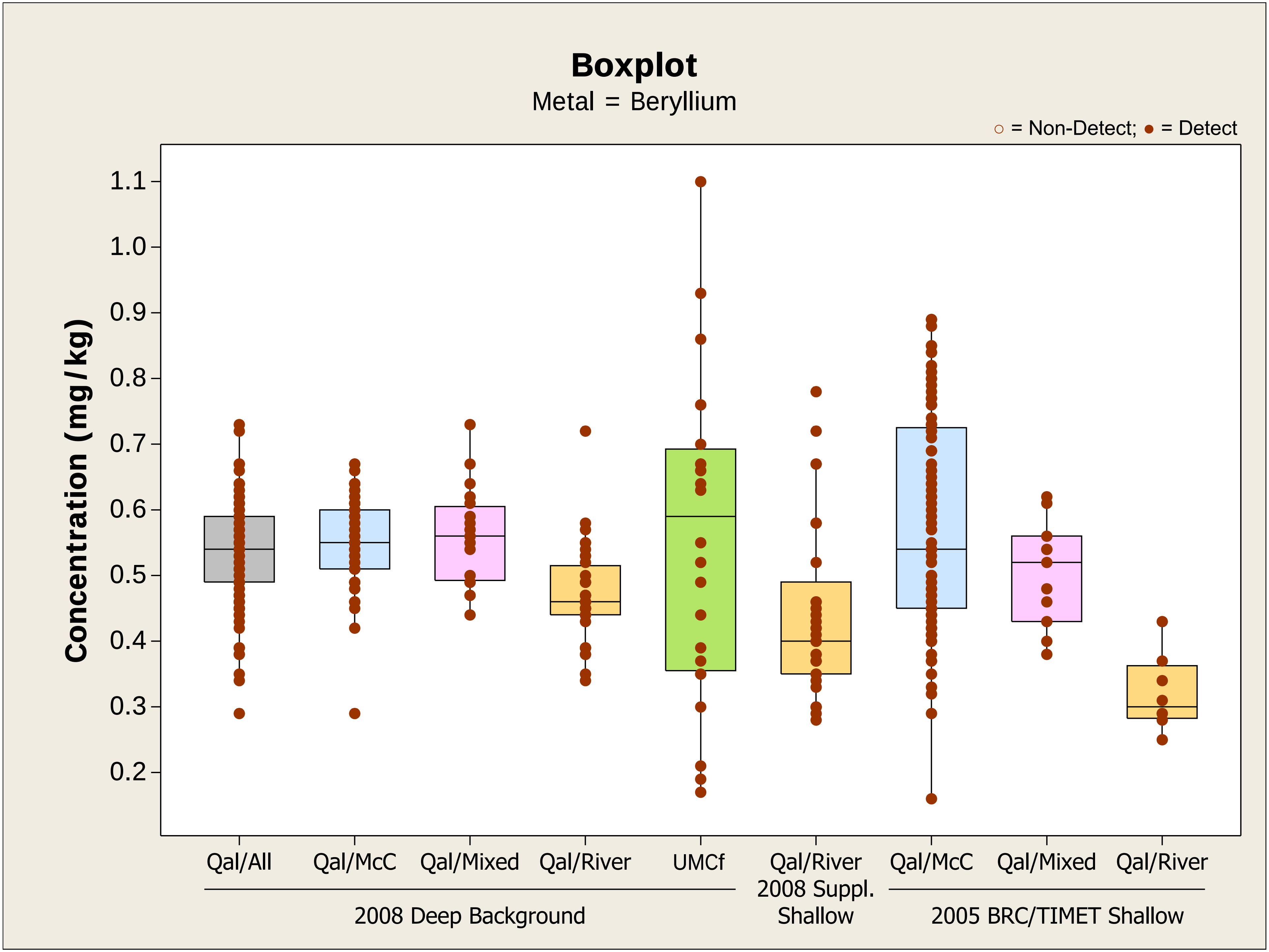
Boxplot
Metal = Aluminum
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
20000
15000
10000
5000
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

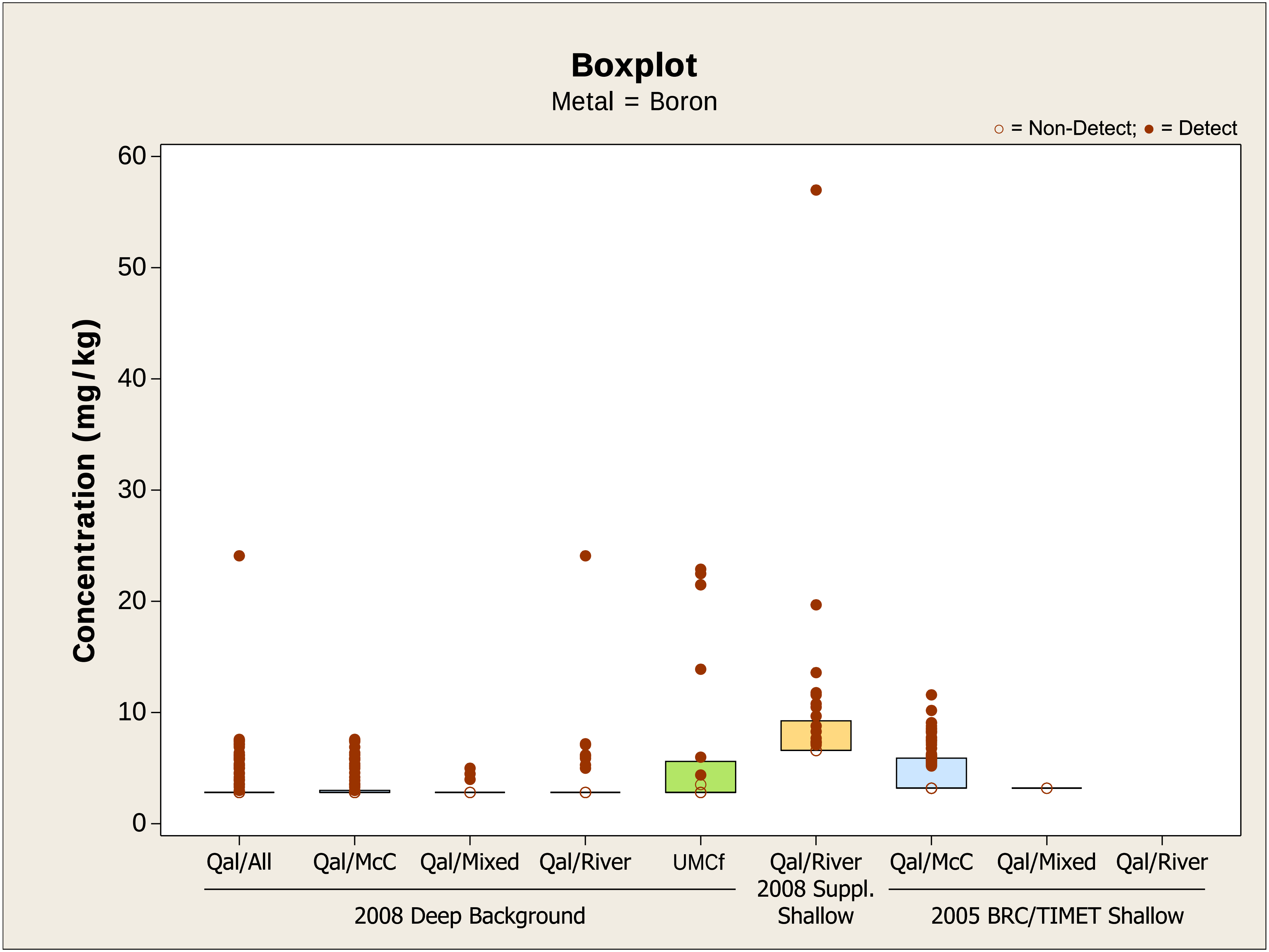

Boxplot
Metal = Antimony
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow


Boxplot
Metal = Arsenic
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0
5
10
15
20
25
30
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl.
Shallow
2005 BRC/TIMET Shallow

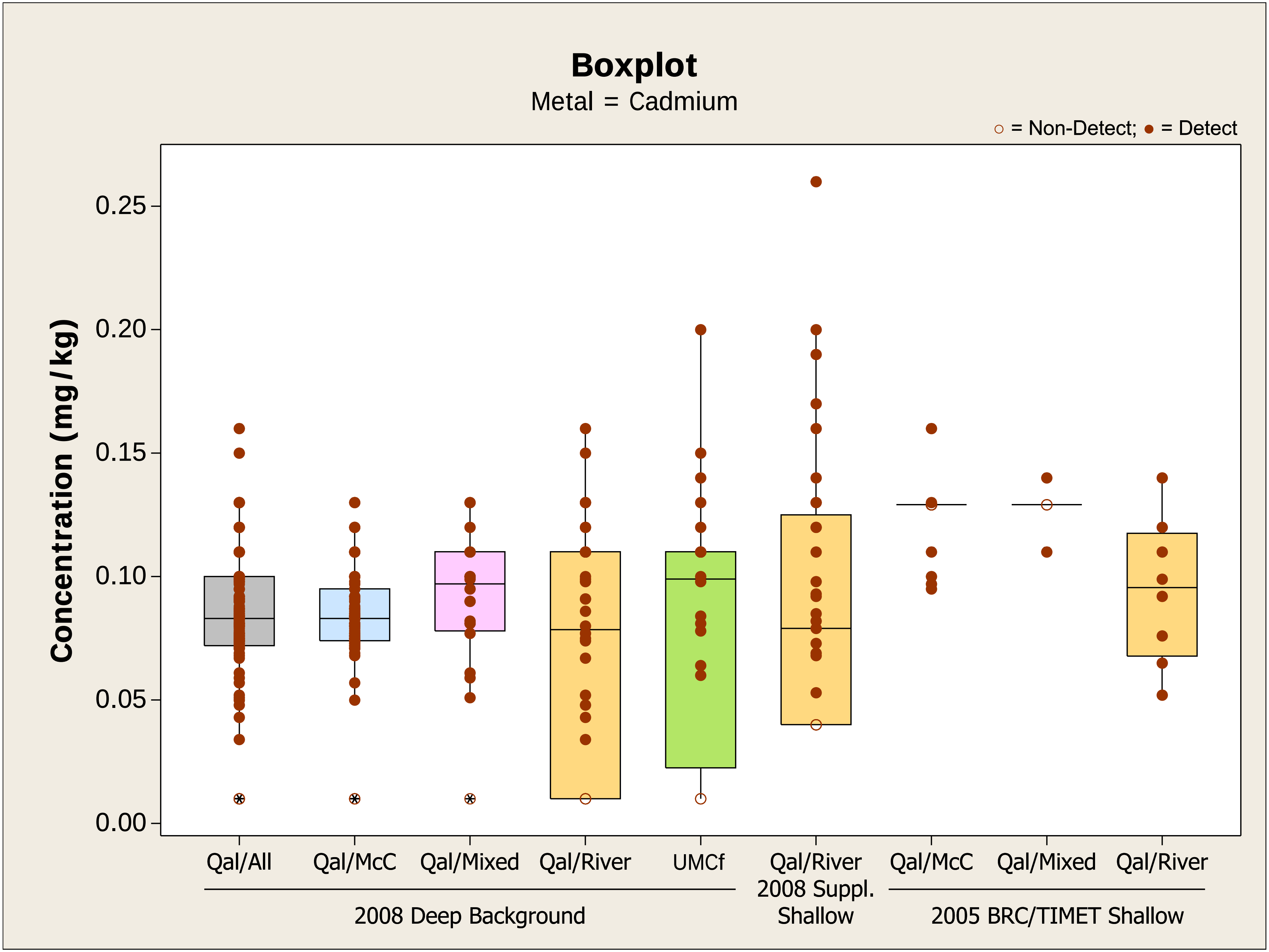


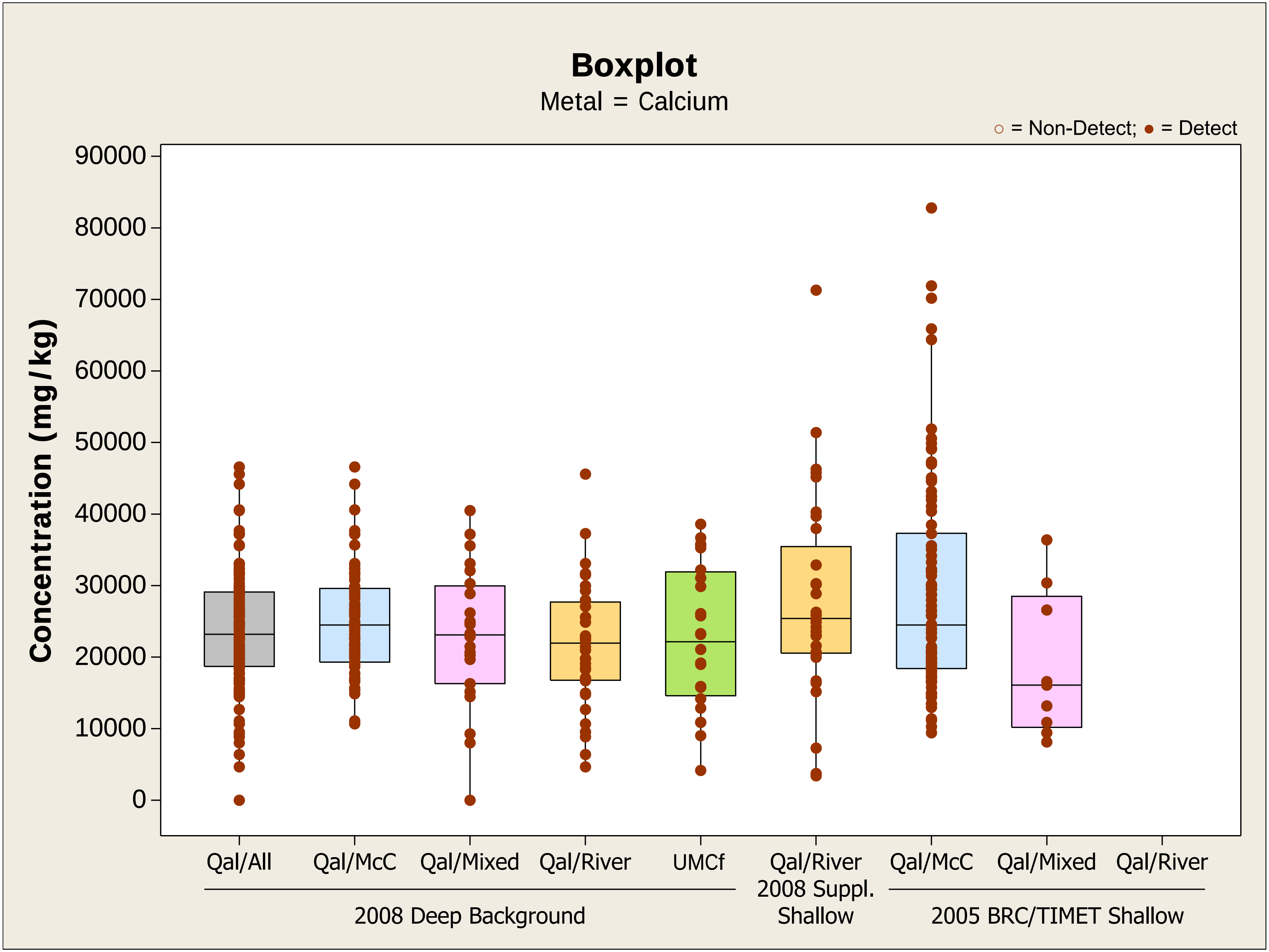
Boxplot
Metal = Barium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
1400
1200
1000
800
600
400
200
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow


Boxplot
Metal = Beryllium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

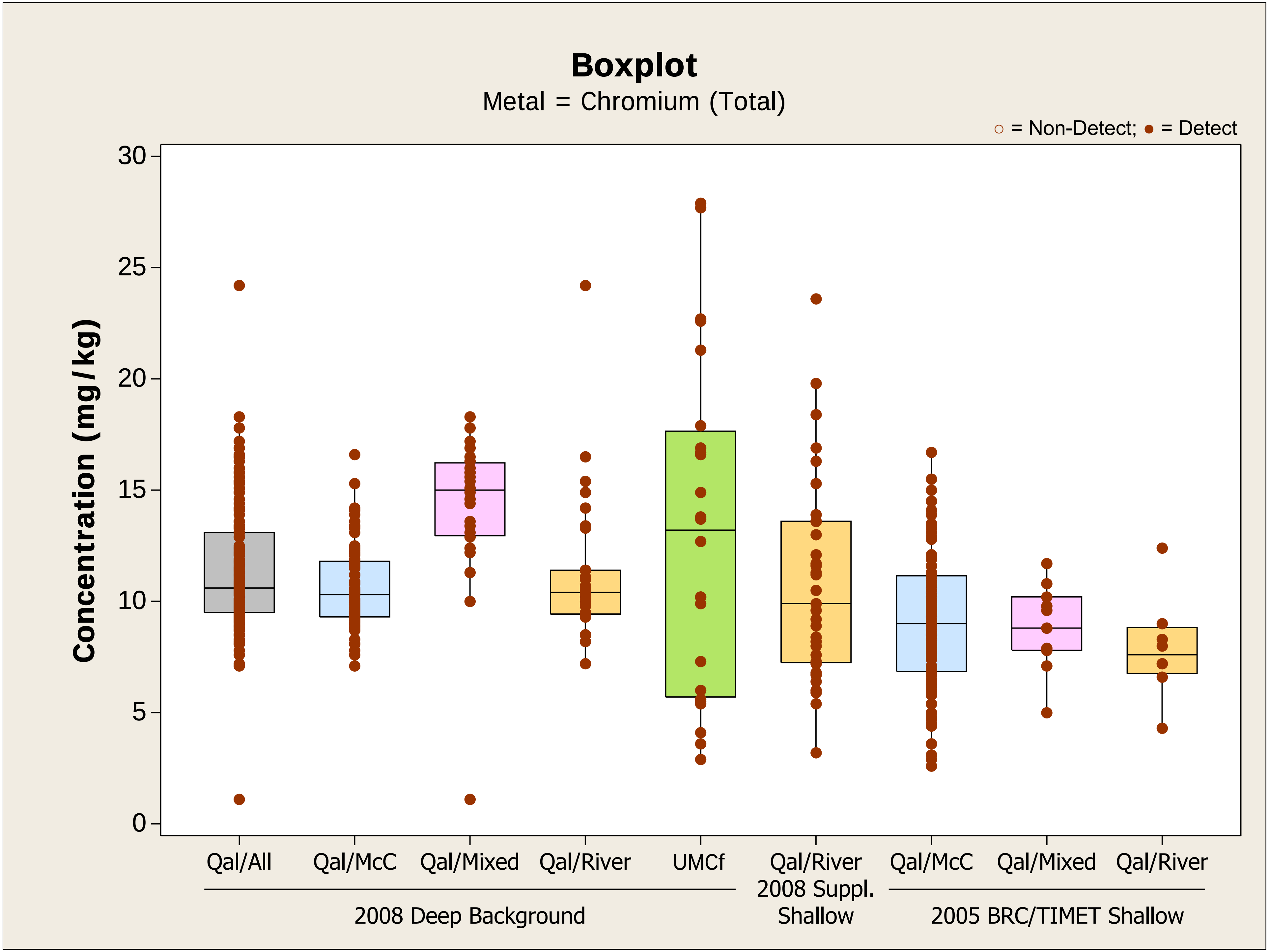


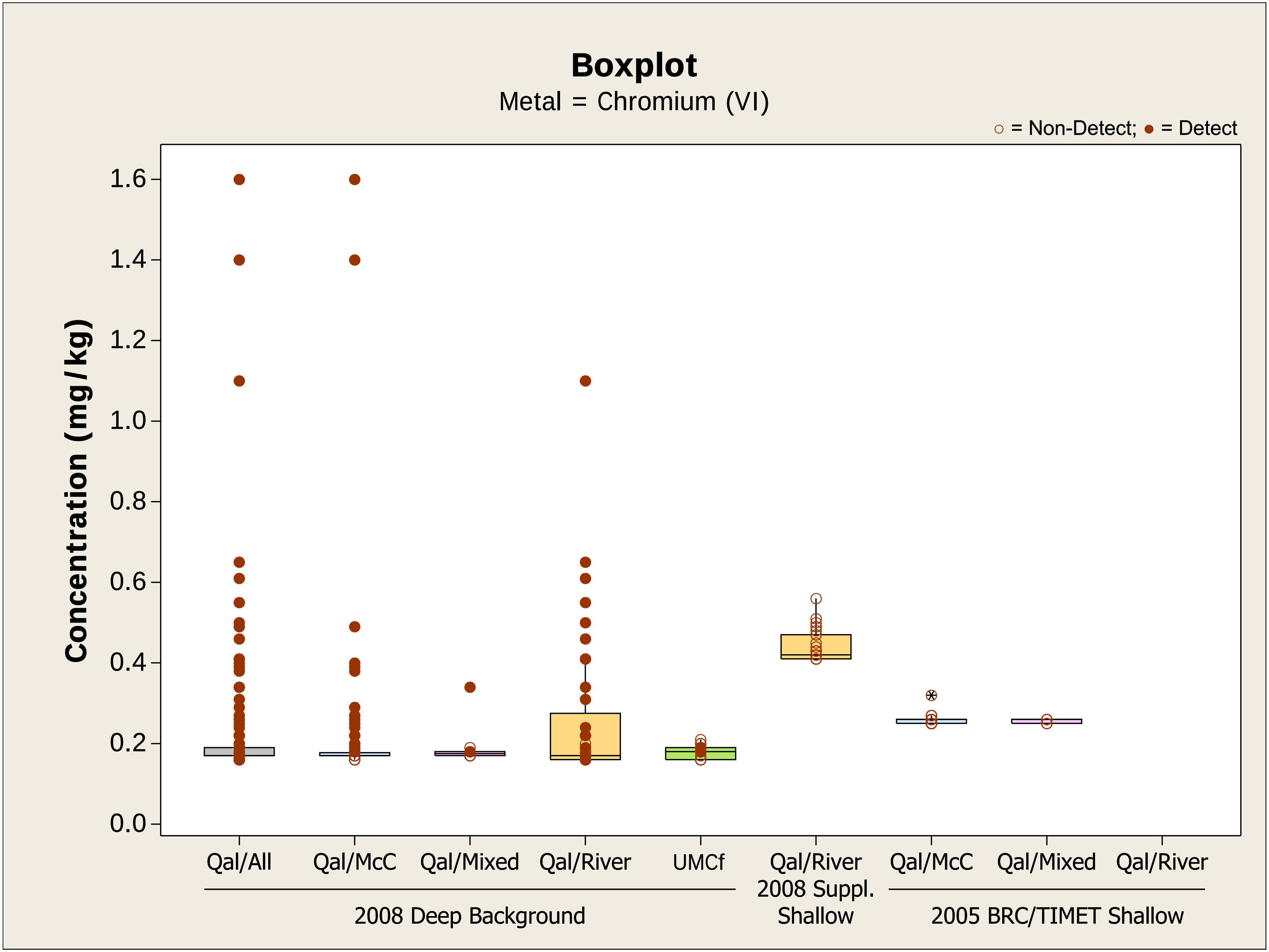
Boxplot
Metal = Boron
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0
10
20
30
40
50
60
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl.
Shallow
2005 BRC/TIMET Shallow


Boxplot
Metal = Cadmium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0.25
0.20
0.15
0.10
0.05
0.00
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl.
Shallow
2005 BRC/TIMET Shallow

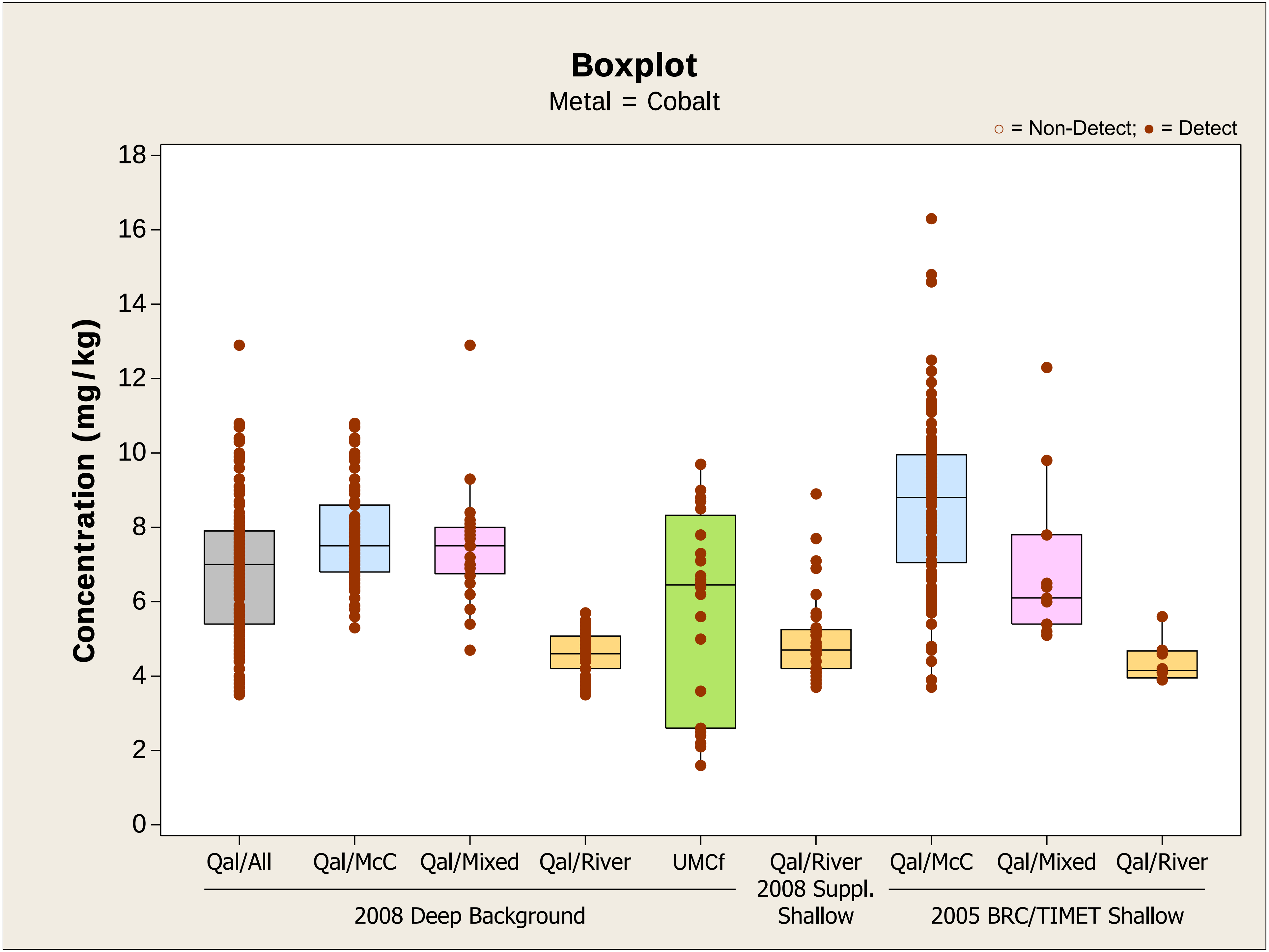


Boxplot
Metal = Calcium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl.
Shallow
2005 BRC/TIMET Shallow

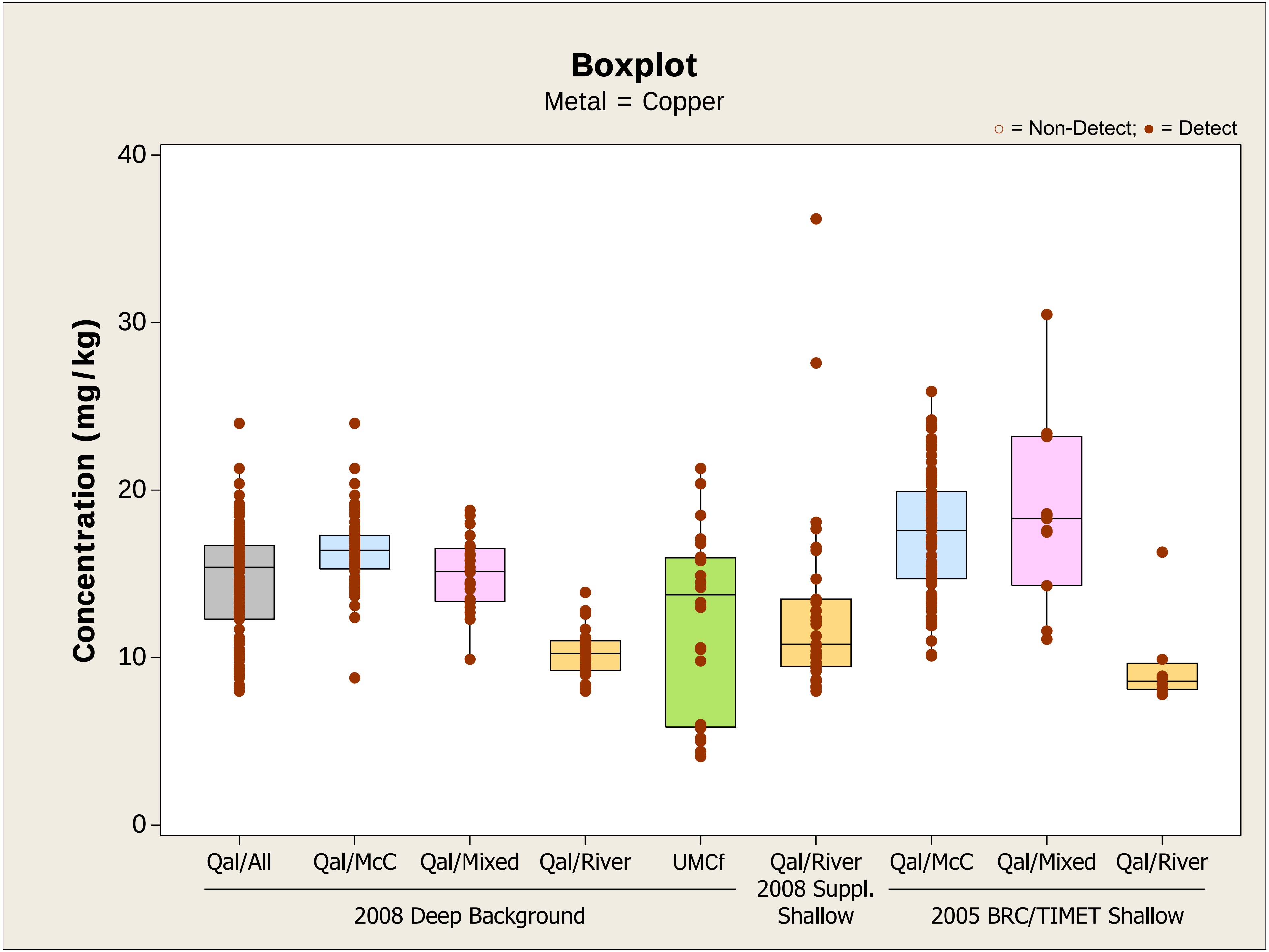

Boxplot
Metal = Chromium (Total)
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
30
25
20
15
10
5
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow



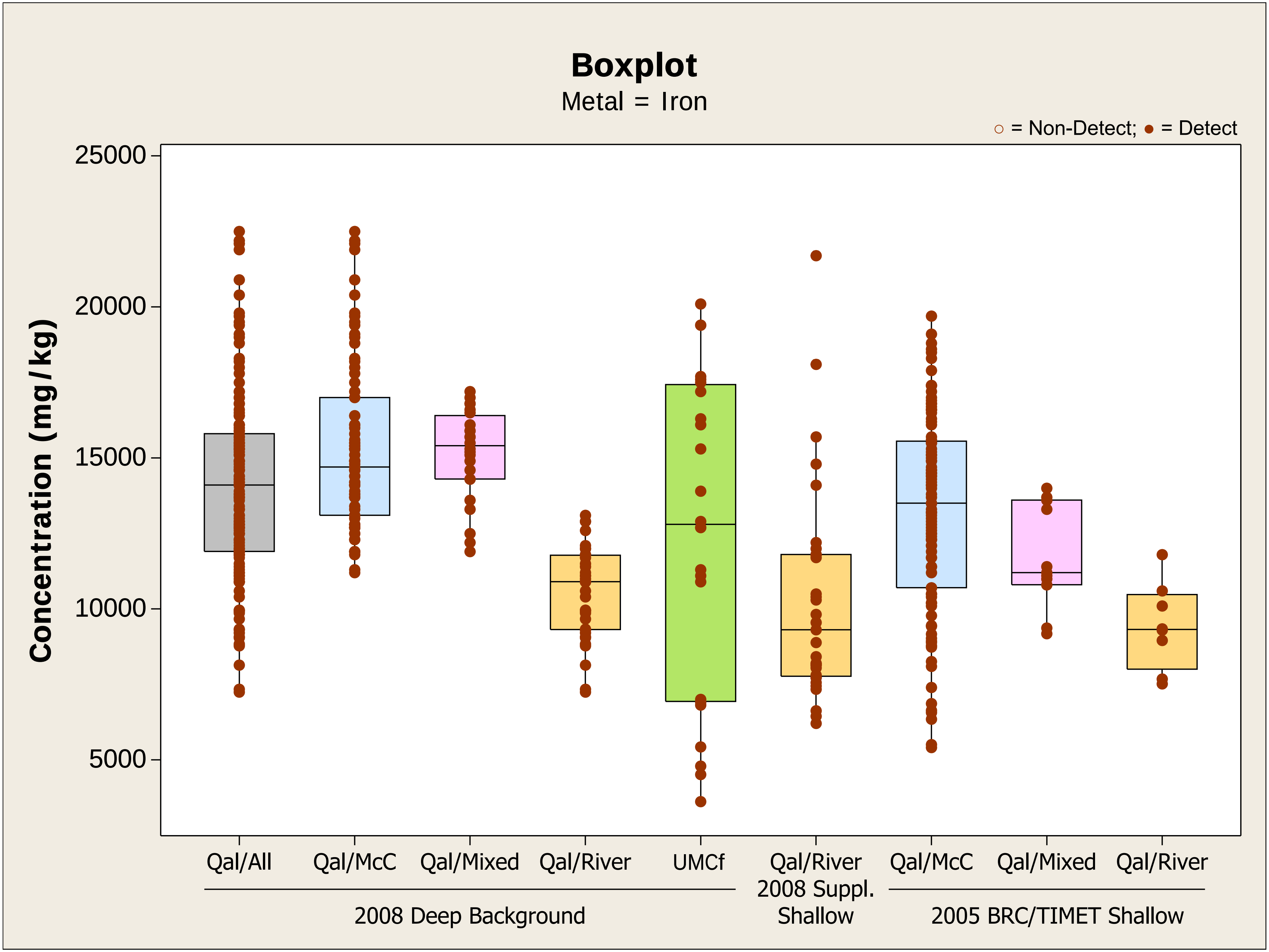
Boxplot
Metal = Chromium (VI)
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

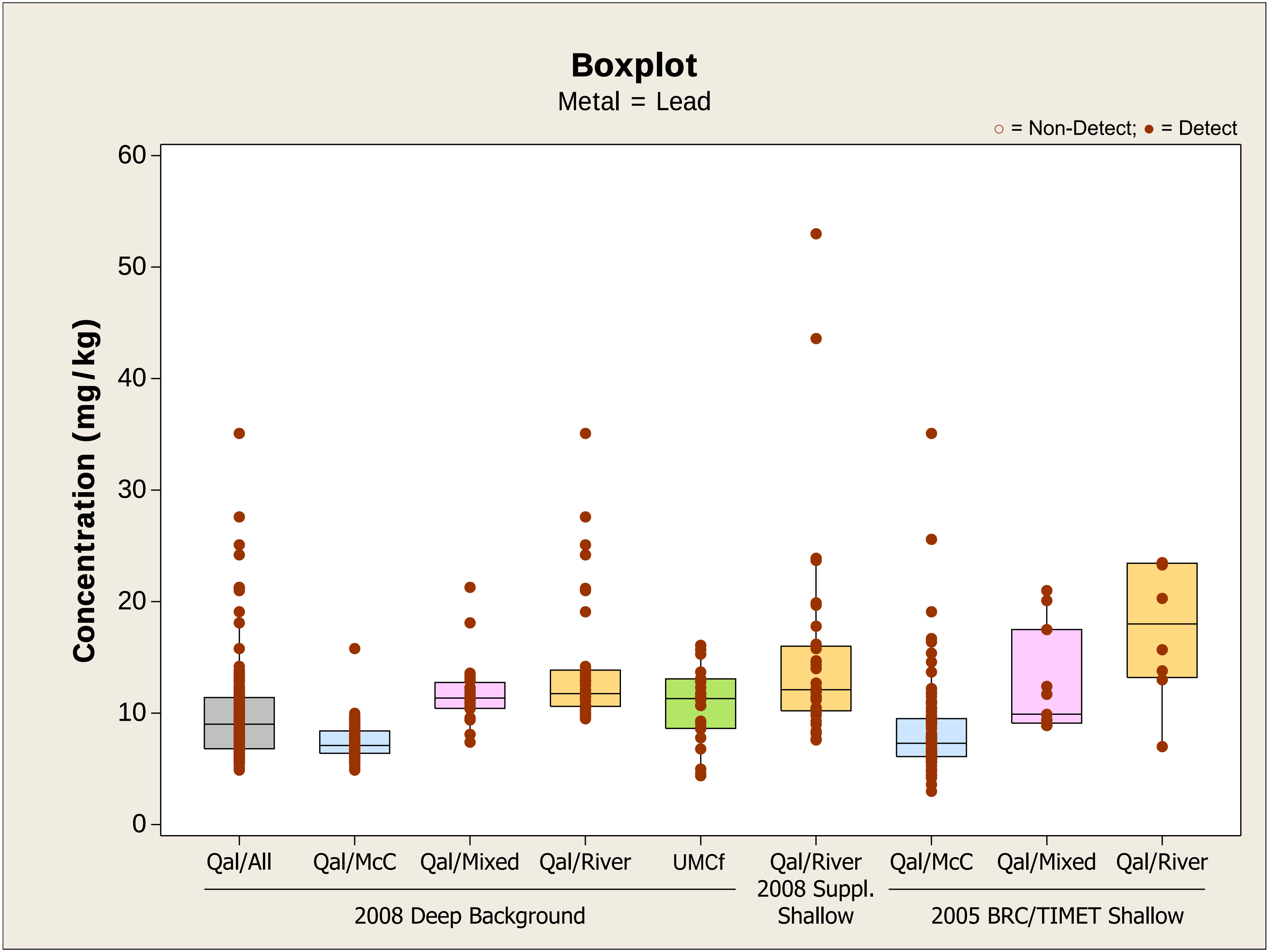


Boxplot
Metal = Cobalt
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
18
16
14
12
10
8
6
4
2
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

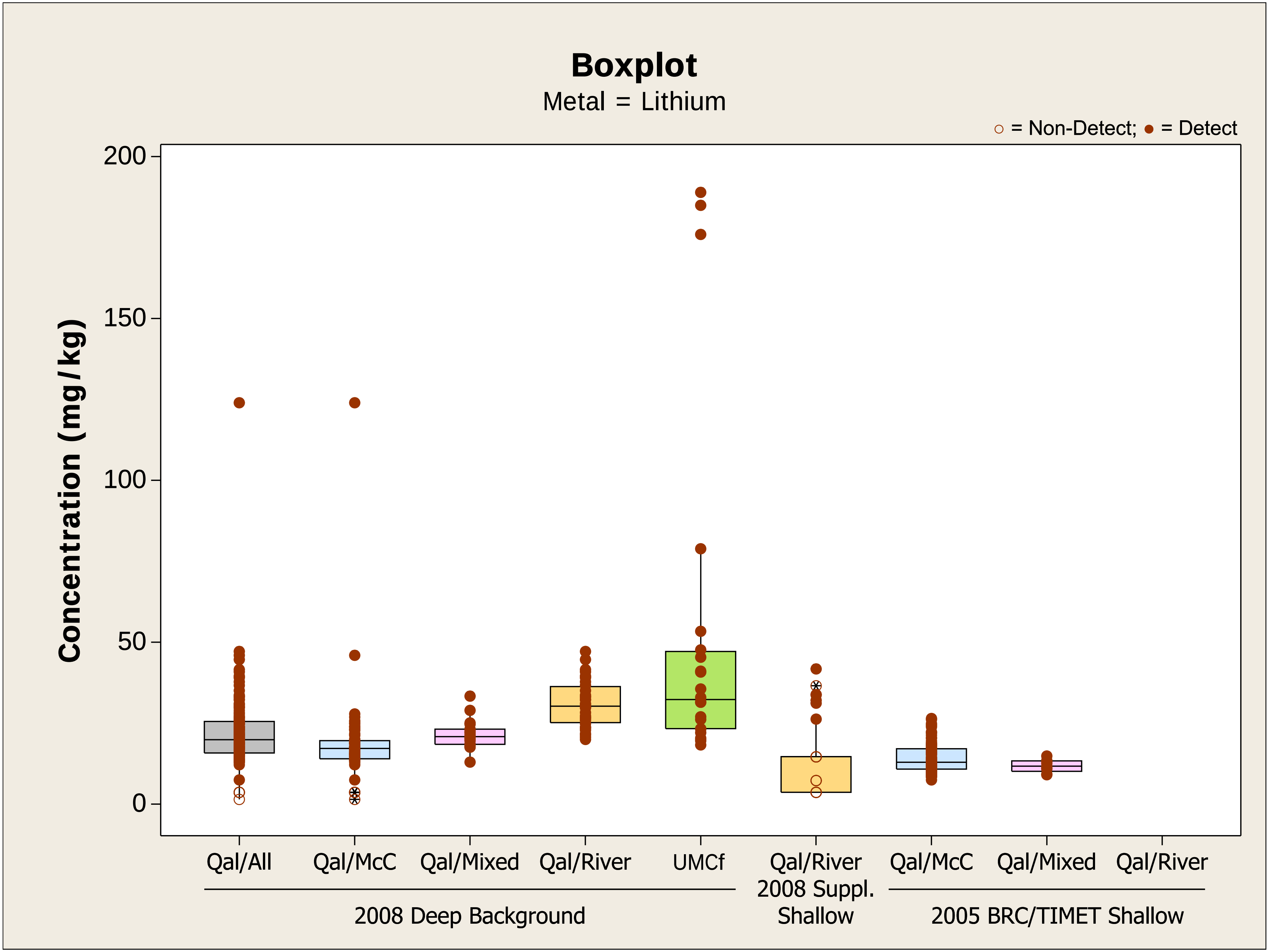


Boxplot
Metal = Copper
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
40
30
20
10
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

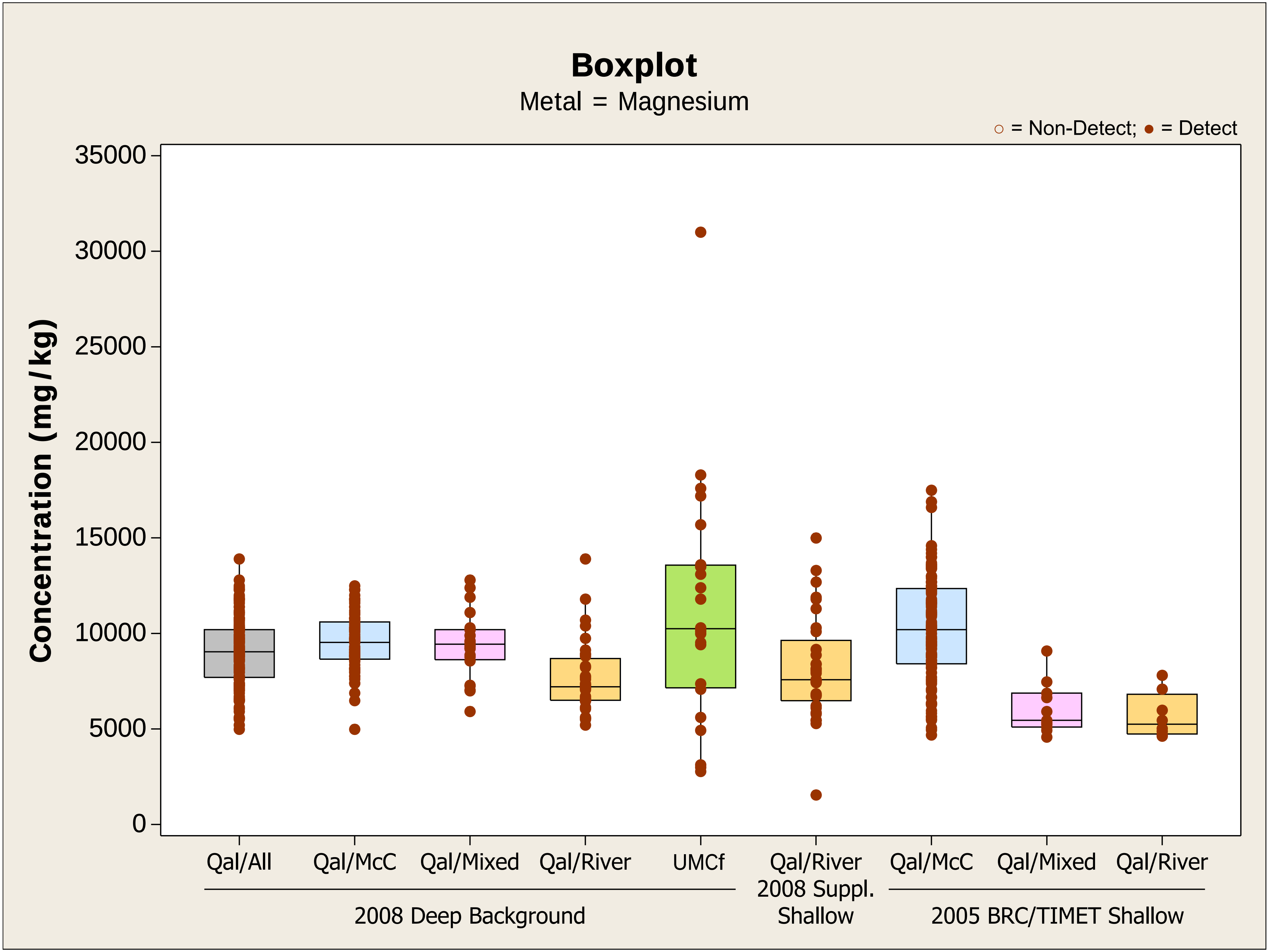

Boxplot
Metal = Iron
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
25000
20000
15000
10000
5000
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

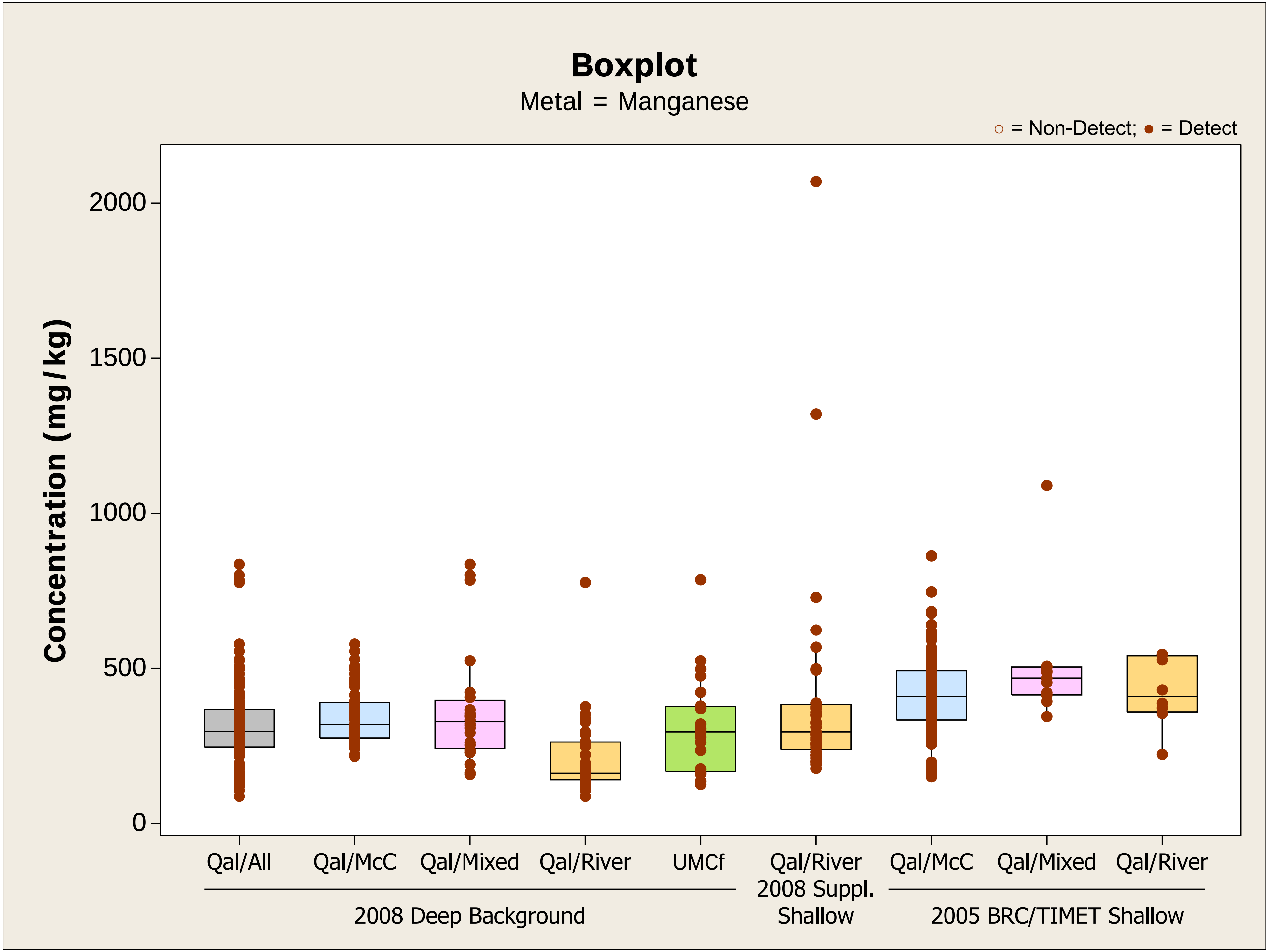


Boxplot
Metal = Lead
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
60
50
40
30
20
10
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

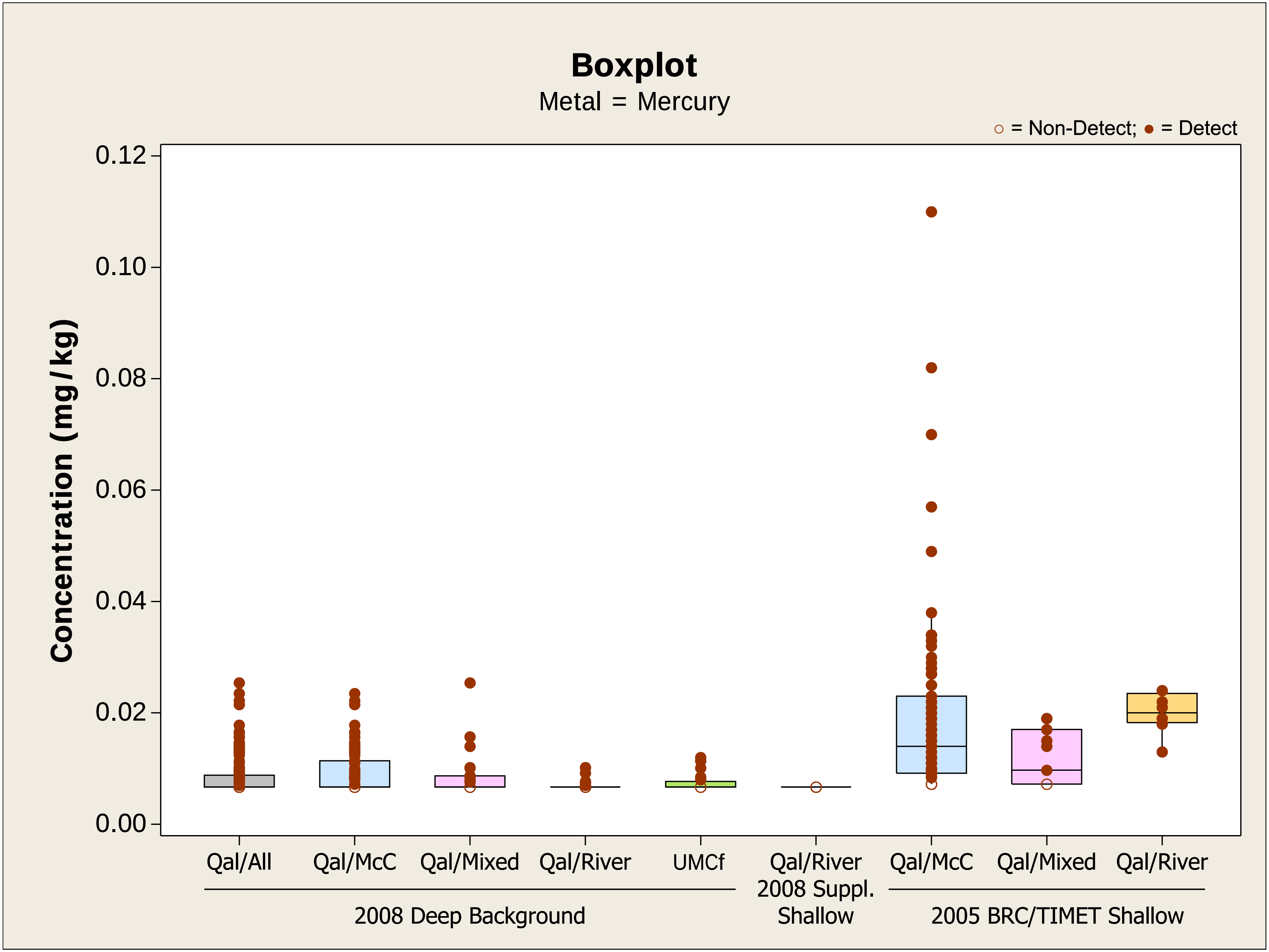


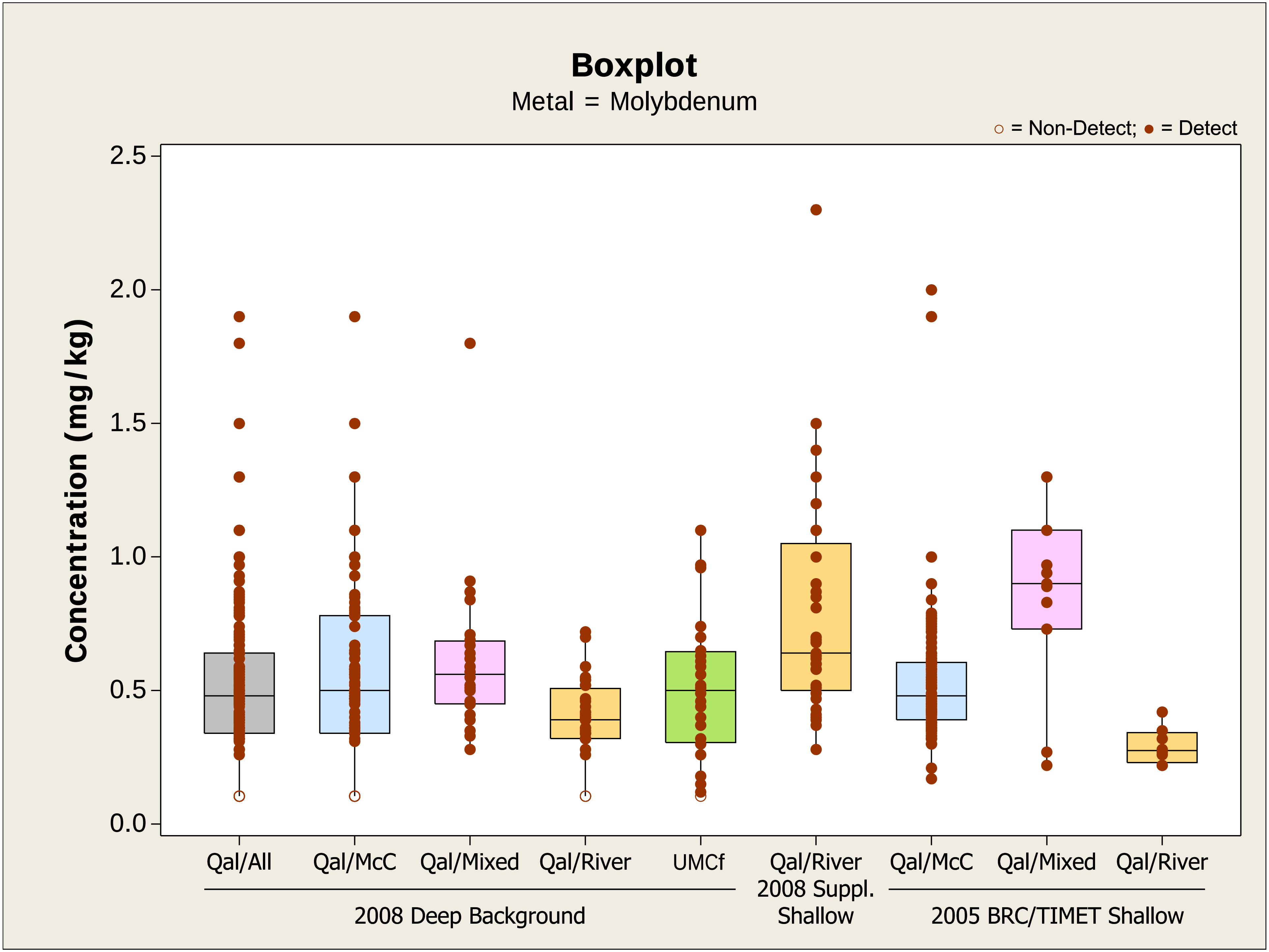
Boxplot
Metal = Lithium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
200
150
100
50
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl.
Shallow
2005 BRC/TIMET Shallow


Boxplot
Metal = Magnesium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
35000
30000
25000
20000
15000
10000
5000
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

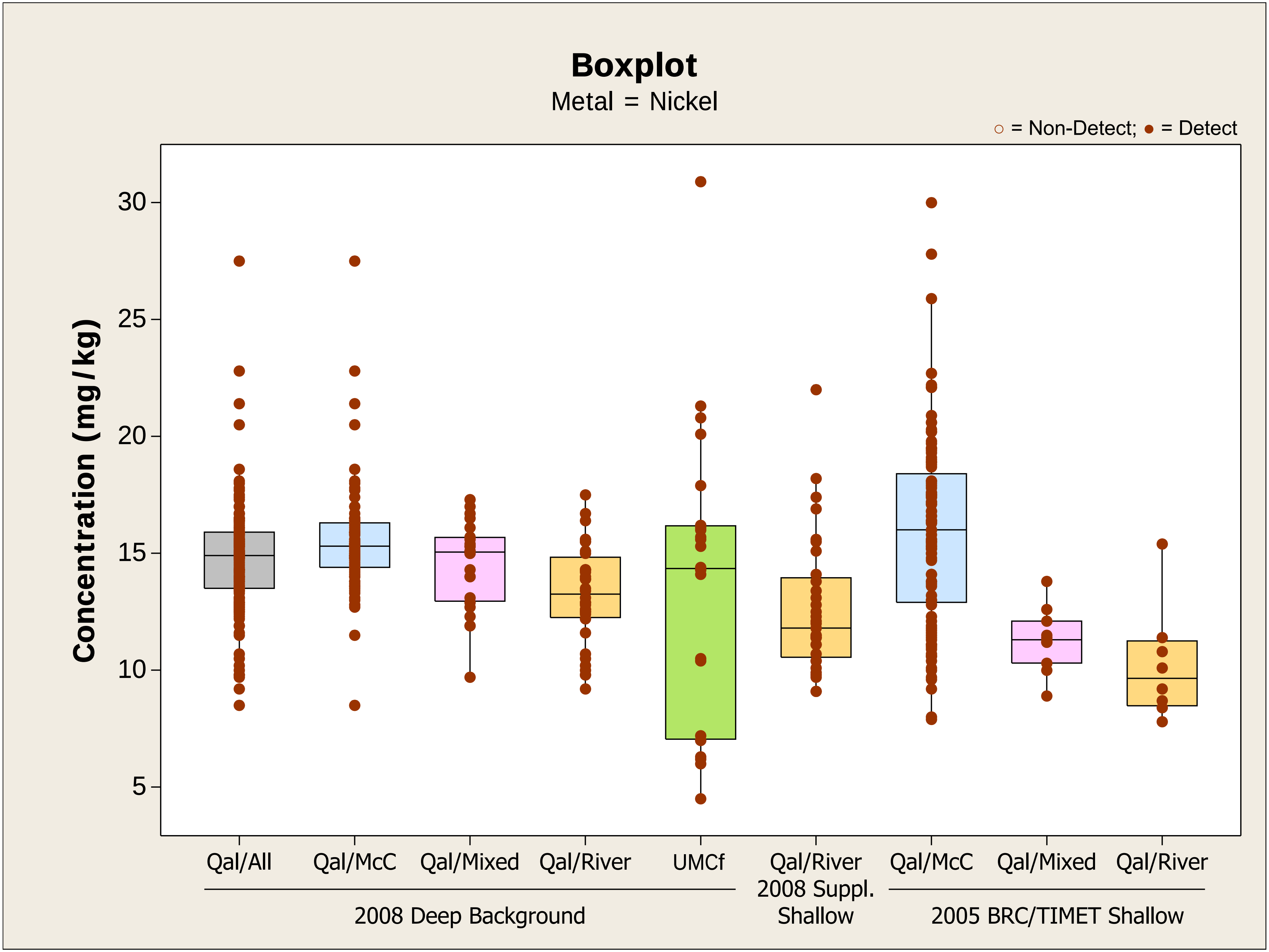


Boxplot
Metal = Manganese
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
2000
1500
1000
500
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

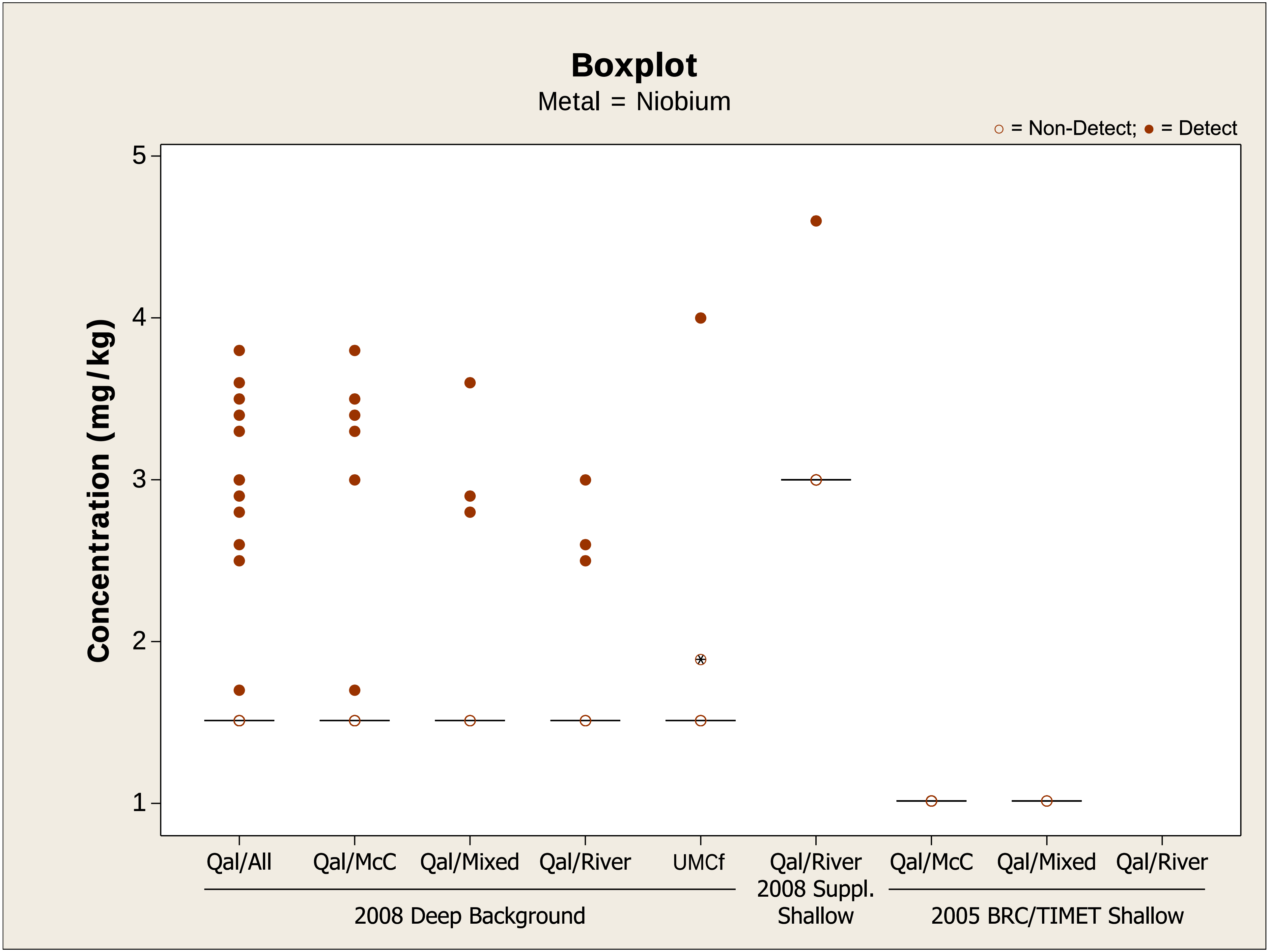

Boxplot
Metal = Mercury
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow



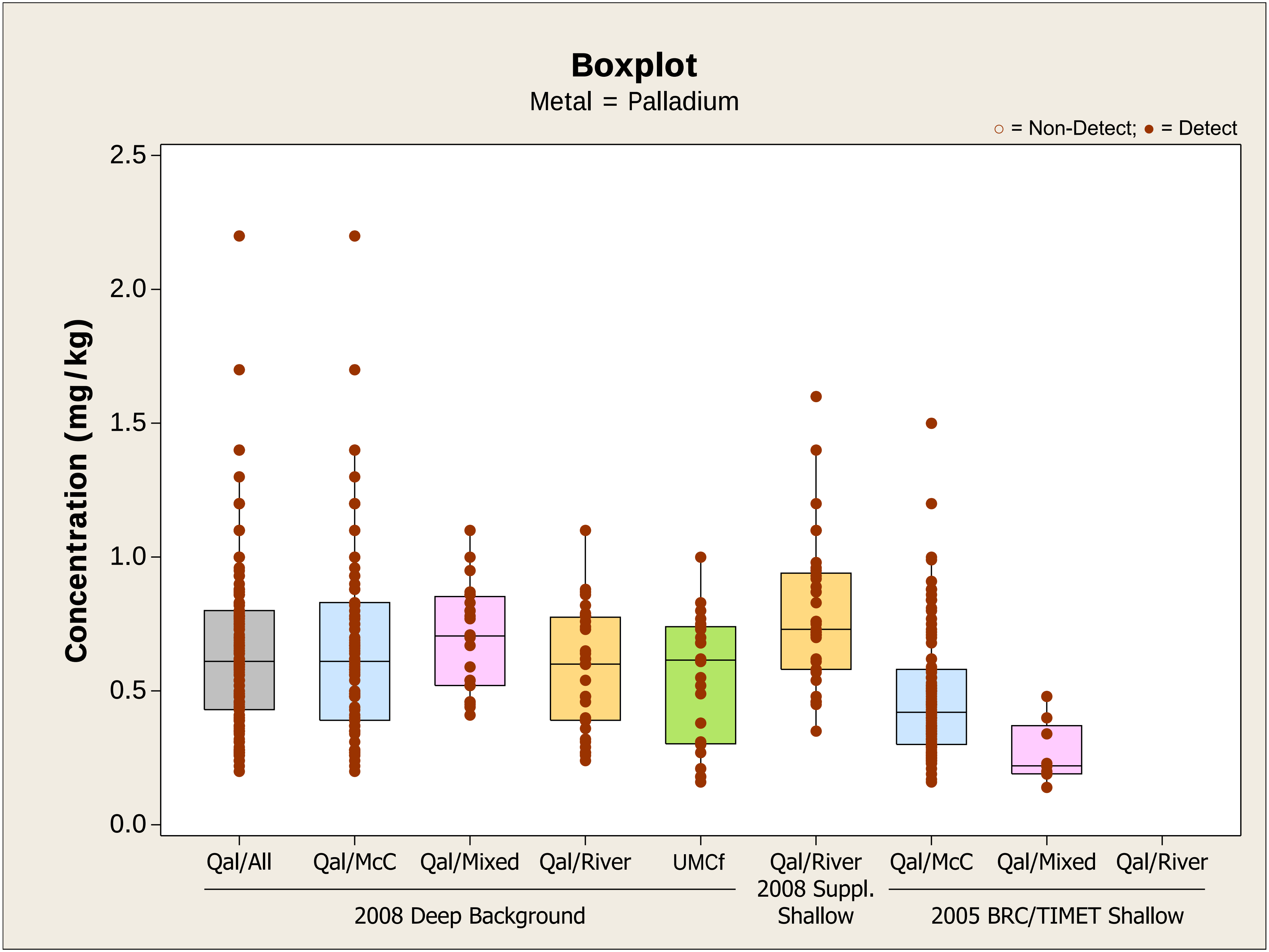
Boxplot
Metal = Molybdenum
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
2.5
2.0
1.5
1.0
0.5
0.0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow



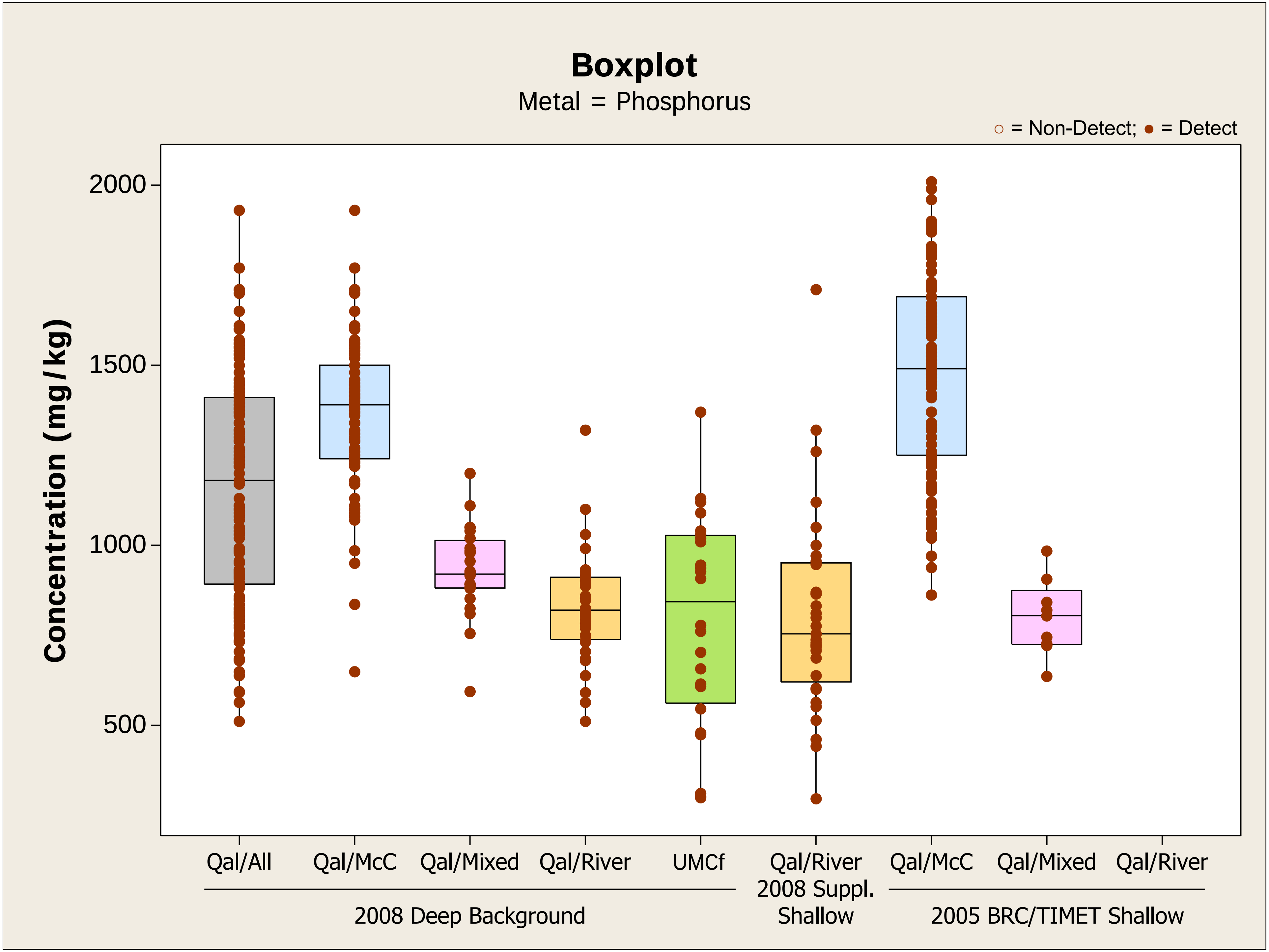
Boxplot
Metal = Nickel
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
30
25
20
15
10
5
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

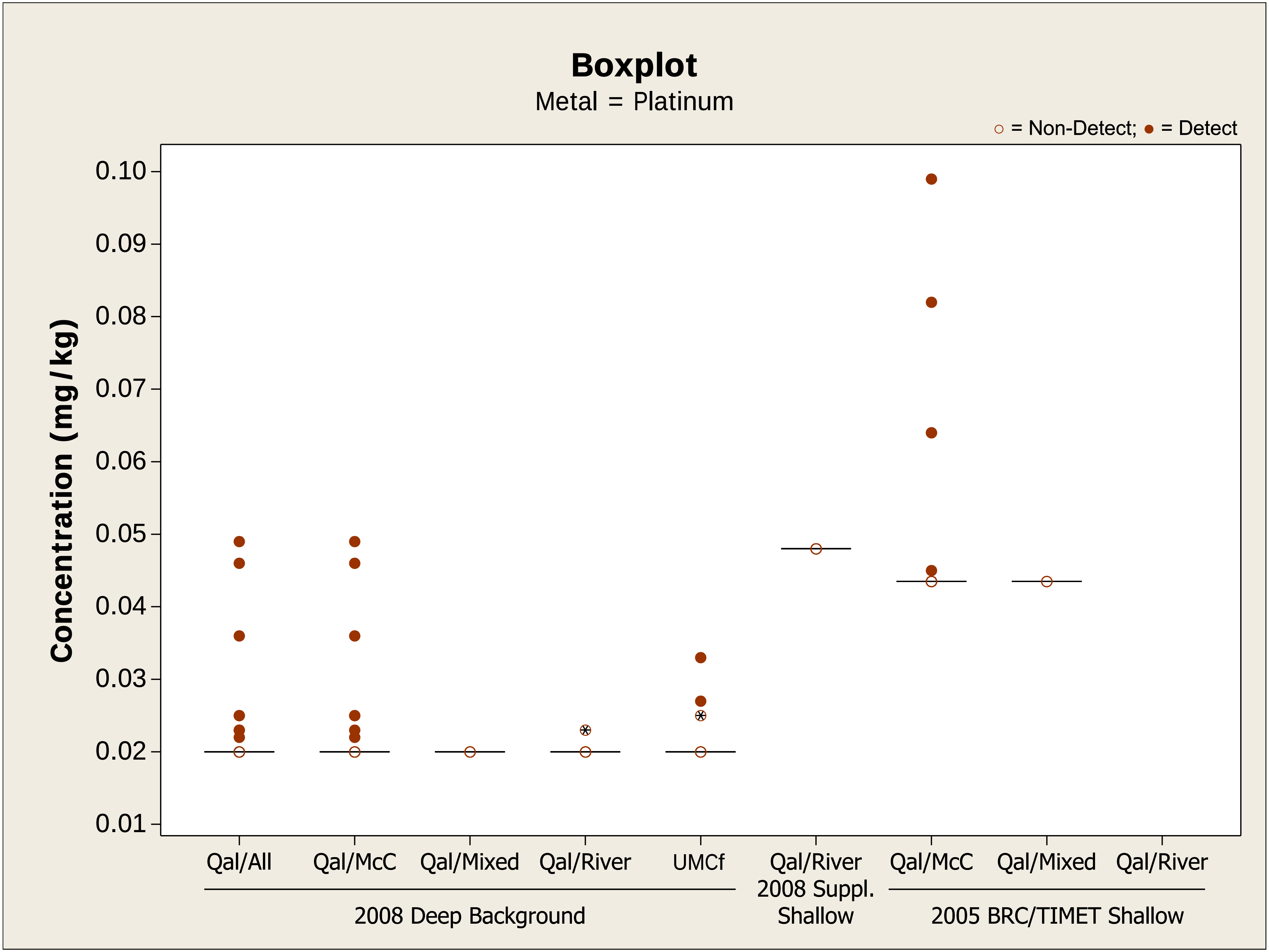


Boxplot
Metal = Niobium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
5
4
3
2
1
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

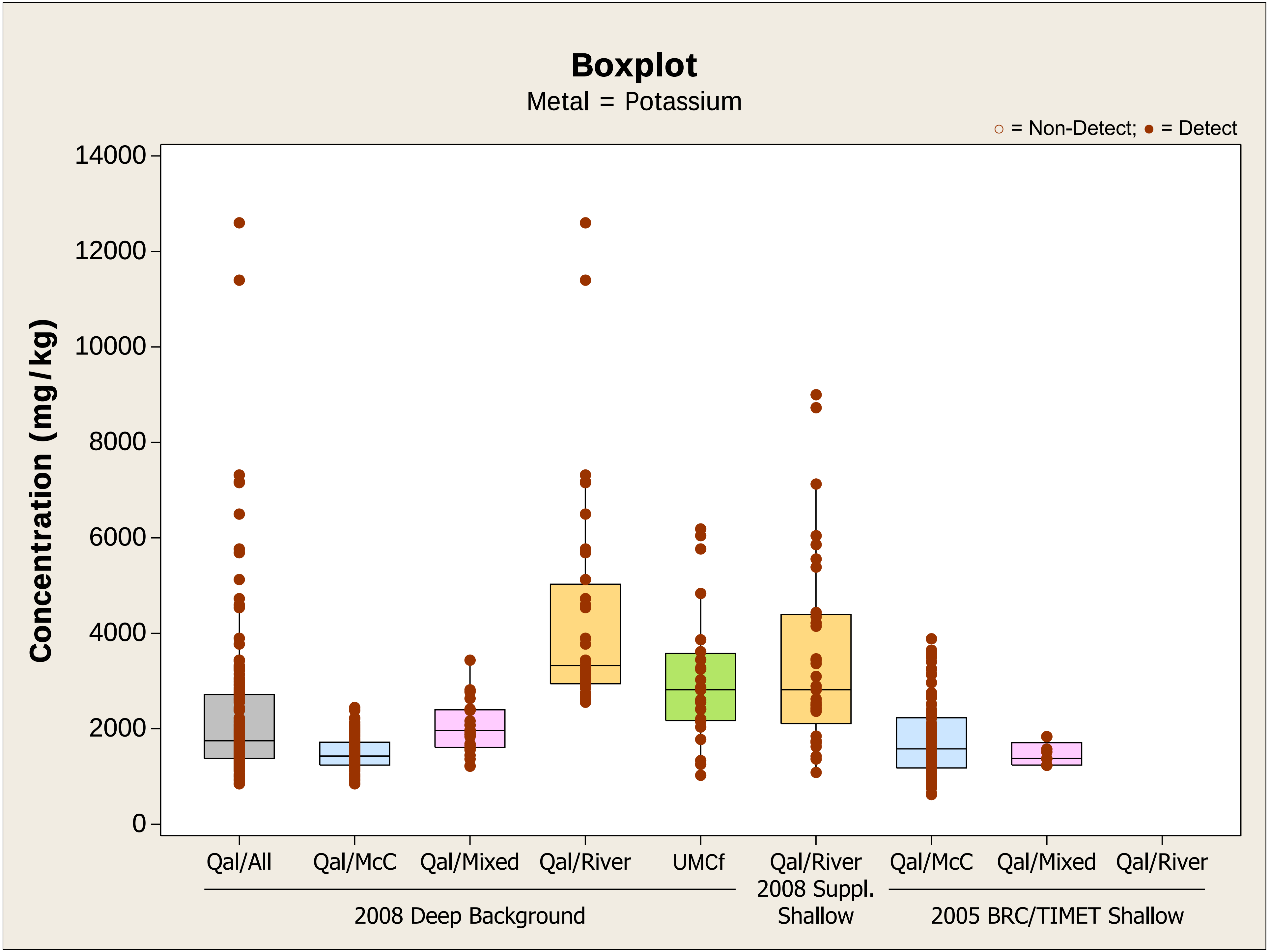


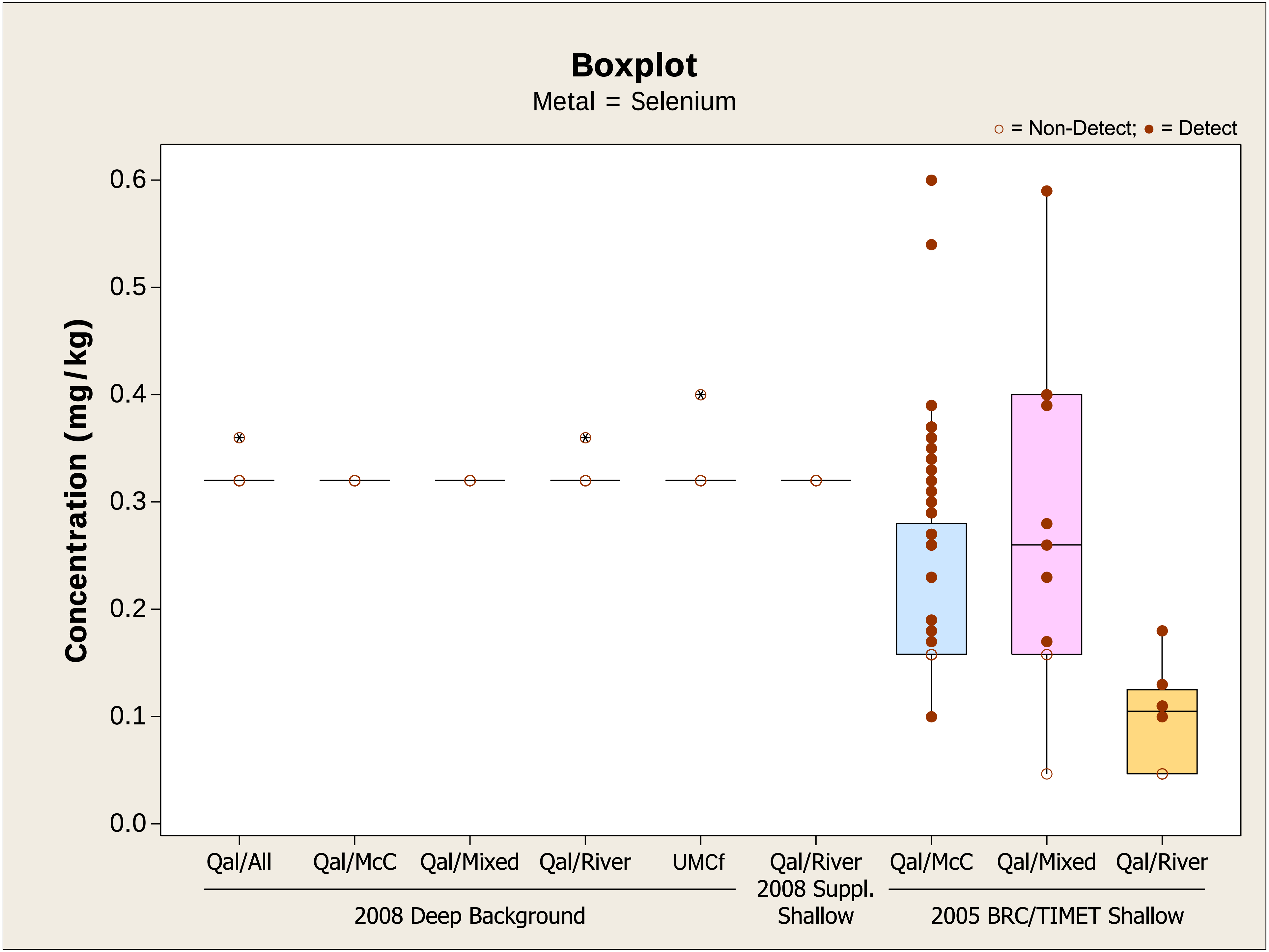
Boxplot
Metal = Palladium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
2.5
2.0
1.5
1.0
0.5
0.0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow


Boxplot
Metal = Phosphorus
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
2000
1500
1000
500
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

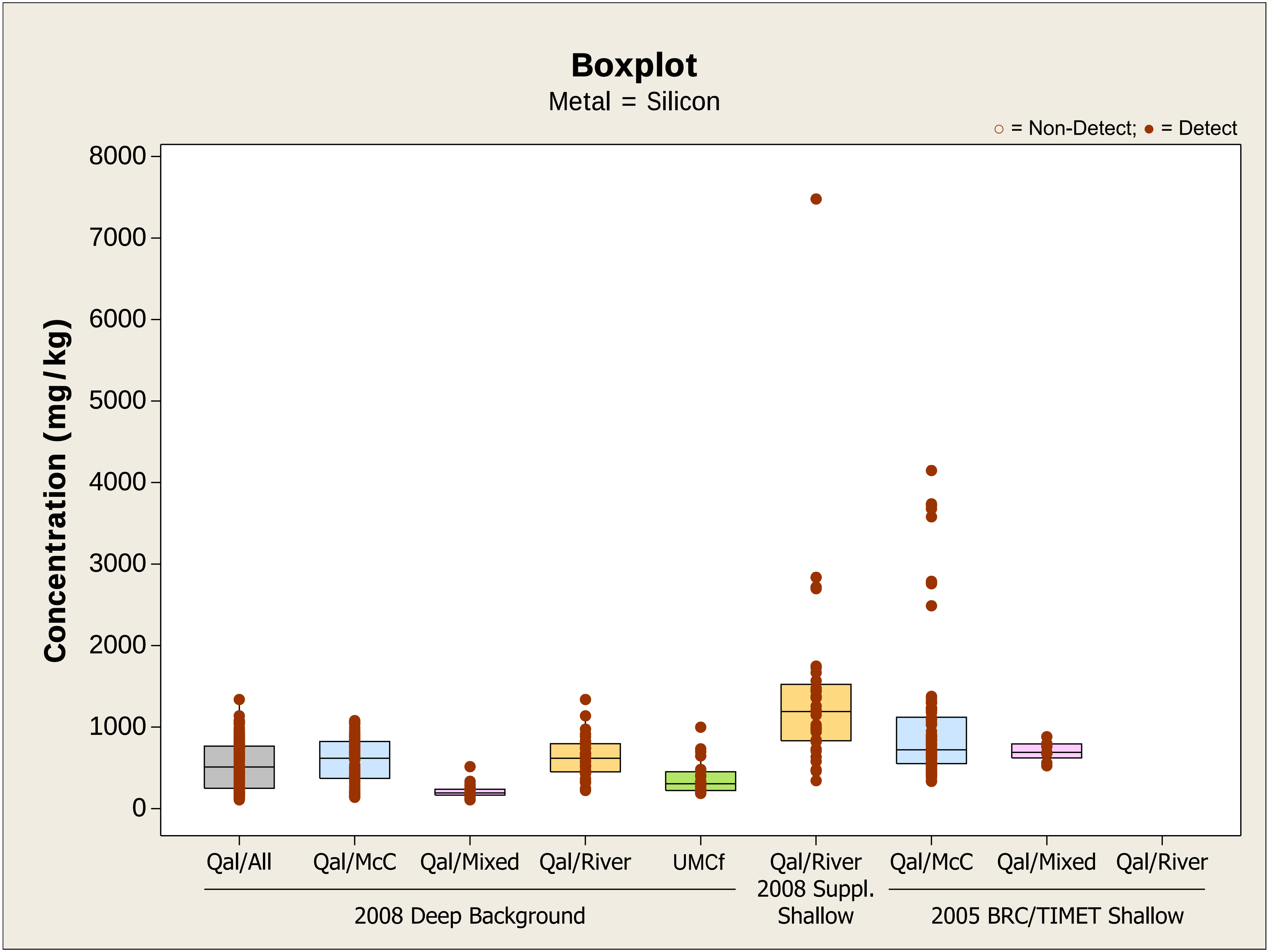


Boxplot
Metal = Platinum
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

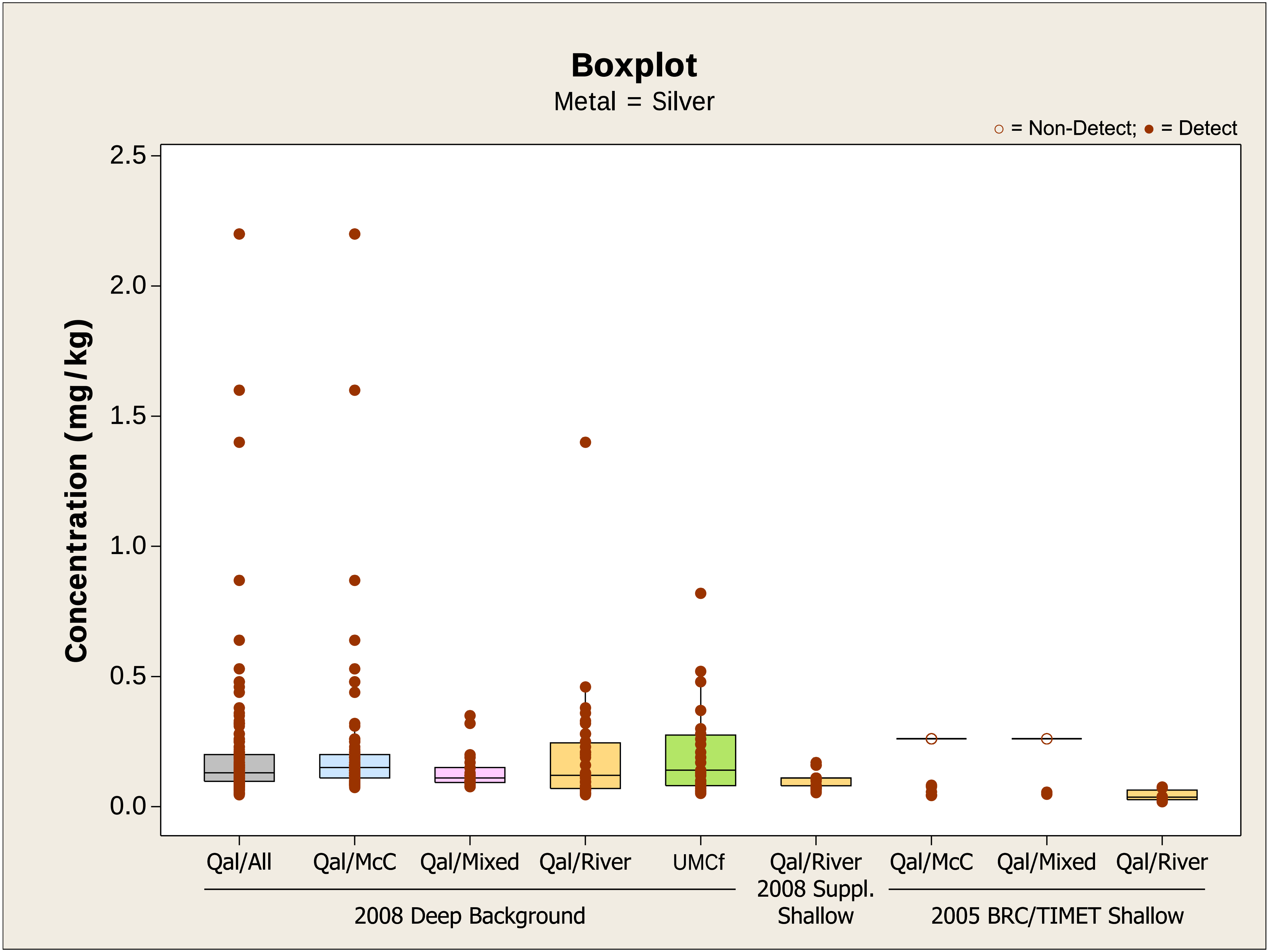

Boxplot
Metal = Potassium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
14000
12000
10000
8000
6000
4000
2000
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

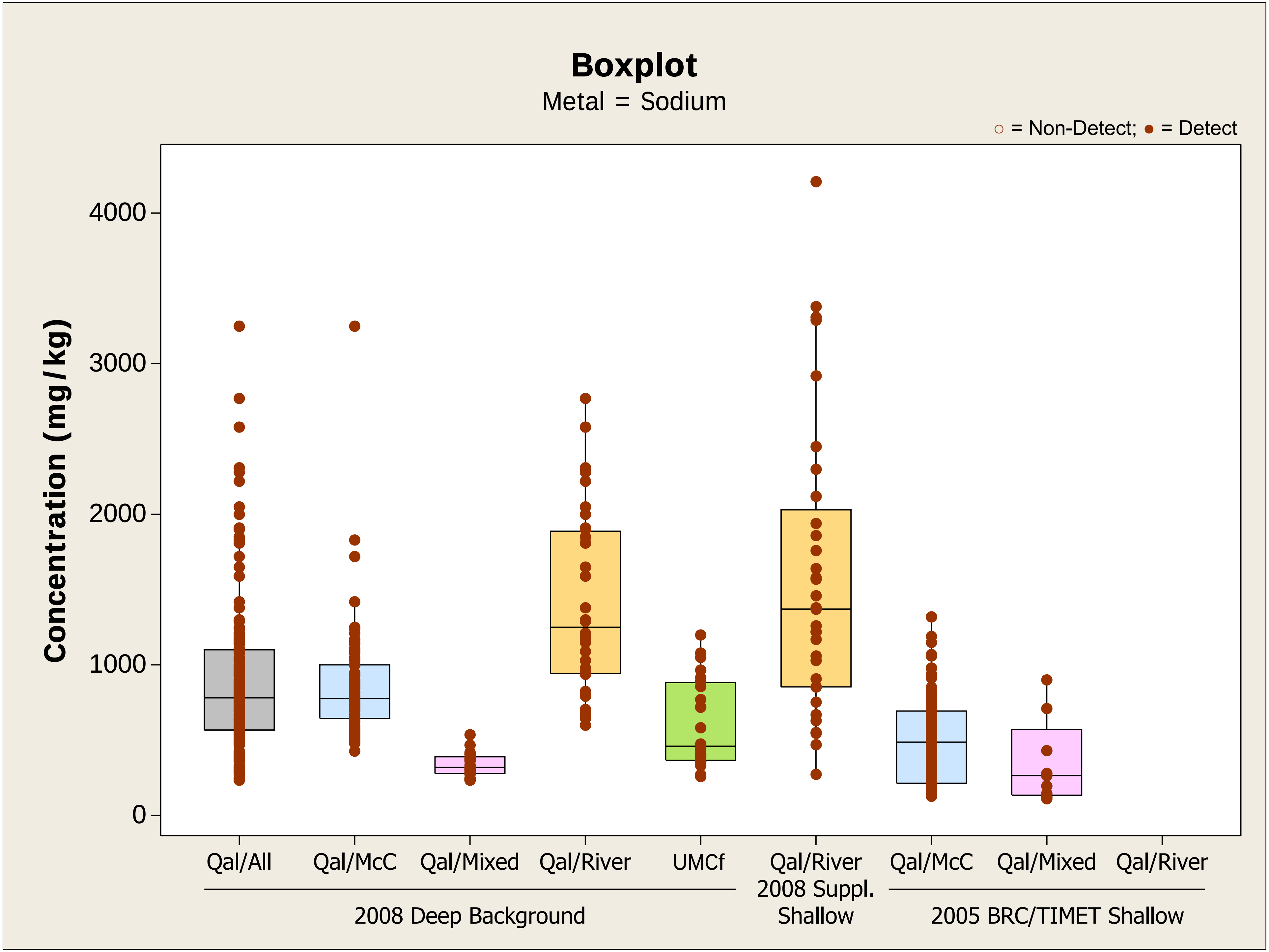


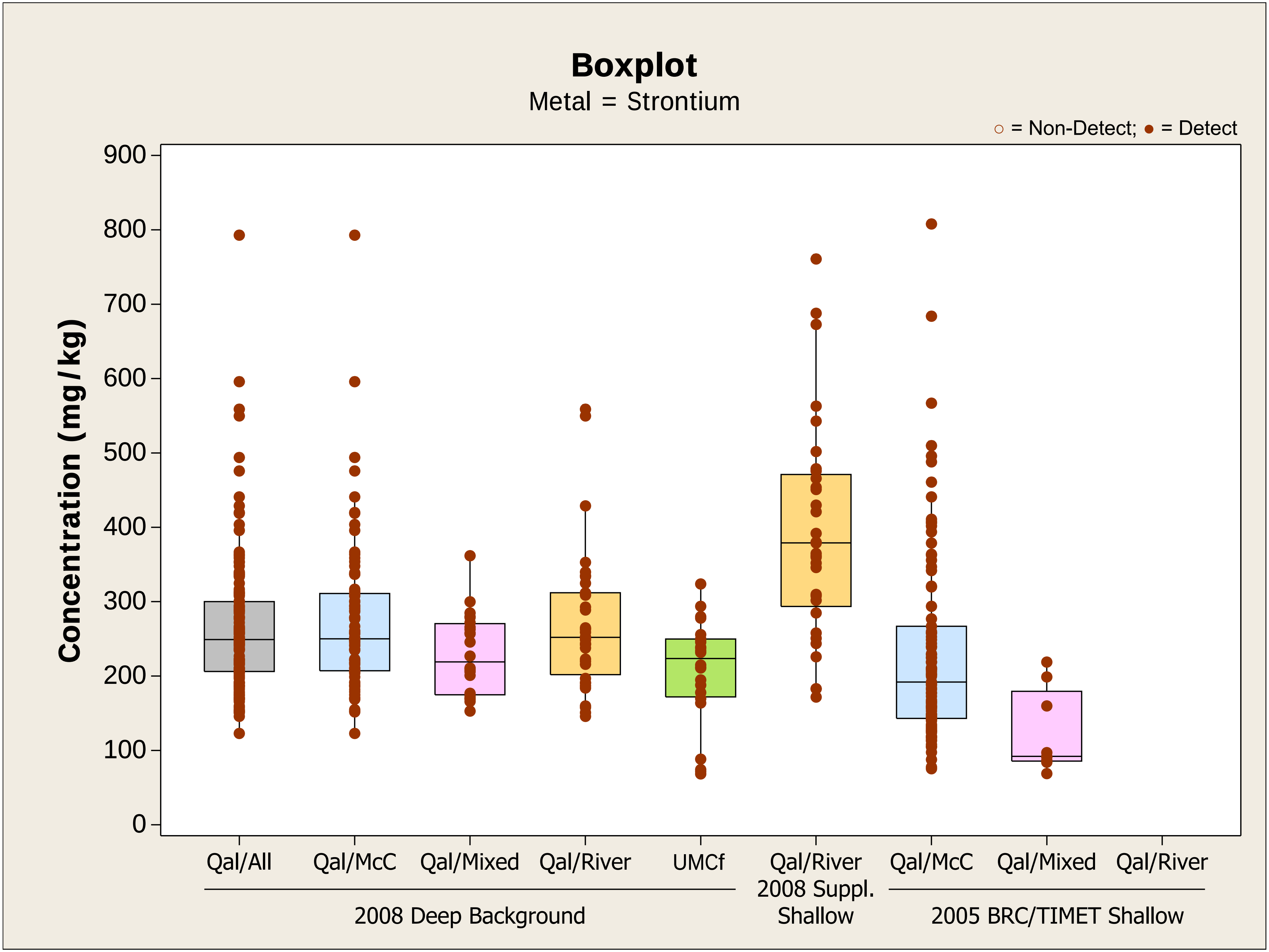
Boxplot
Metal = Selenium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

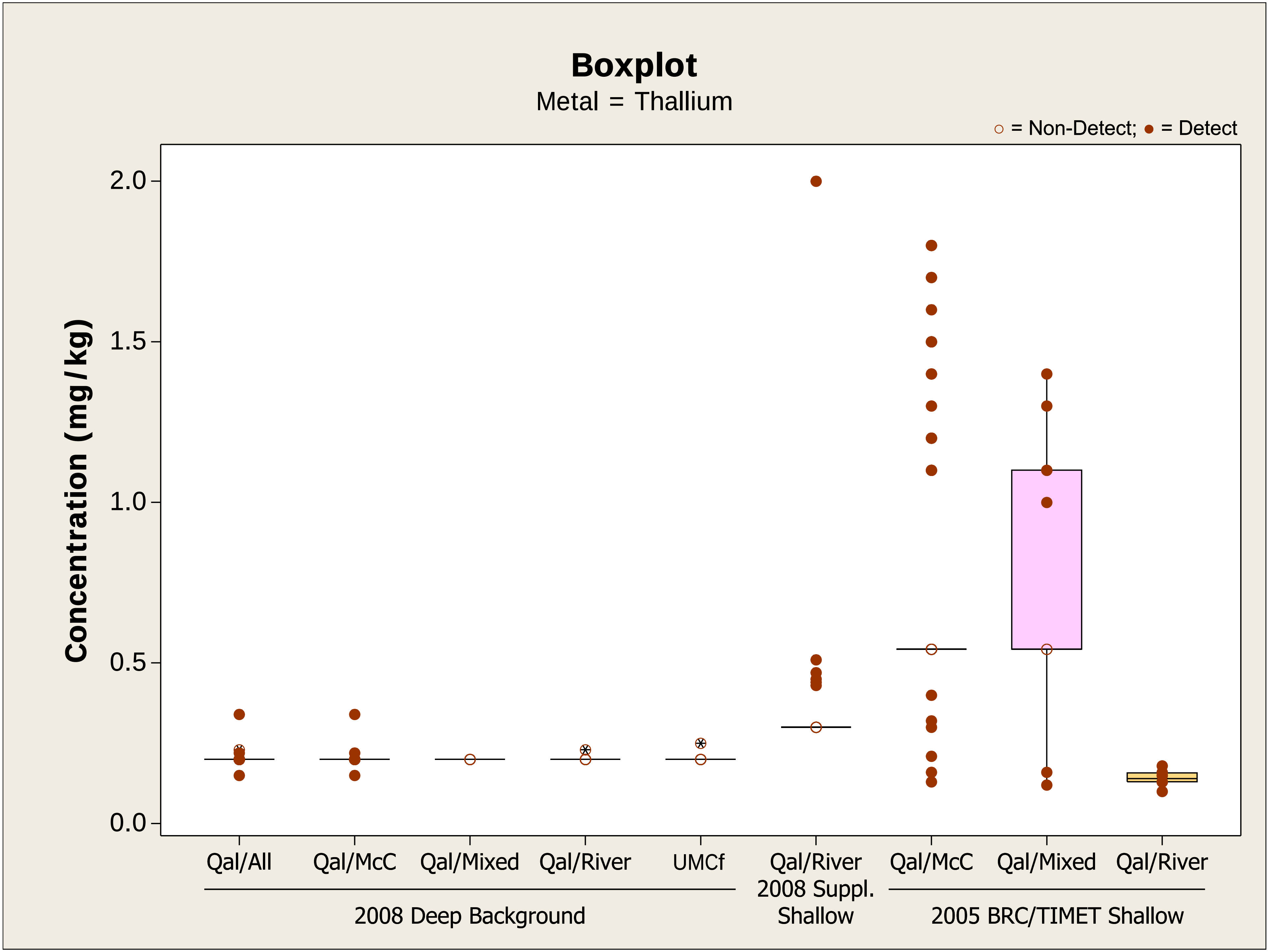


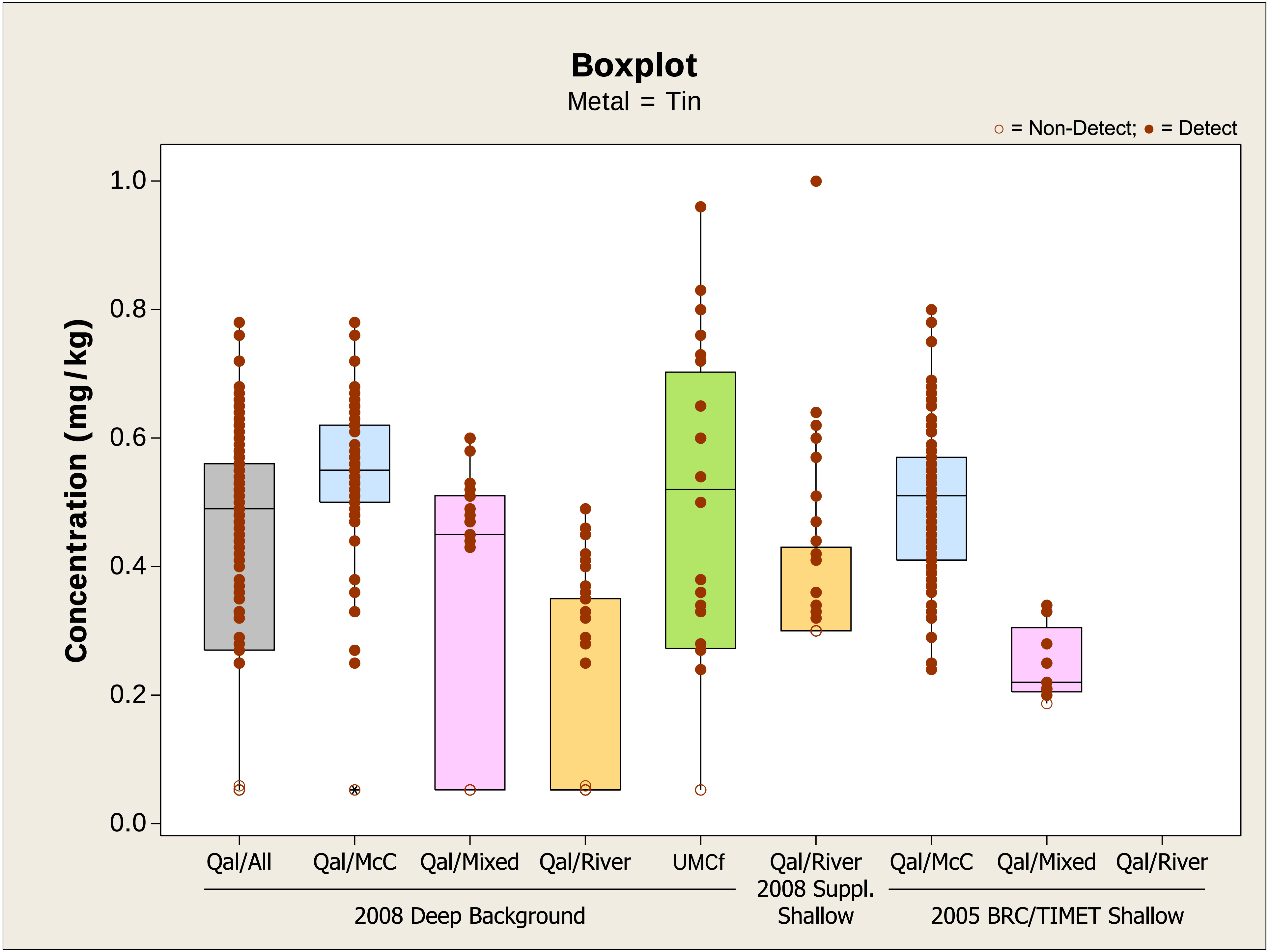
Boxplot
Metal = Silicon
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
8000
7000
6000
5000
4000
3000
2000
1000
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

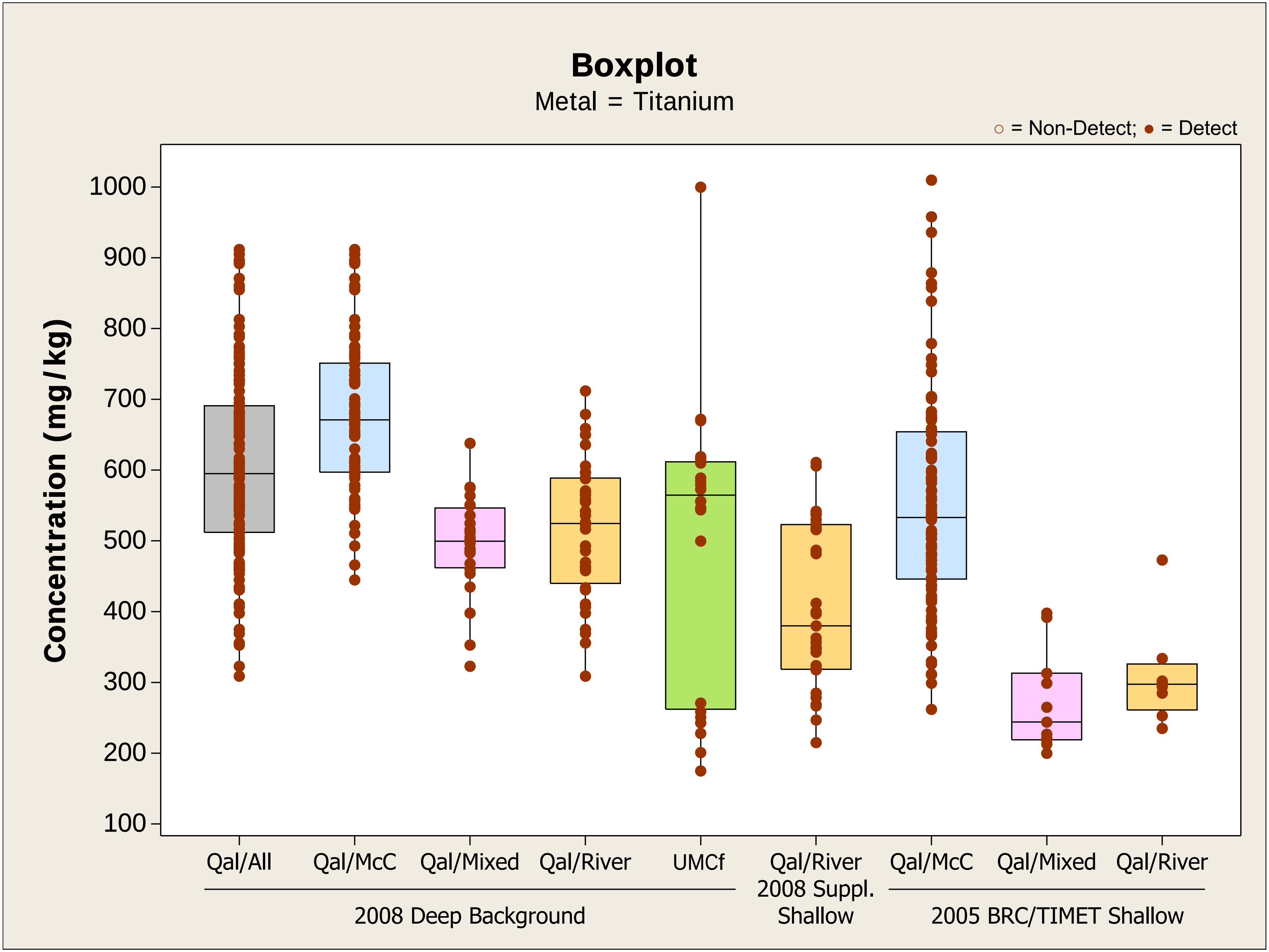

Boxplot
Metal = Silver
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
2.5
2.0
1.5
1.0
0.5
0.0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
2008 Suppl. Shallow
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2005 BRC/TIMET Shallow

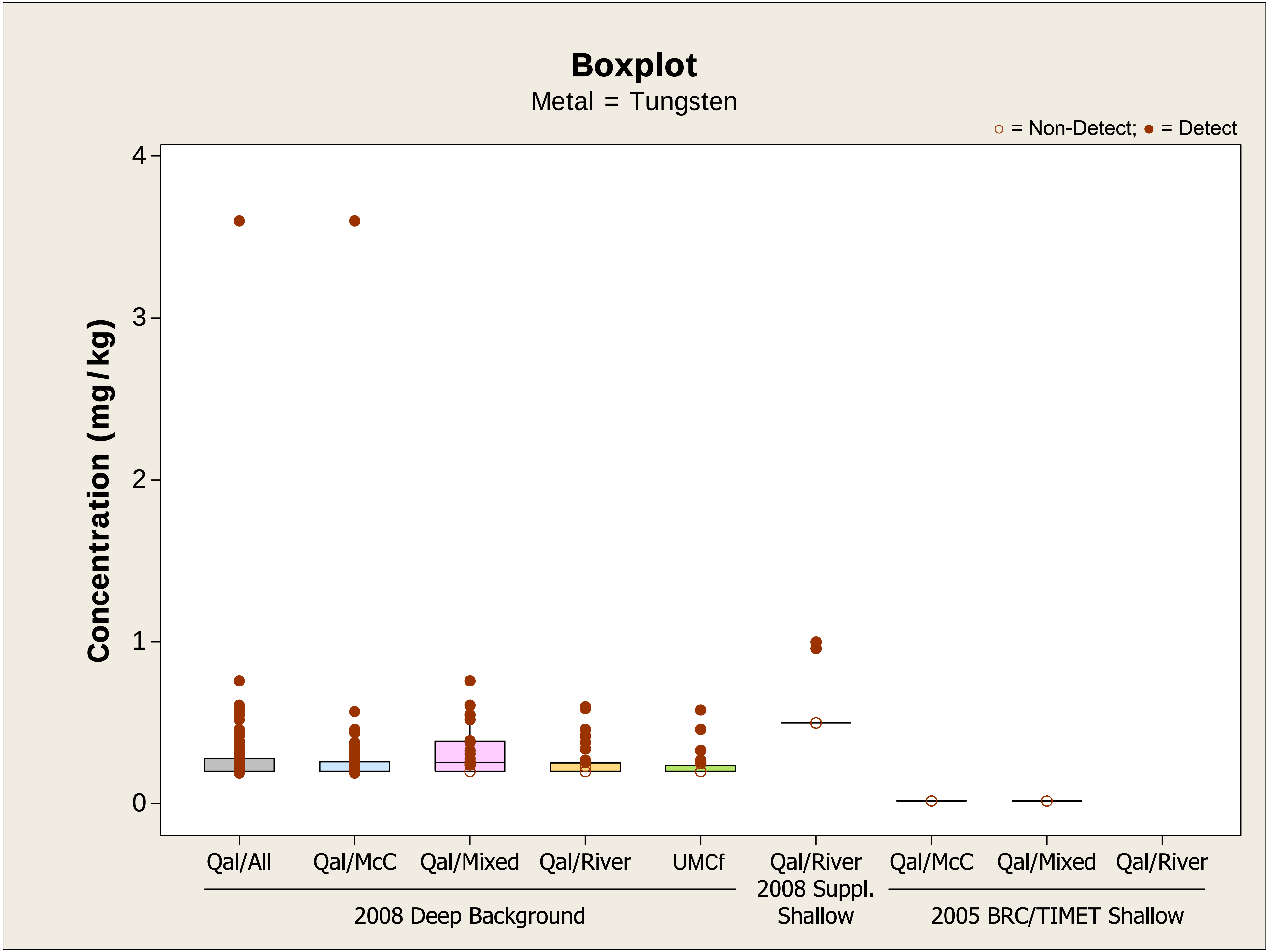

Boxplot
Metal = Sodium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
4000
3000
2000
1000
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow


Boxplot
Metal = Strontium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
900
800
700
600
500
400
300
200
100
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

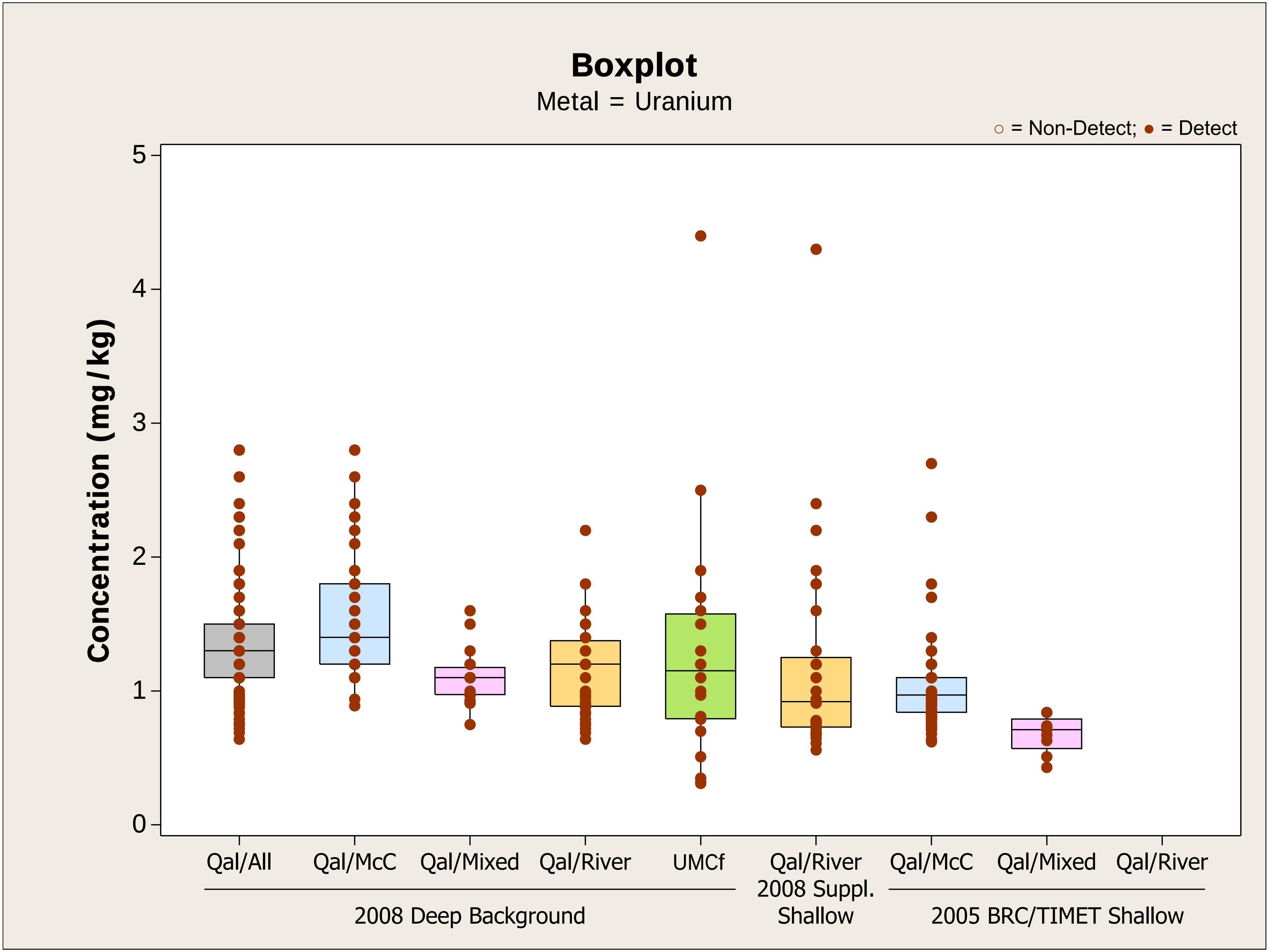

Boxplot
Metal = Thallium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
2.0
1.5
1.0
0.5
0.0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl.
Shallow
2005 BRC/TIMET Shallow


Boxplot
Metal = Tin
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
1.0
0.8
0.6
0.4
0.2
0.0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

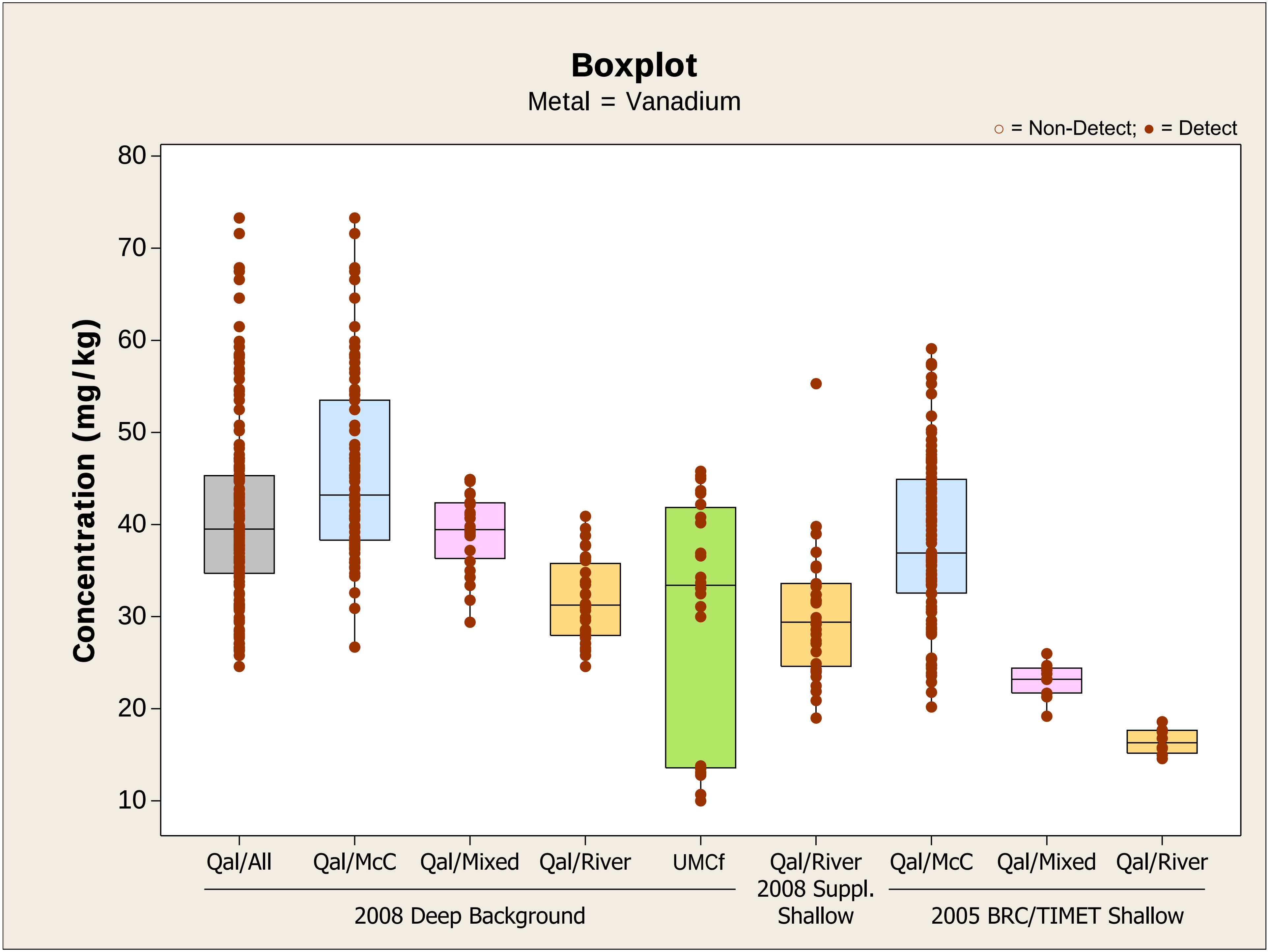

Boxplot
Metal = Titanium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
1000
900
800
700
600
500
400
300
200
100
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow



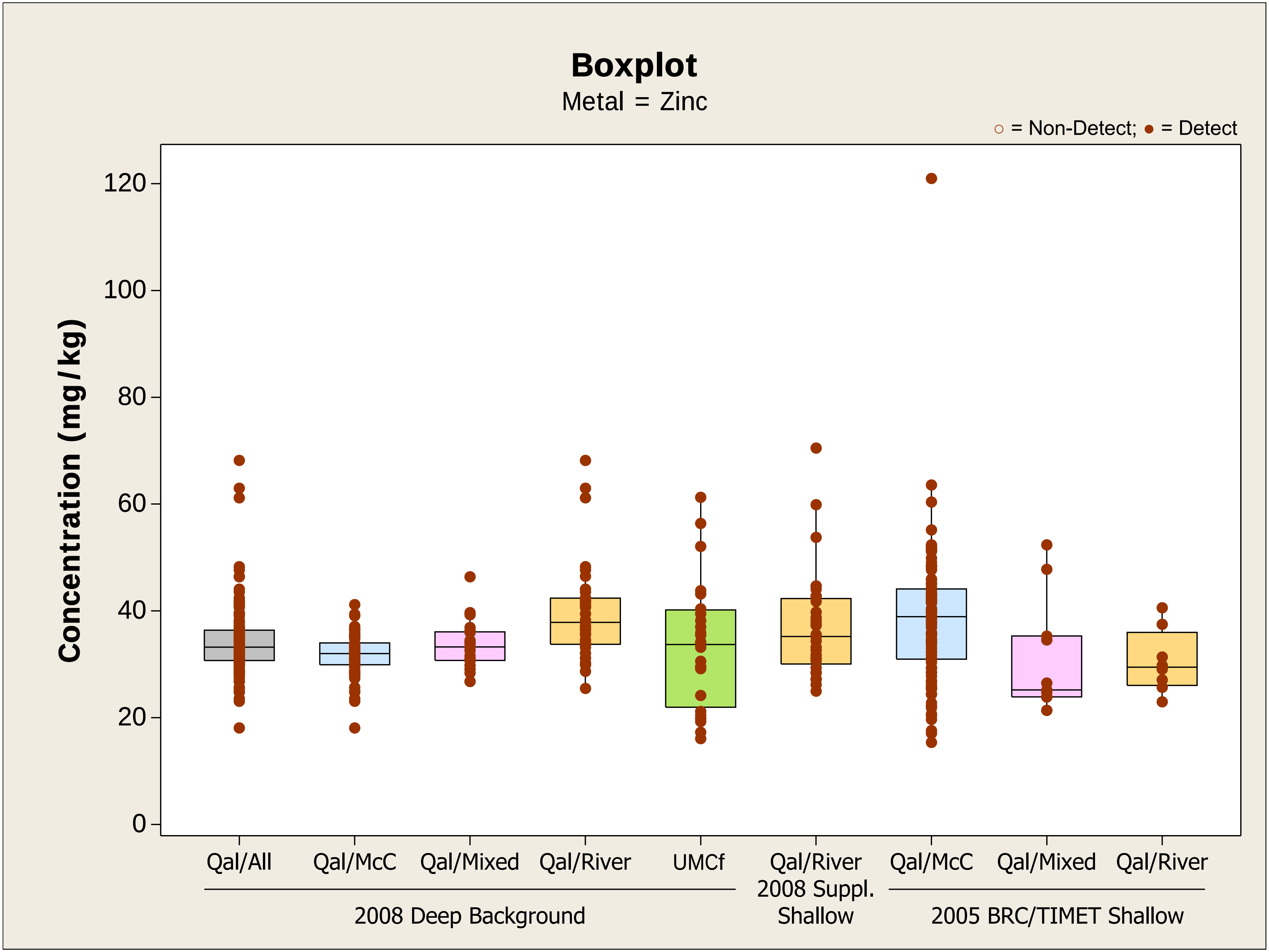
Boxplot
Metal = Tungsten
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
4
3
2
1
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

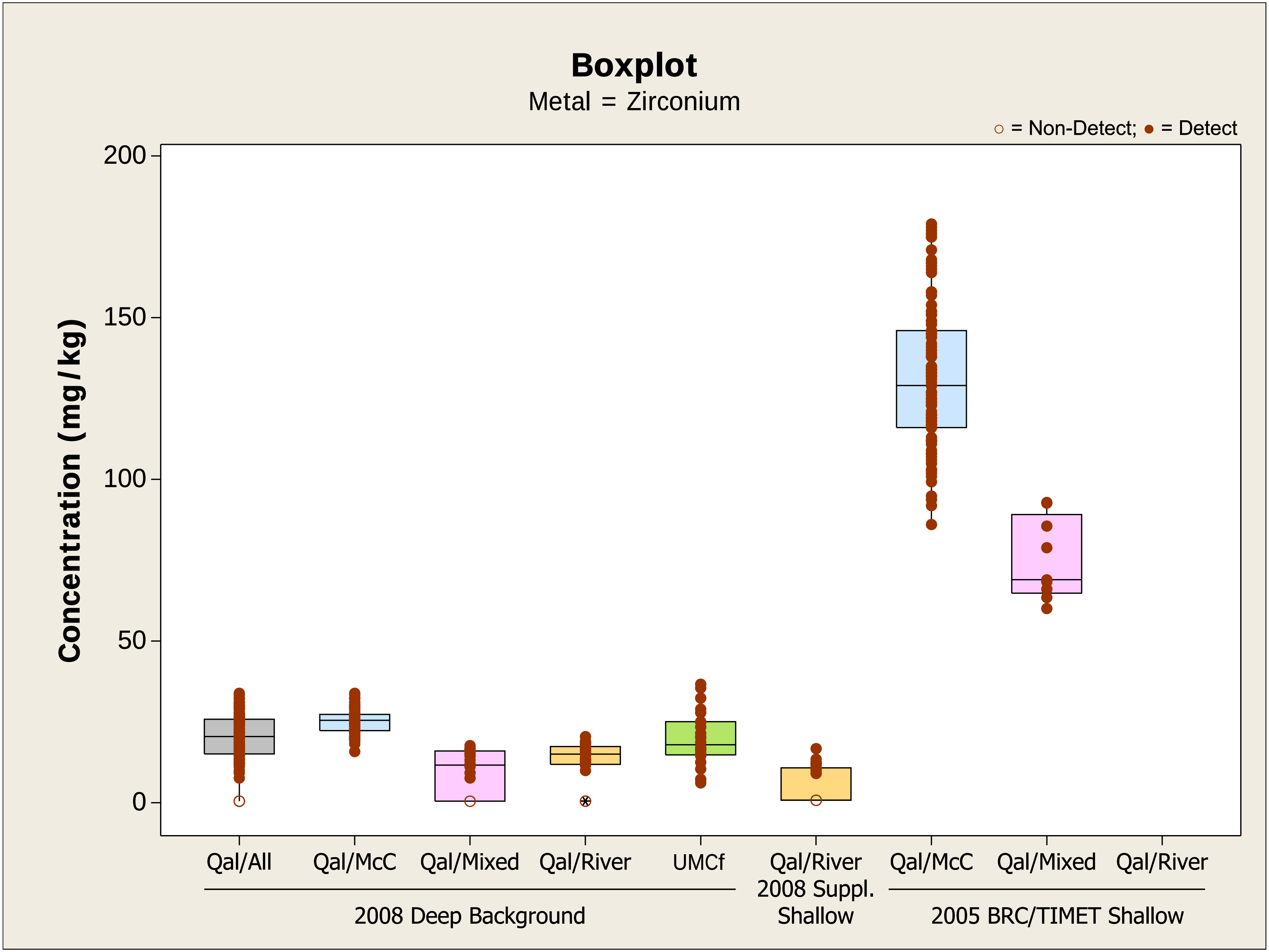


Boxplot
Metal = Uranium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0
1
2
3
4
5
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl.
Shallow
2005 BRC/TIMET Shallow

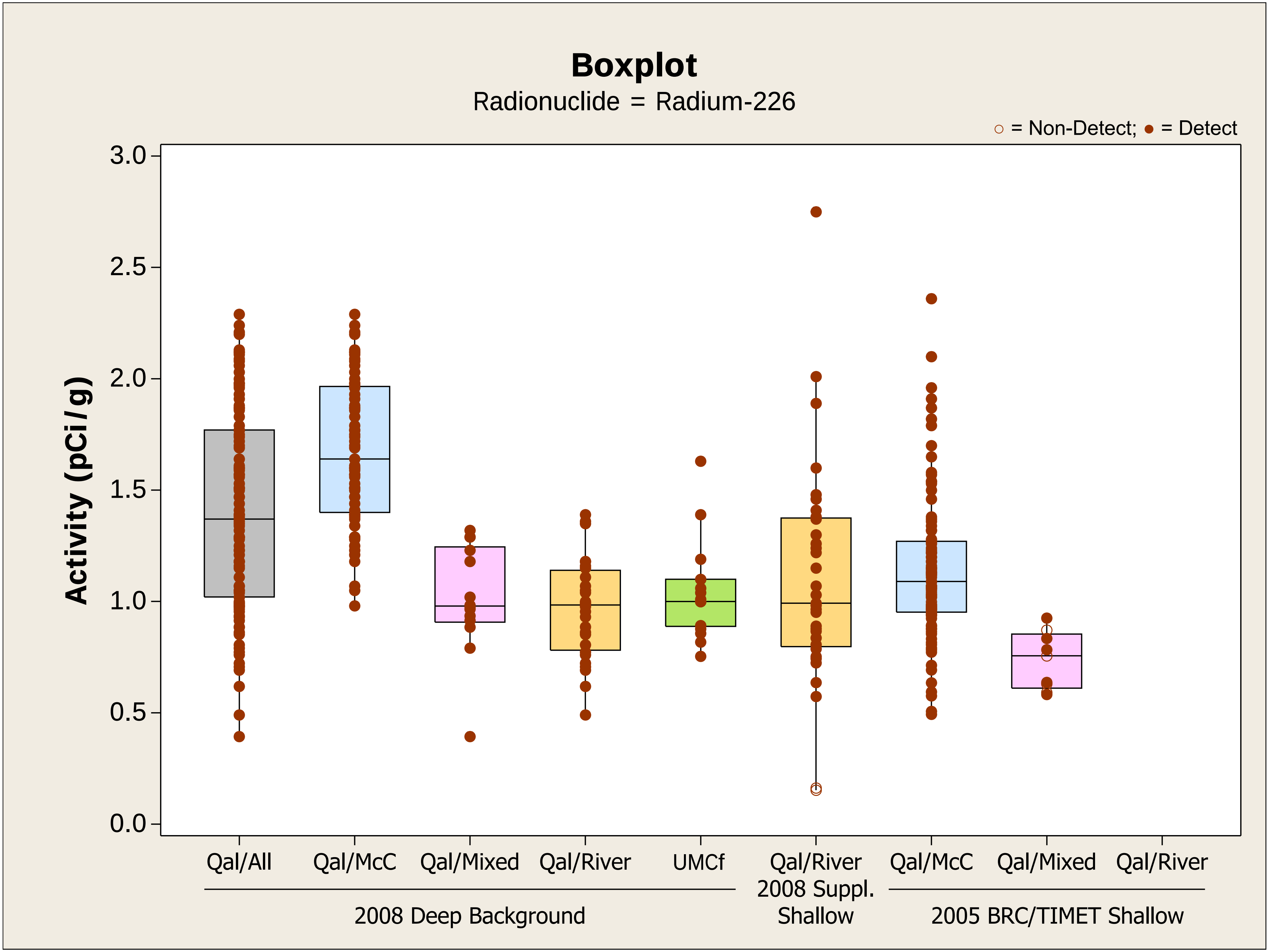


Boxplot
Metal = Vanadium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
80
70
60
50
40
30
20
10
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

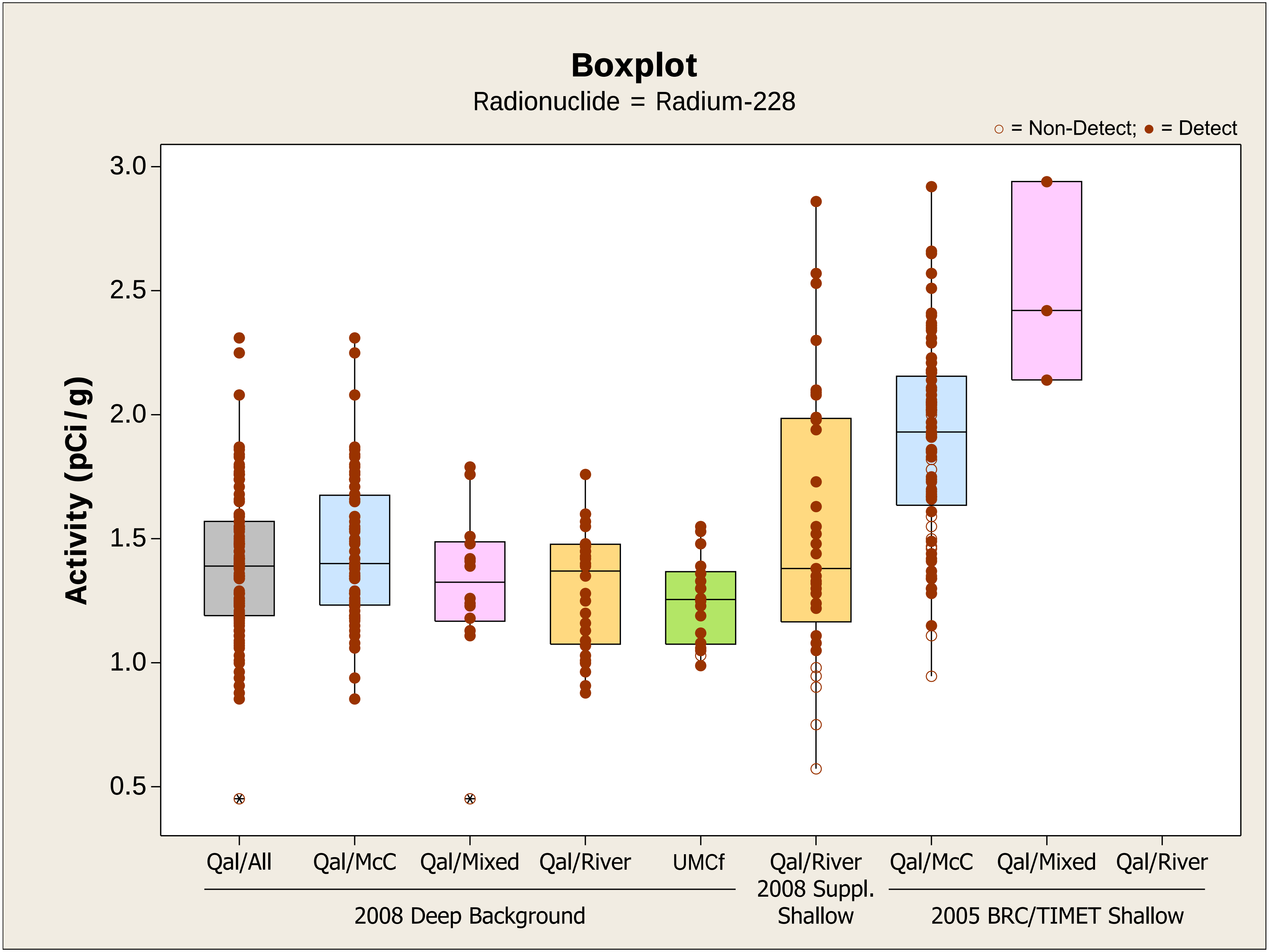

Boxplot
Metal = Zinc
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
120
100
80
60
40
20
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

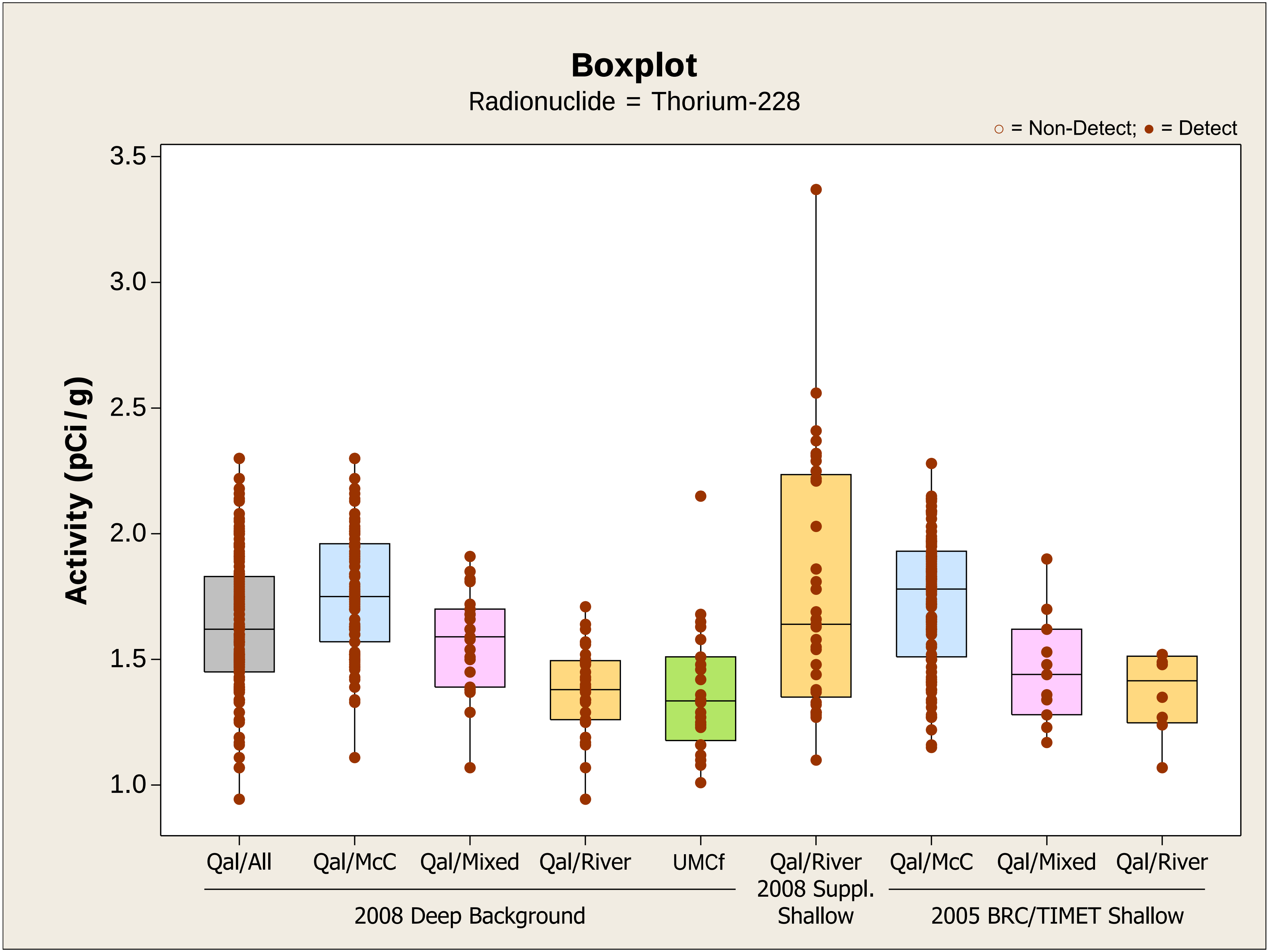


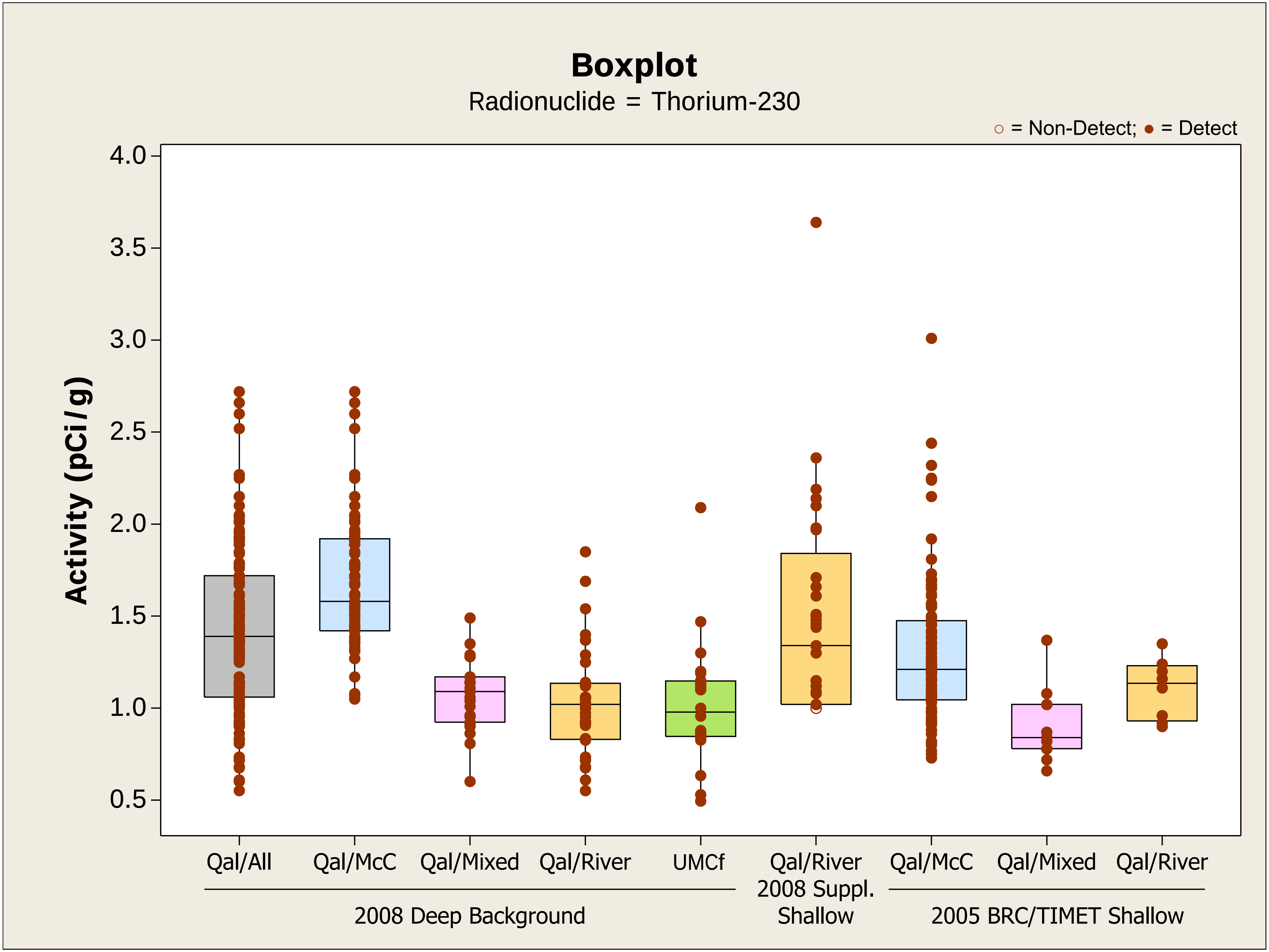
Boxplot
Metal = Zirconium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
200
150
100
50
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

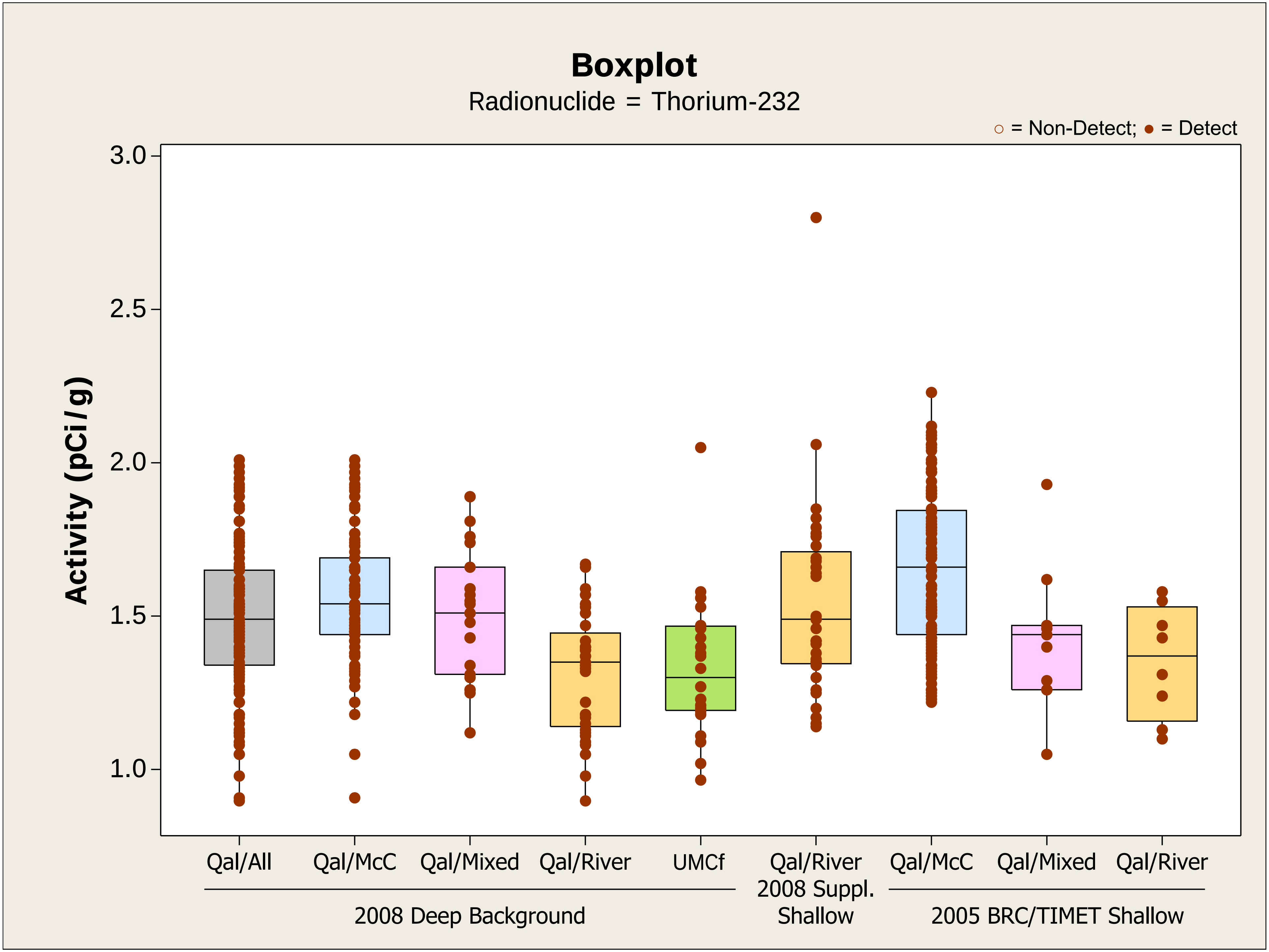


Boxplot
Radionuclide = Radium-226
○ = Non-Detect; ● = Detect
Activity (pCi / g)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

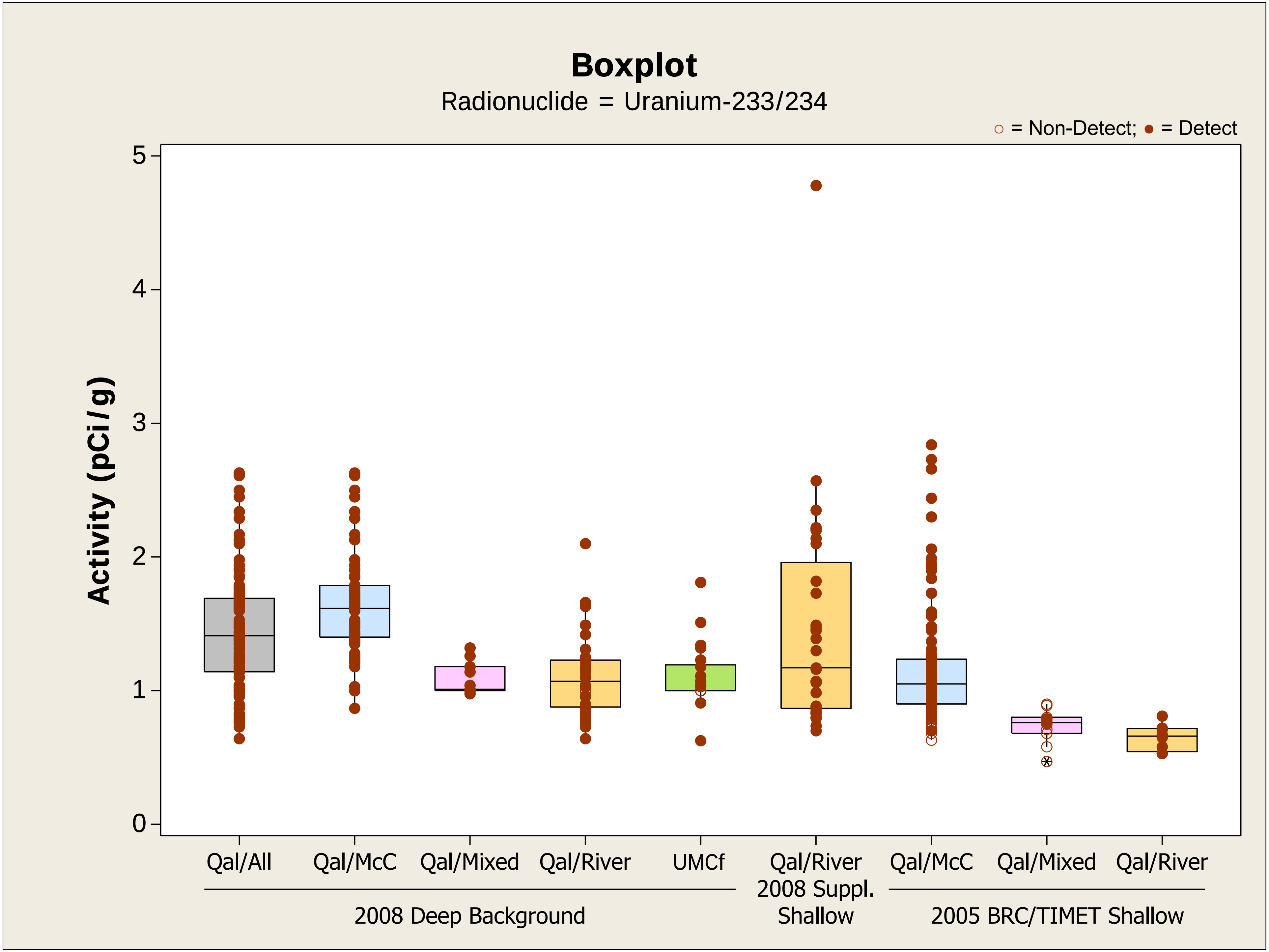

Boxplot
Radionuclide = Radium-228
○ = Non-Detect; ● = Detect
Activity (pCi / g)
3.0
2.5
2.0
1.5
1.0
0.5
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow


Boxplot
Radionuclide = Thorium-228
○ = Non-Detect; ● = Detect
Activity (pCi / g)
3.5
3.0
2.5
2.0
1.5
1.0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
2008 Suppl.
Shallow
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2005 BRC/TIMET Shallow

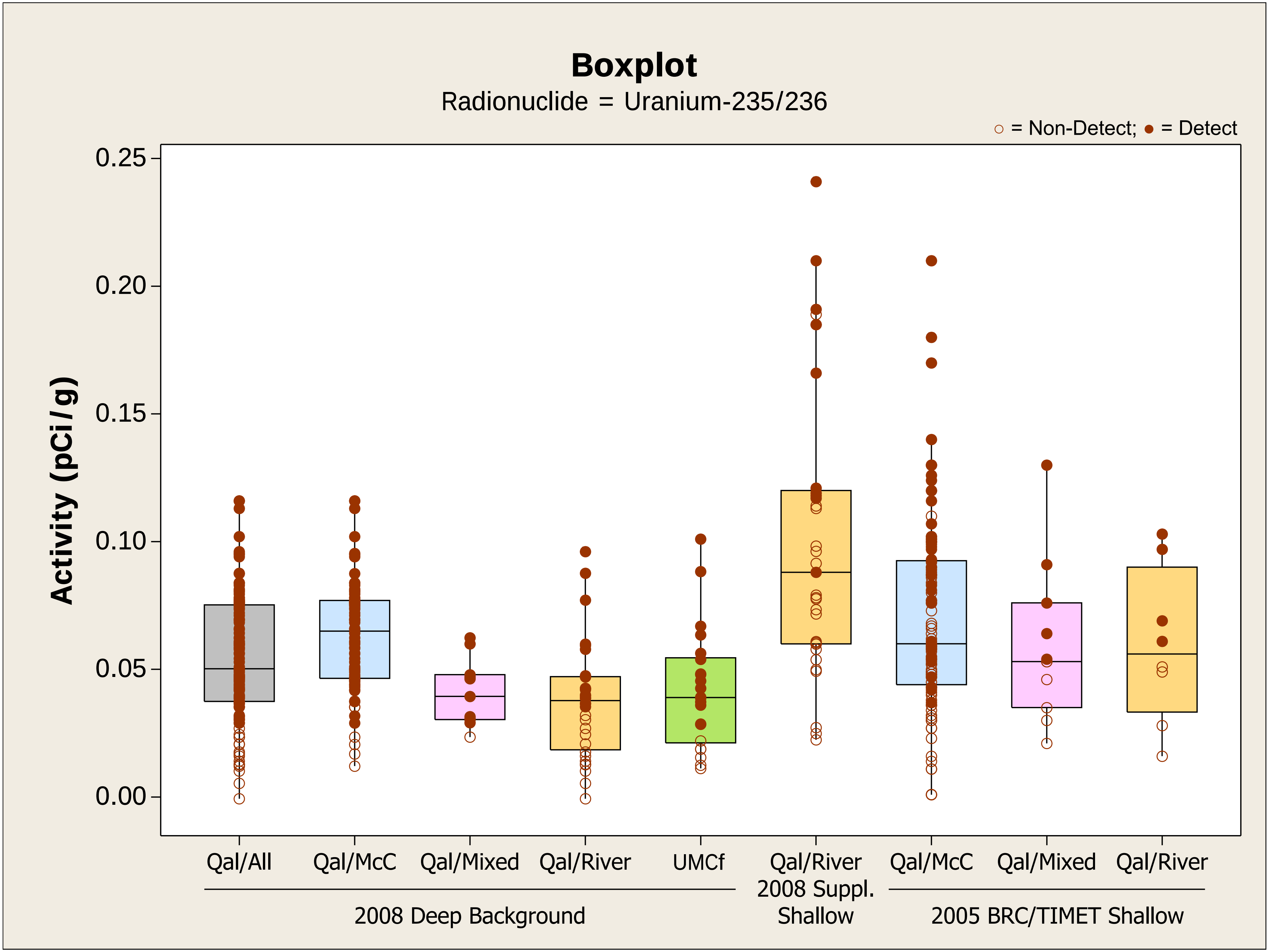

Boxplot
Radionuclide = Thorium-230
○ = Non-Detect; ● = Detect
Activity (pCi / g)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

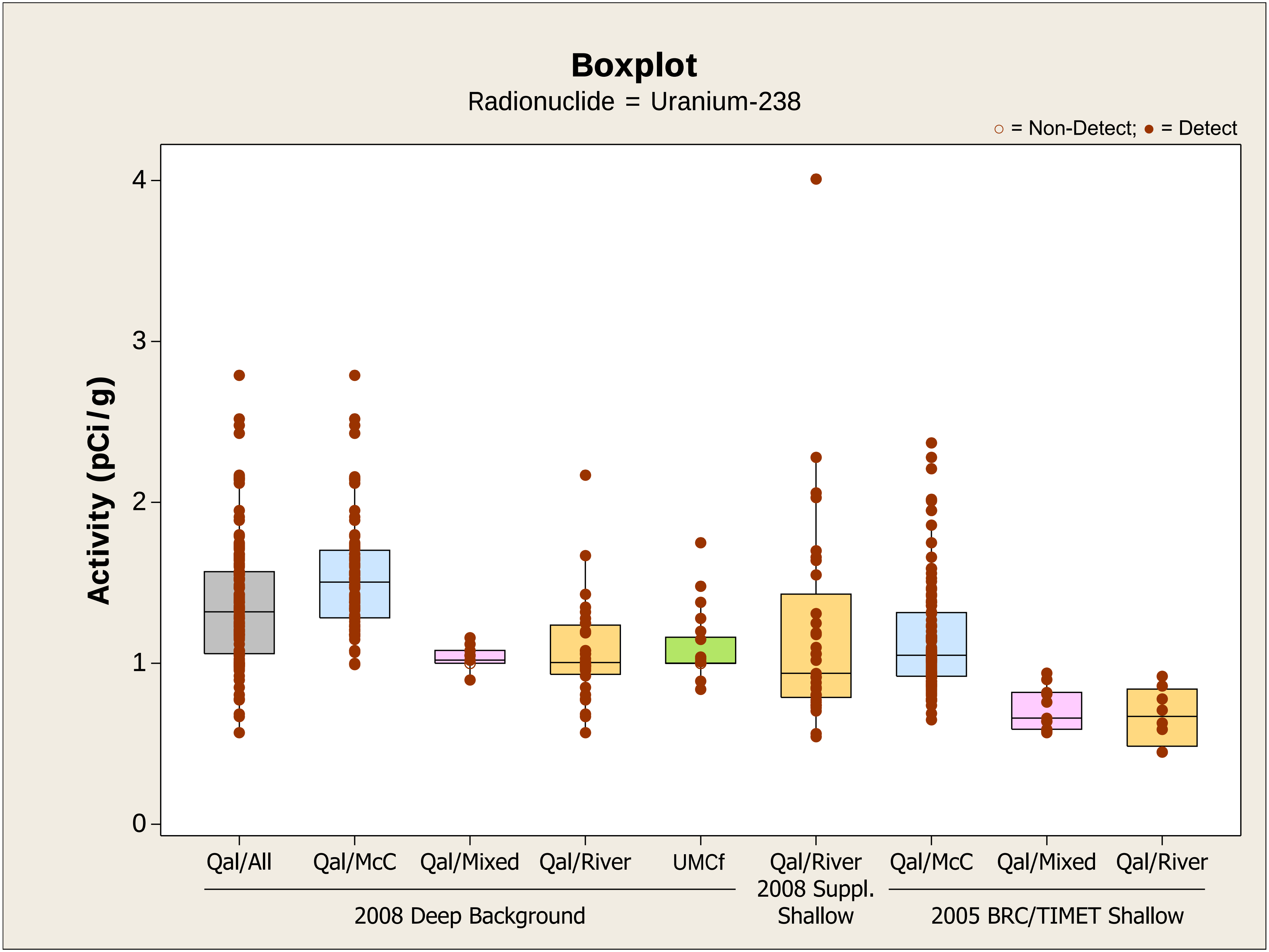


Boxplot
Radionuclide = Thorium-232
○ = Non-Detect; ● = Detect
Activity (pCi / g)
3.0
2.5
2.0
1.5
1.0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow



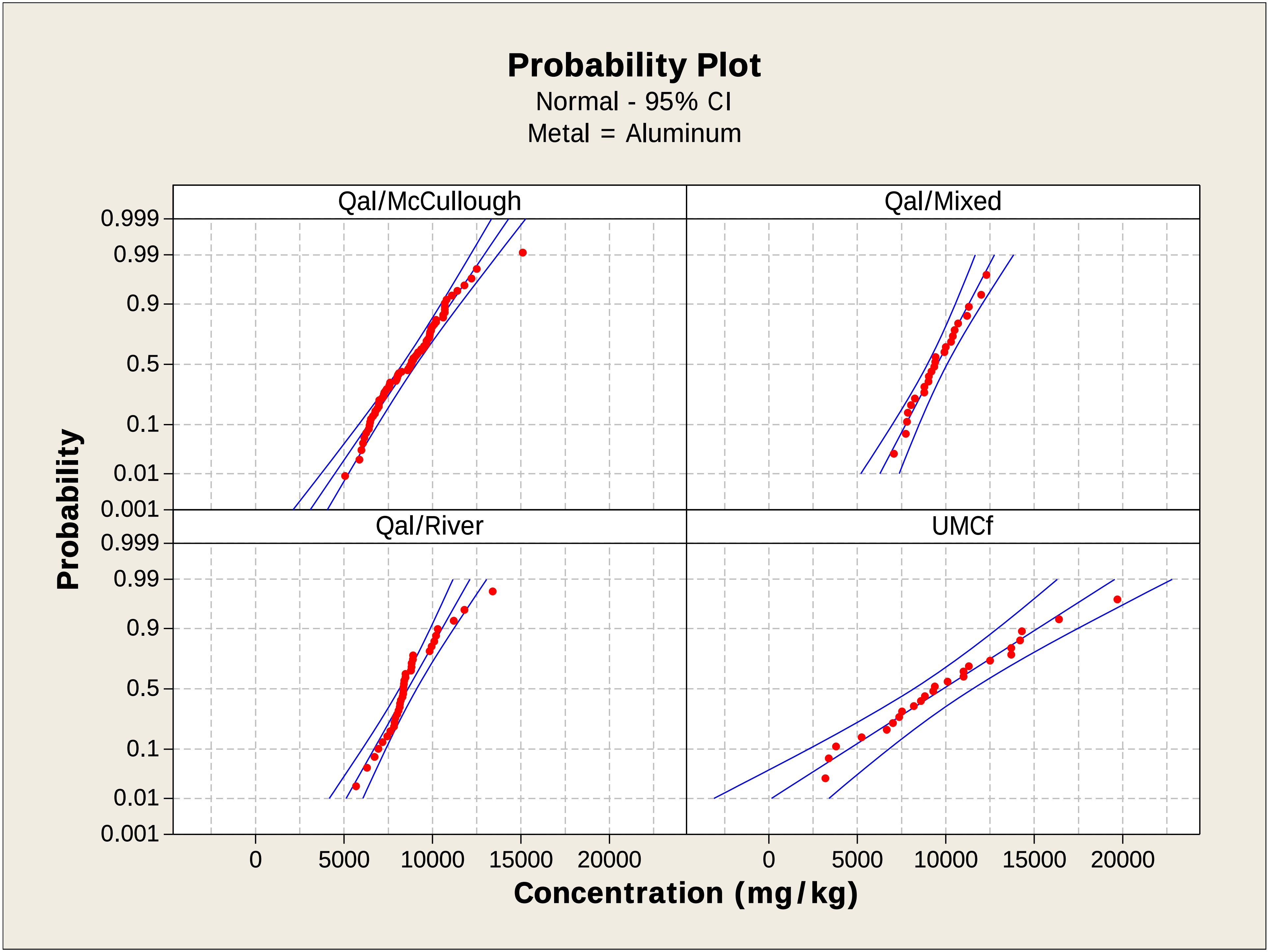
Boxplot
Radionuclide = Uranium-233/234
○ = Non-Detect; ● = Detect
Activity (pCi / g)
5
4
3
2
1
0
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow


Boxplot
Radionuclide = Uranium-235/236
○ = Non-Detect; ● = Detect
Activity (pCi / g)
0.25
0.20
0.15
0.10
0.05
0.00
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

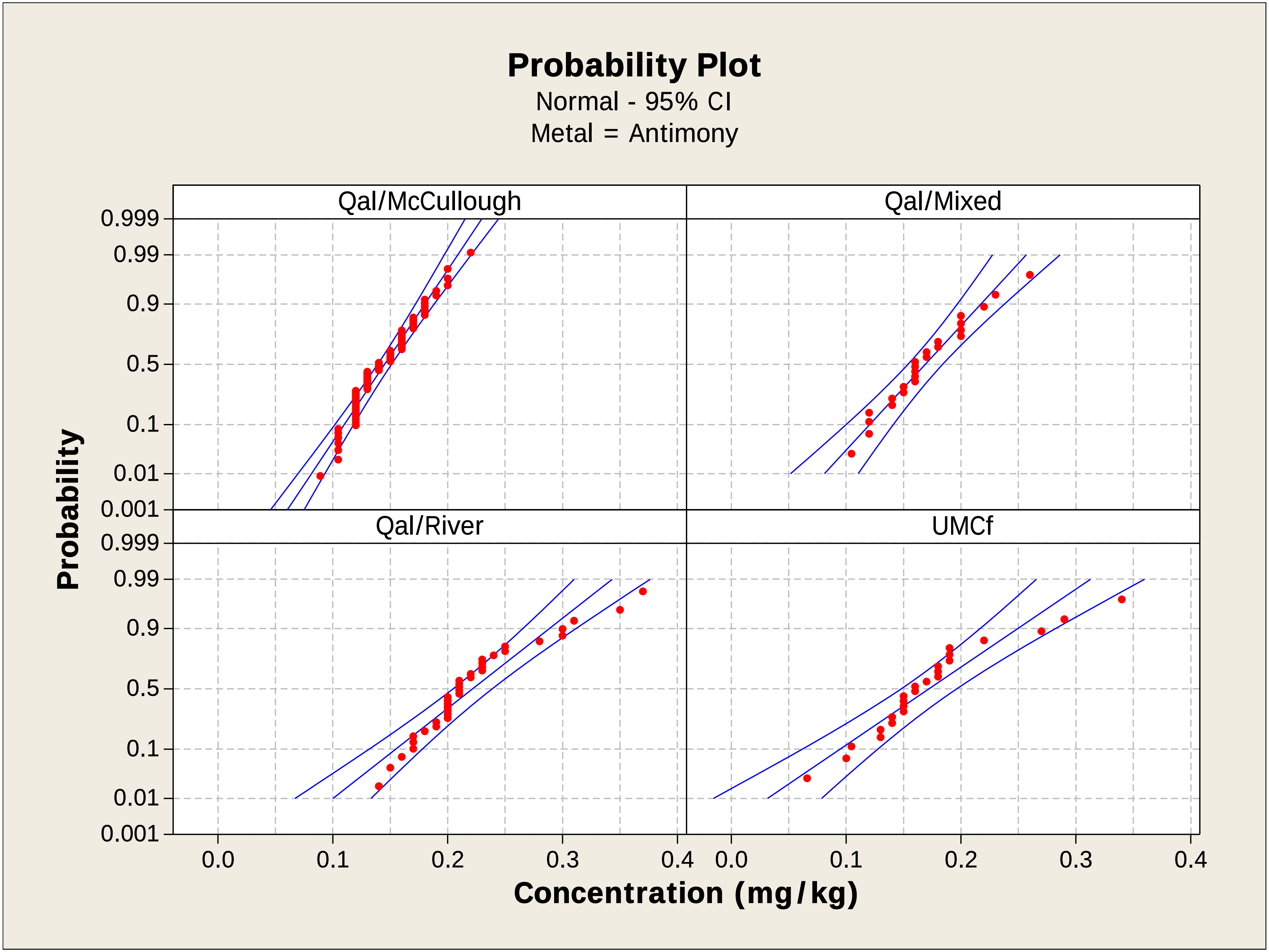


Boxplot
Radionuclide = Uranium-238
○ = Non-Detect; ● = Detect
Activity (pCi / g)
0
1
2
3
4
Qal/All
Qal/McC
Qal/Mixed
Qal/River
UMCf
Qal/River
Qal/McC
Qal/Mixed
Qal/River
2008 Deep Background
2008 Suppl. Shallow
2005 BRC/TIMET Shallow

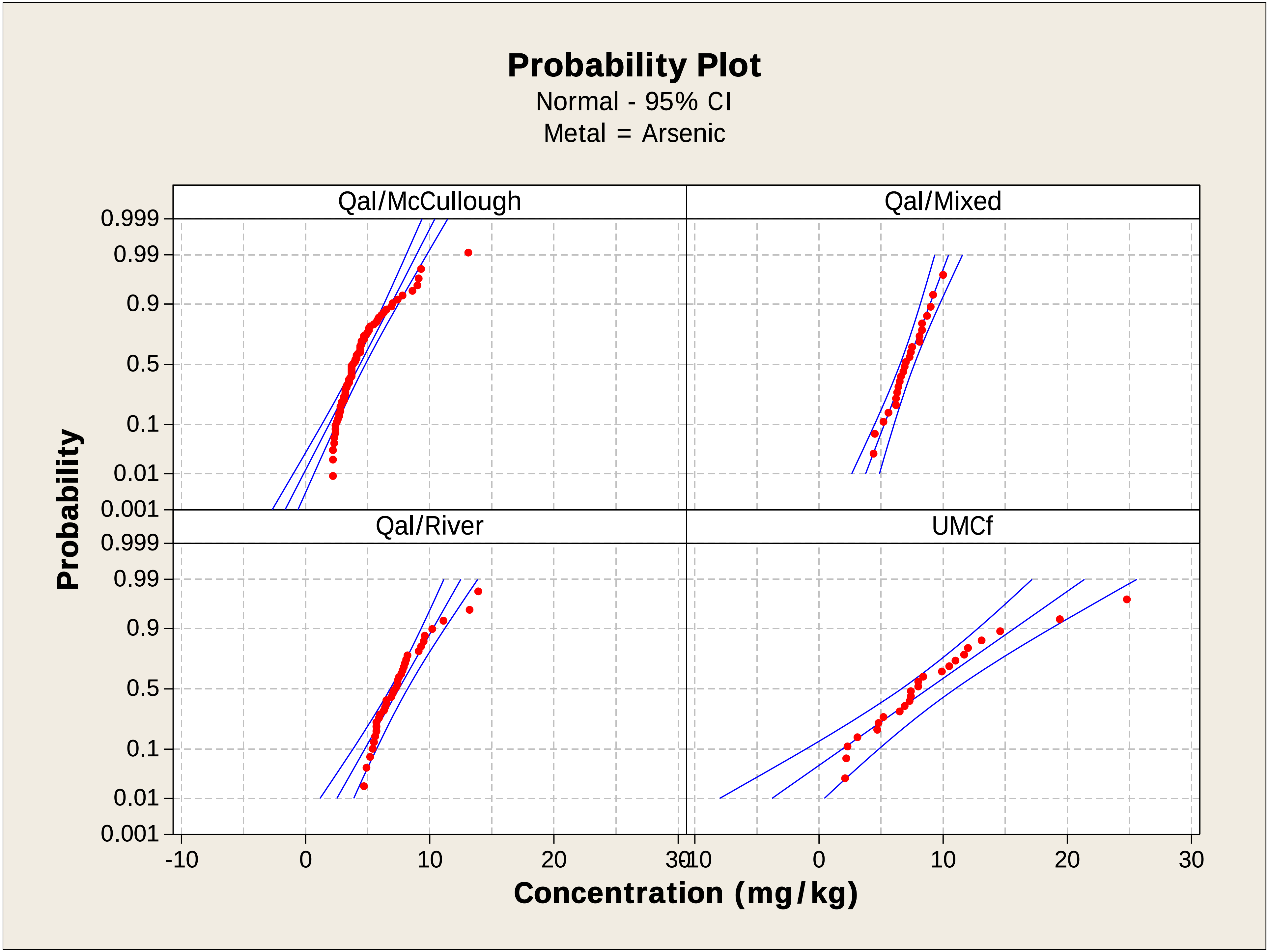
PROBABILITY PLOTS

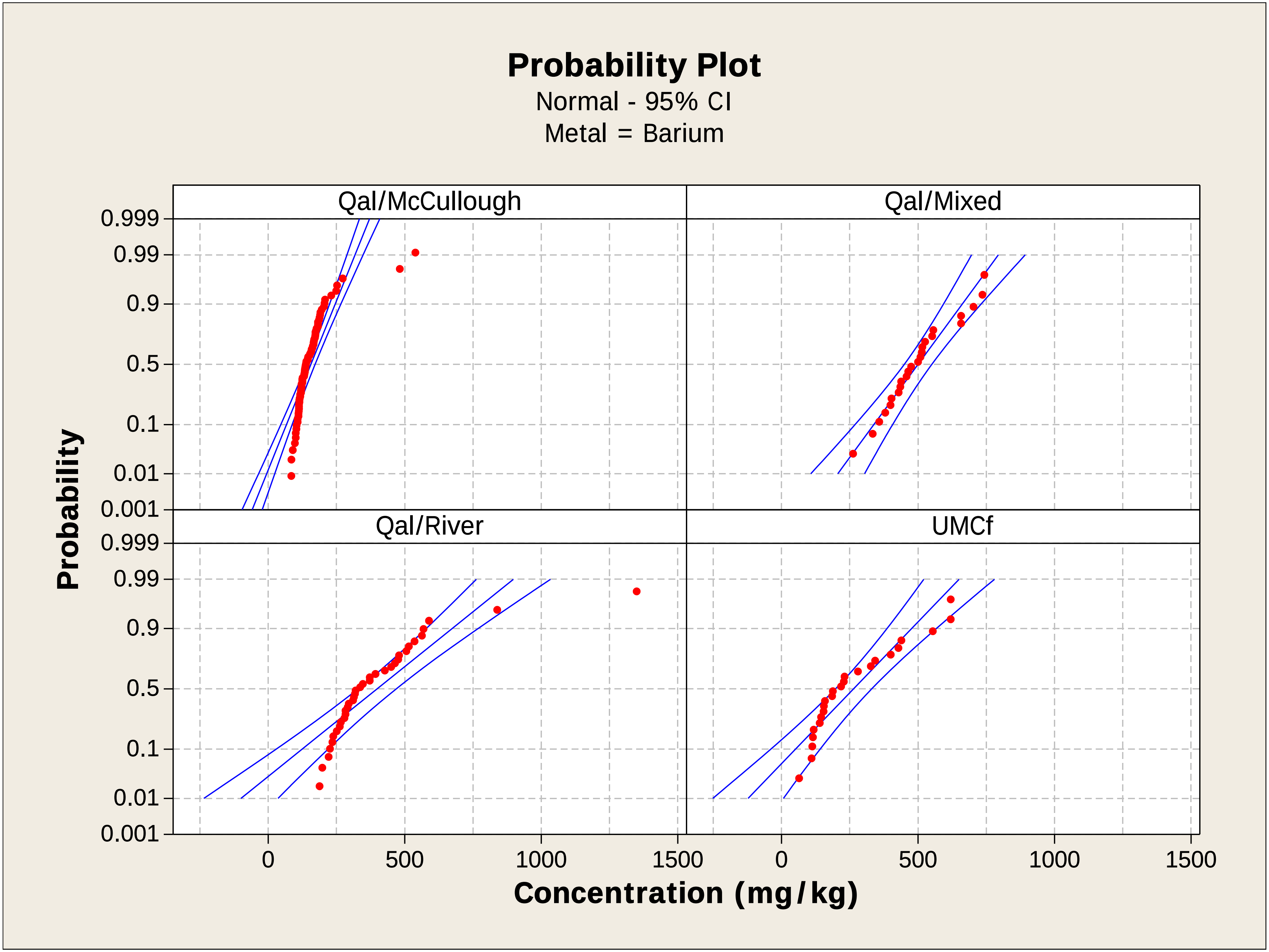


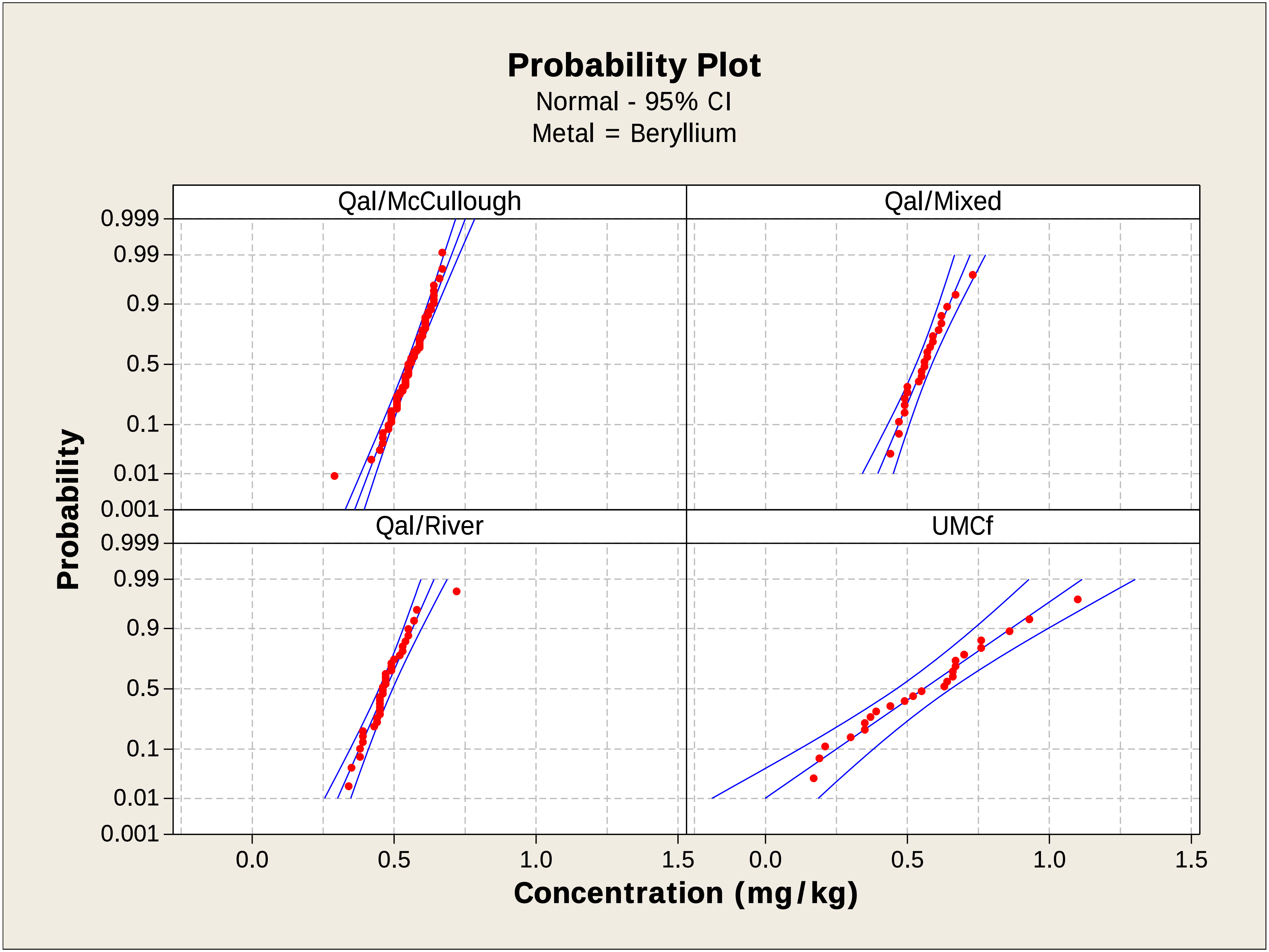
Probability Plot
Normal - 95% CI
Metal = Aluminum
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
5000
10000
15000
20000
Concentration (mg/kg)



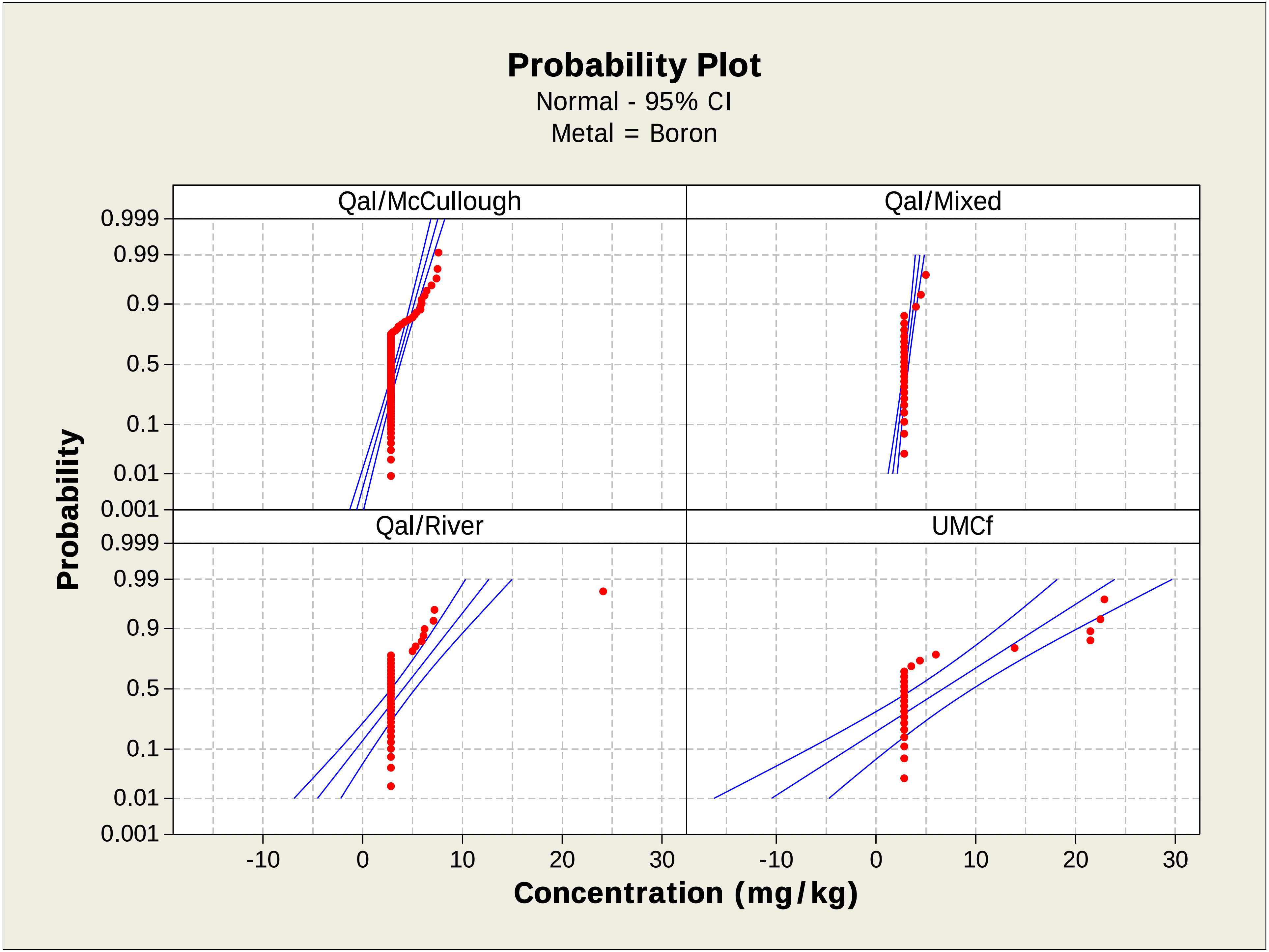
Probability Plot
Normal - 95% CI
Metal = Antimony
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.0
0.1
0.2
0.3
0.4
Probability
Concentration (mg/kg)


Probability Plot
Normal - 95% CI
Metal = Arsenic
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
Probability
-10
0
10
20
30
Concentration (mg/kg)

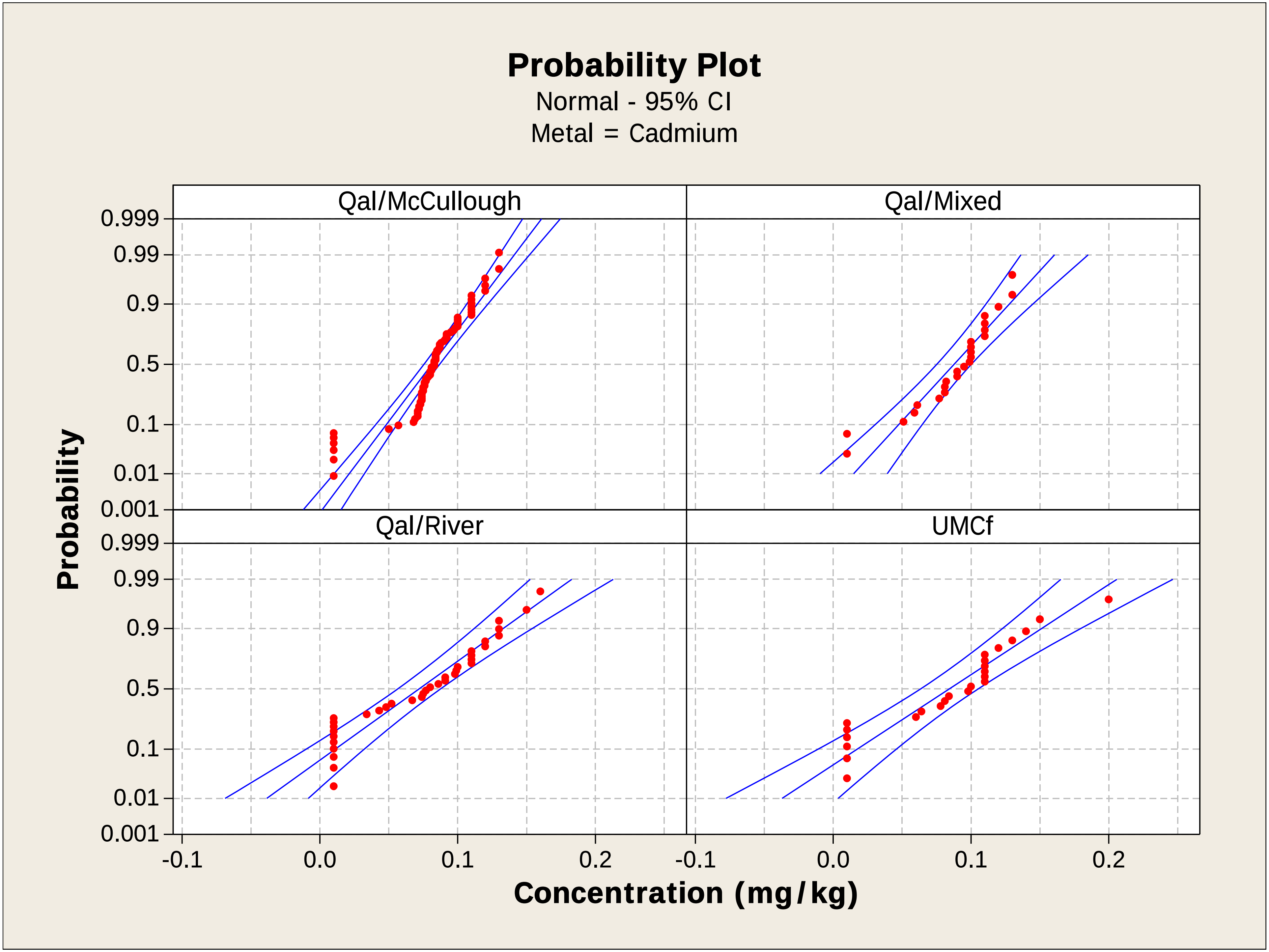

Probability Plot
Normal - 95% CI
Metal = Barium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
500
1000
1500
Concentration (mg/kg)

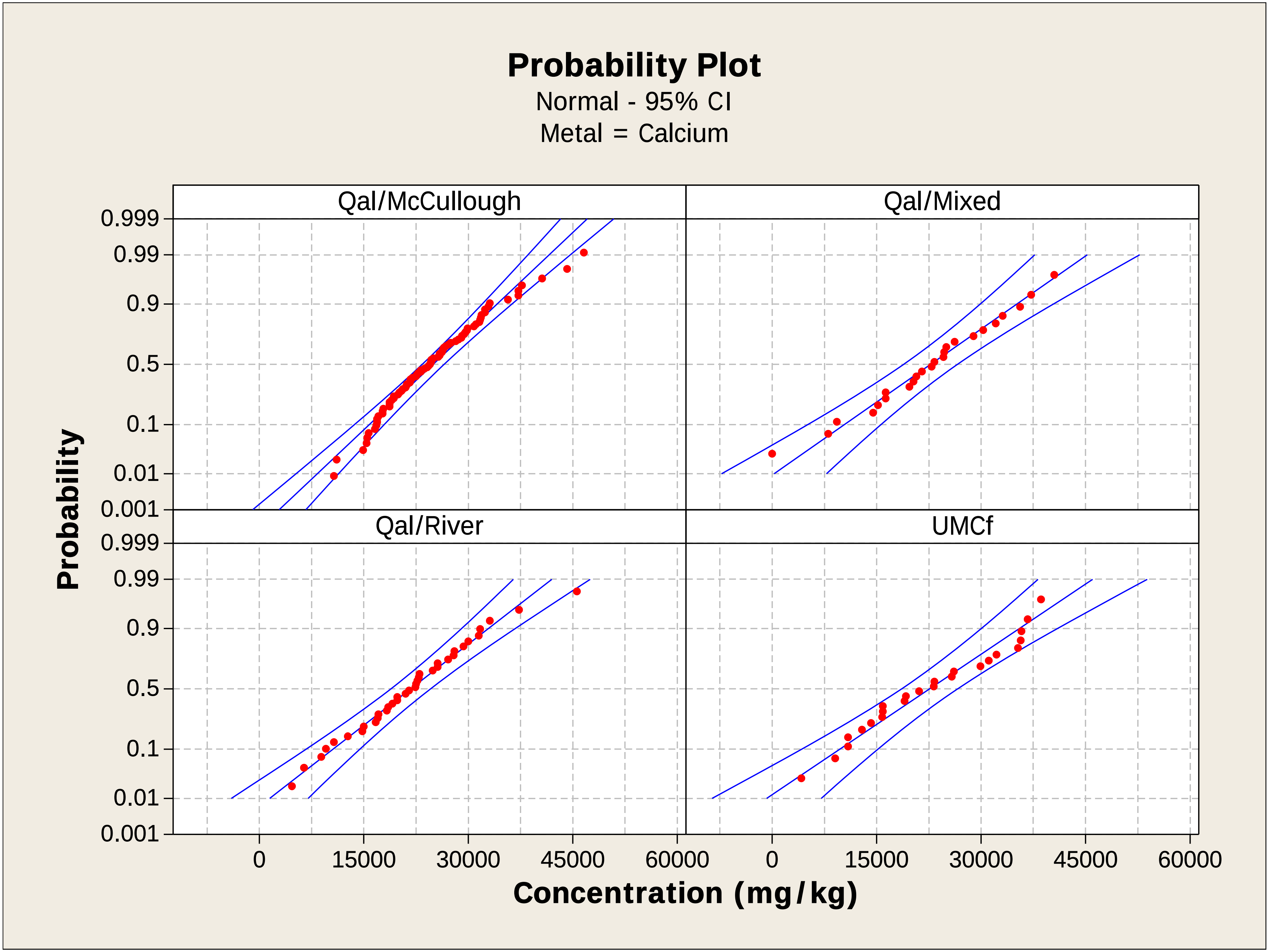


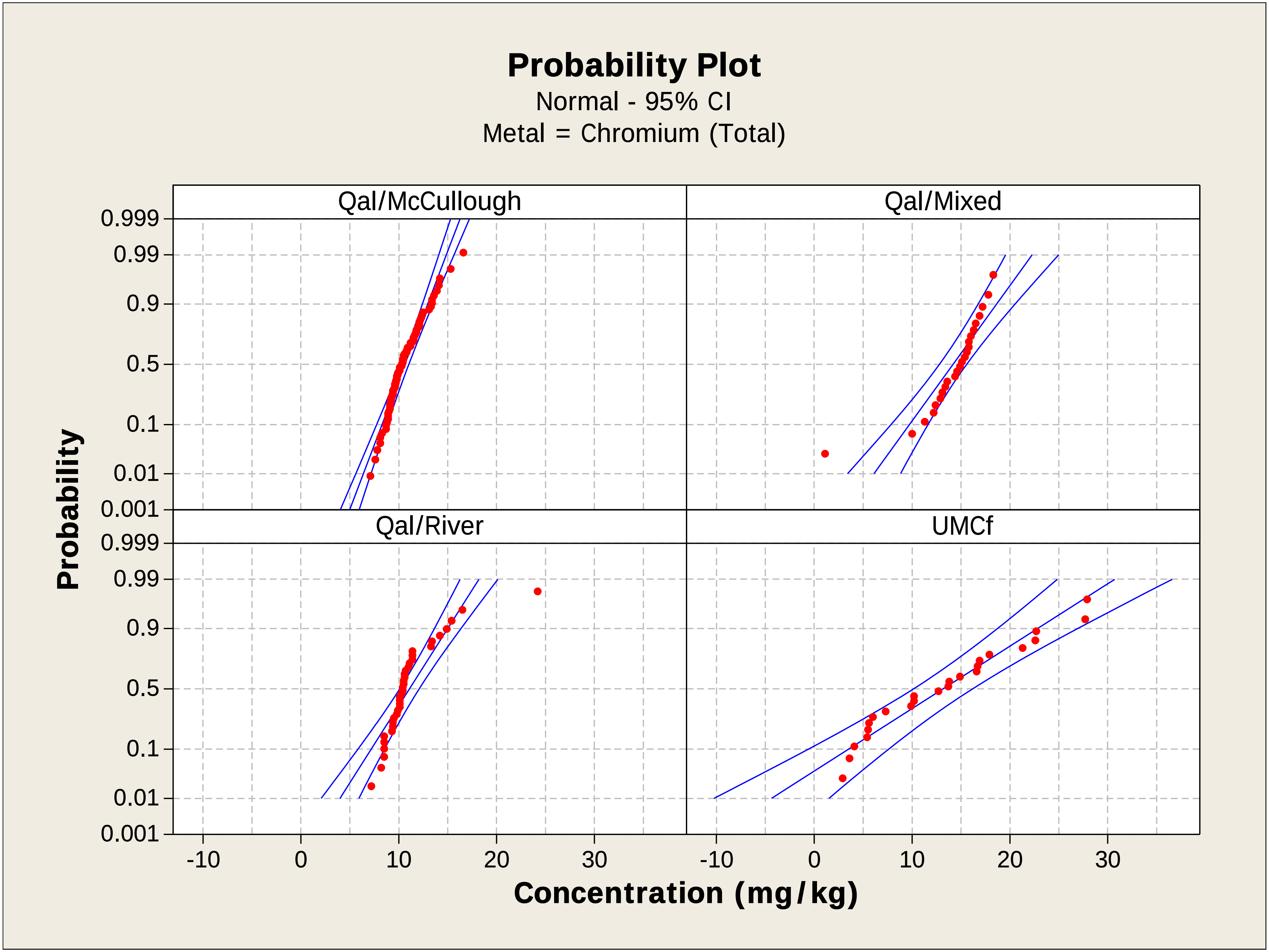
Probability Plot
Normal - 95% CI
Metal = Beryllium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.0
0.5
1.0
1.5
Concentration (mg/kg)



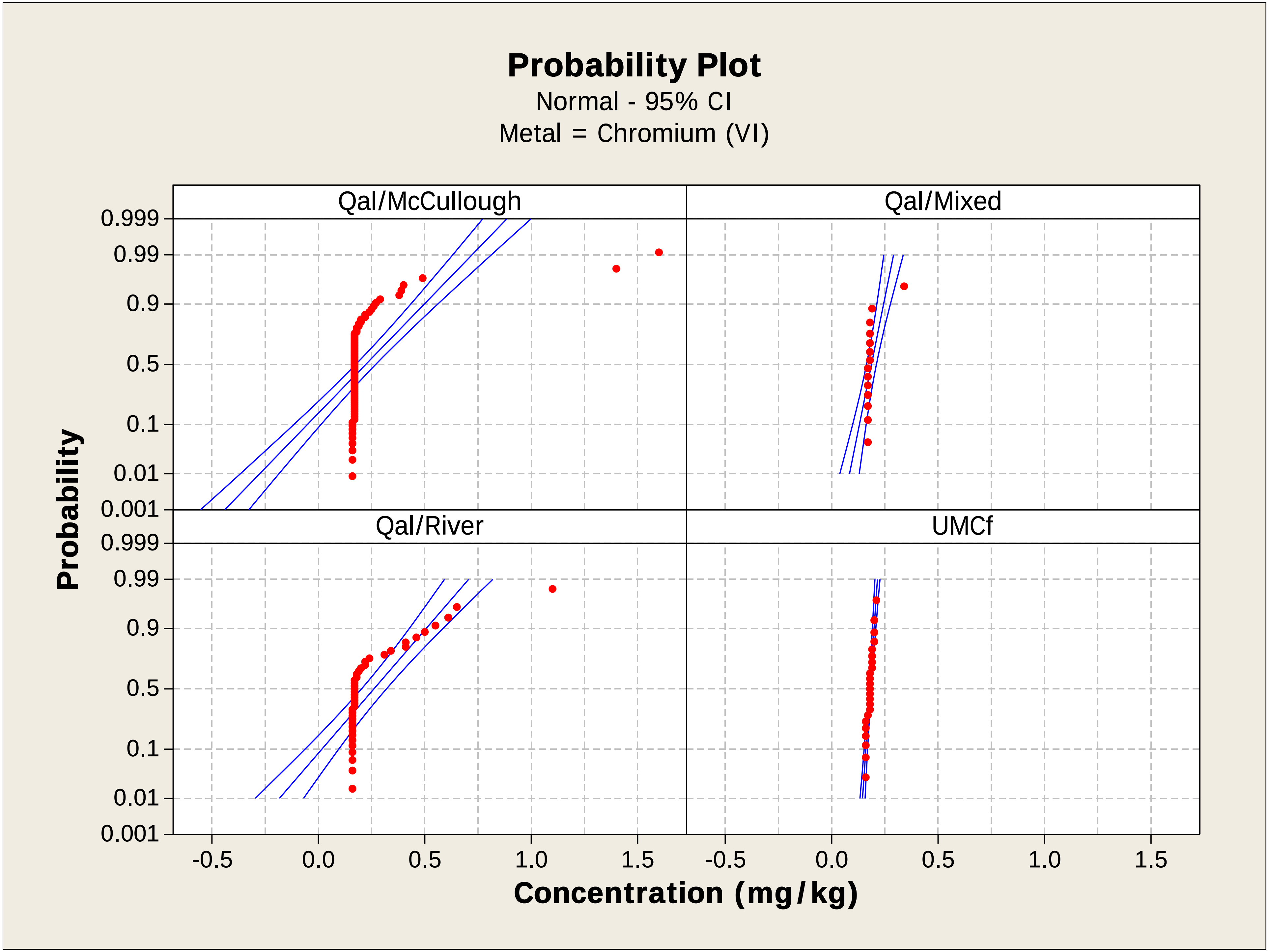
Probability Plot
Normal - 95% CI
Metal = Boron
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-10
0
10
20
30
Probability
Concentration (mg/kg)

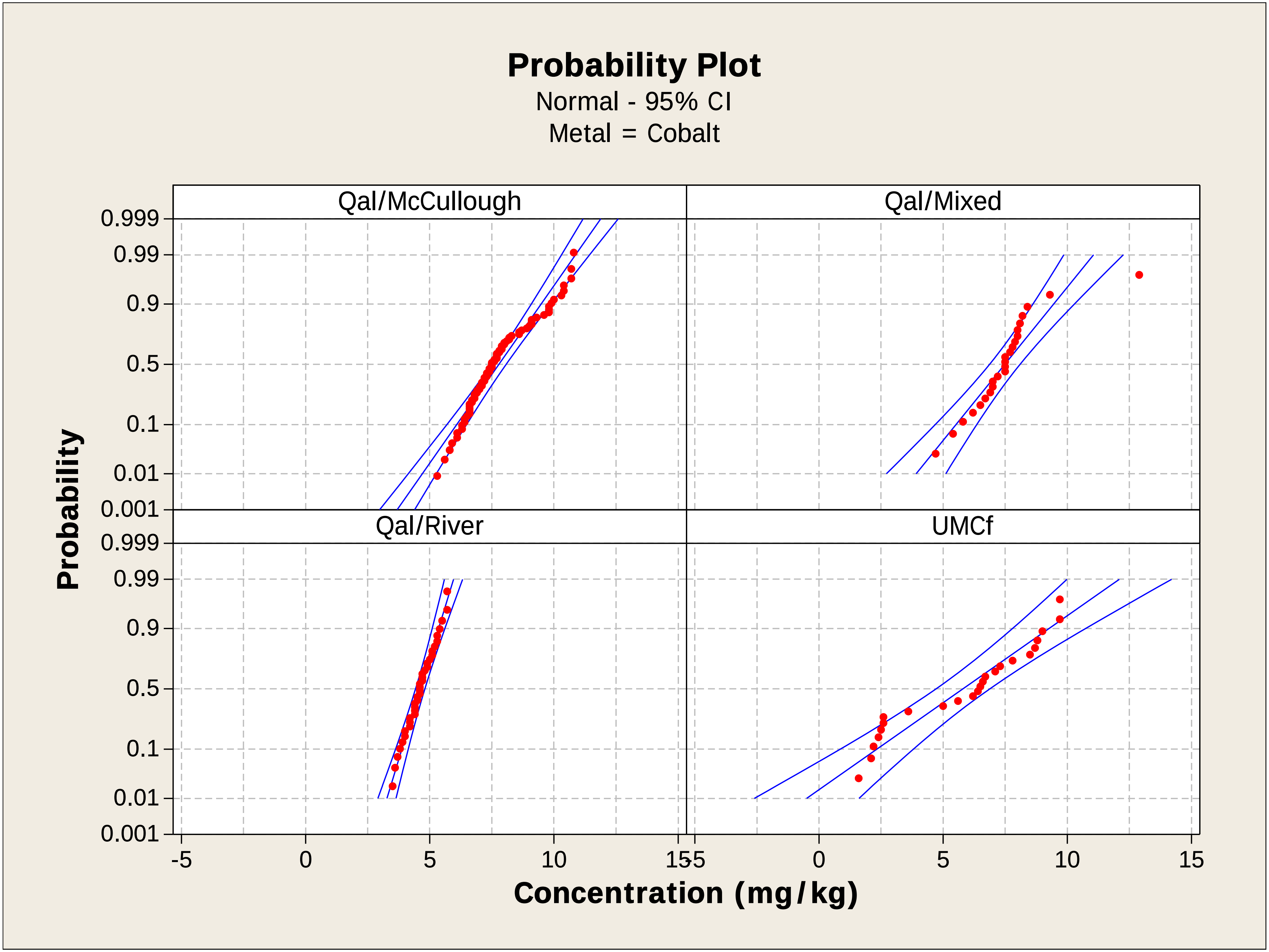

Probability Plot
Normal - 95% CI
Metal = Cadmium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-0.1
0.0
0.1
0.2
Concentration (mg/kg)

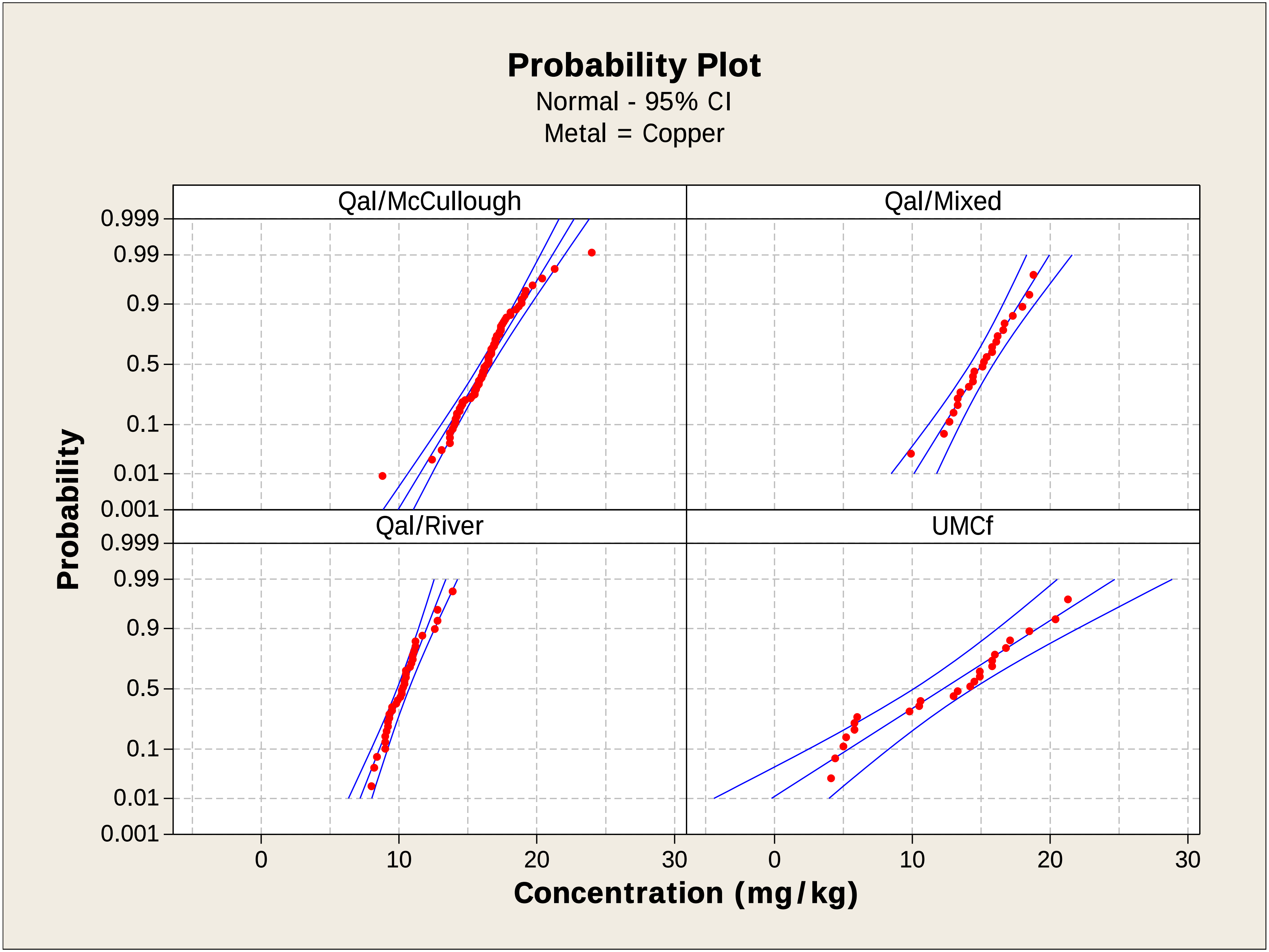

Probability Plot
Normal - 95% CI
Metal = Calcium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
15000
30000
45000
60000
Probability
Concentration (mg/kg)



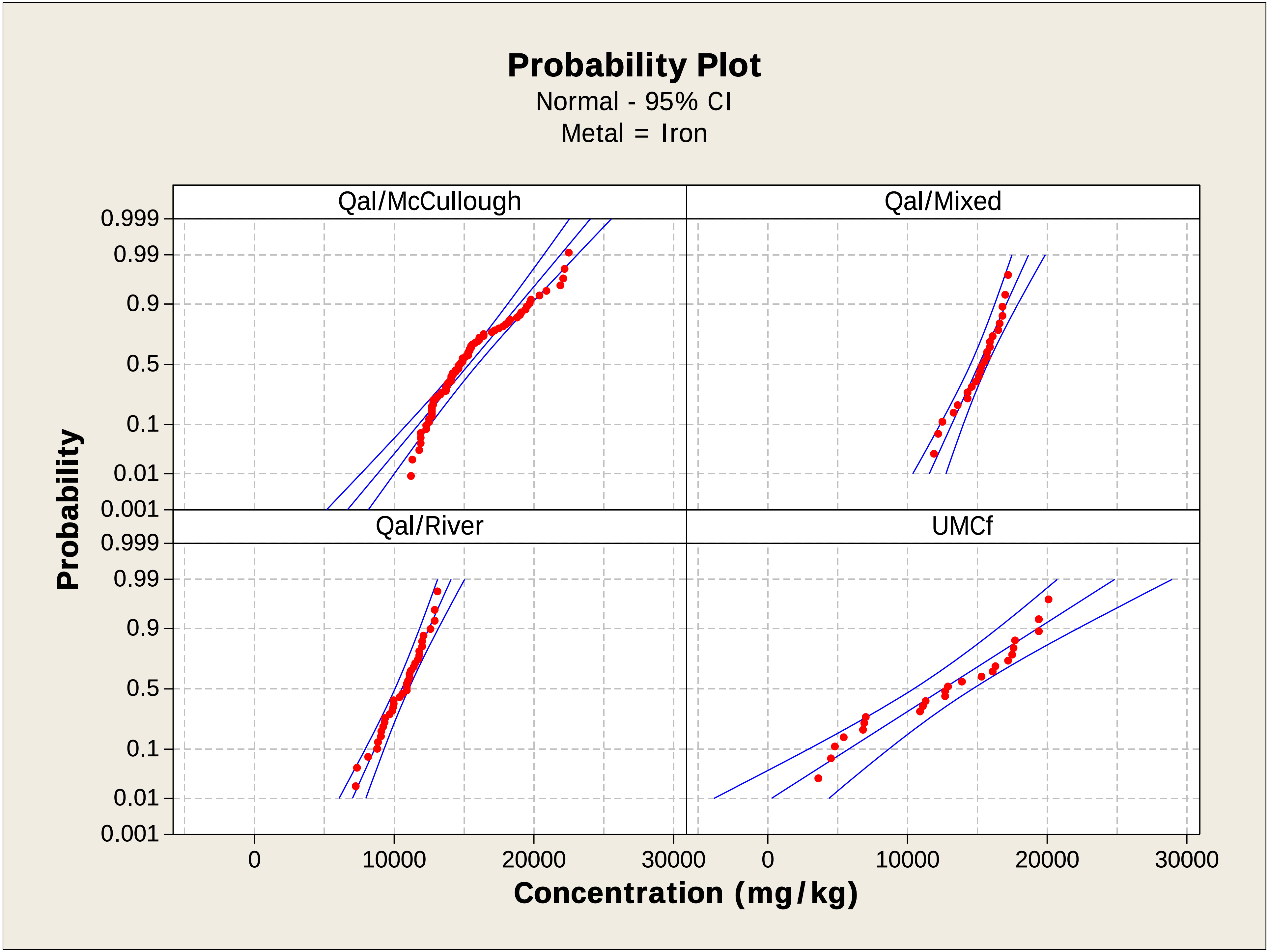
Probability Plot
Normal - 95% CI
Metal = Chromium (Total)
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-10
0
10
20
30
Concentration (mg/kg)


Probability Plot
Normal - 95% CI
Metal = Chromium (VI)
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-0.5
0.0
0.5
1.0
1.5
Concentration (mg/kg)

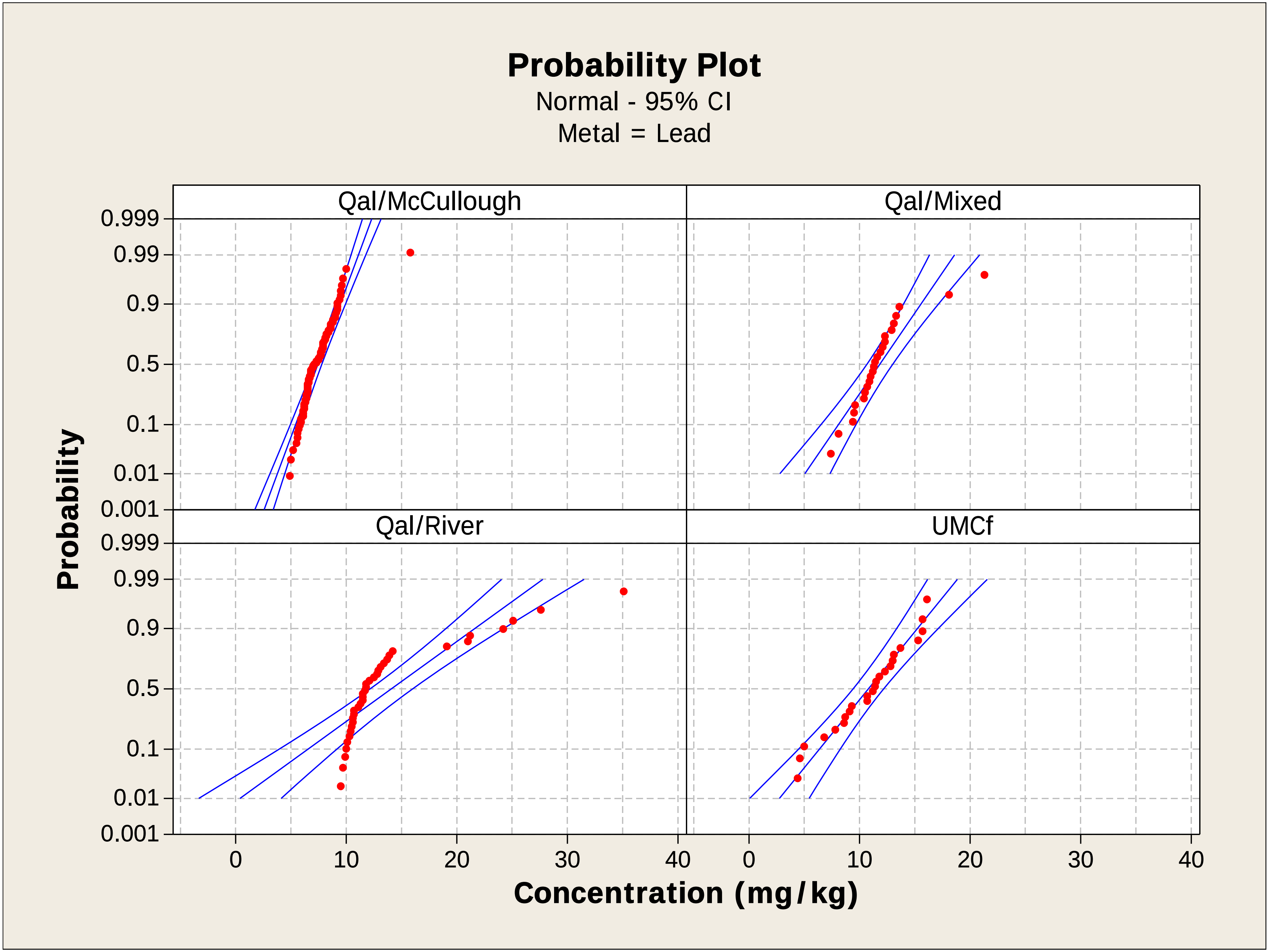

Probability Plot
Normal - 95% CI
Metal = Cobalt
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-5
0
5
10
15
Concentration (mg/kg)



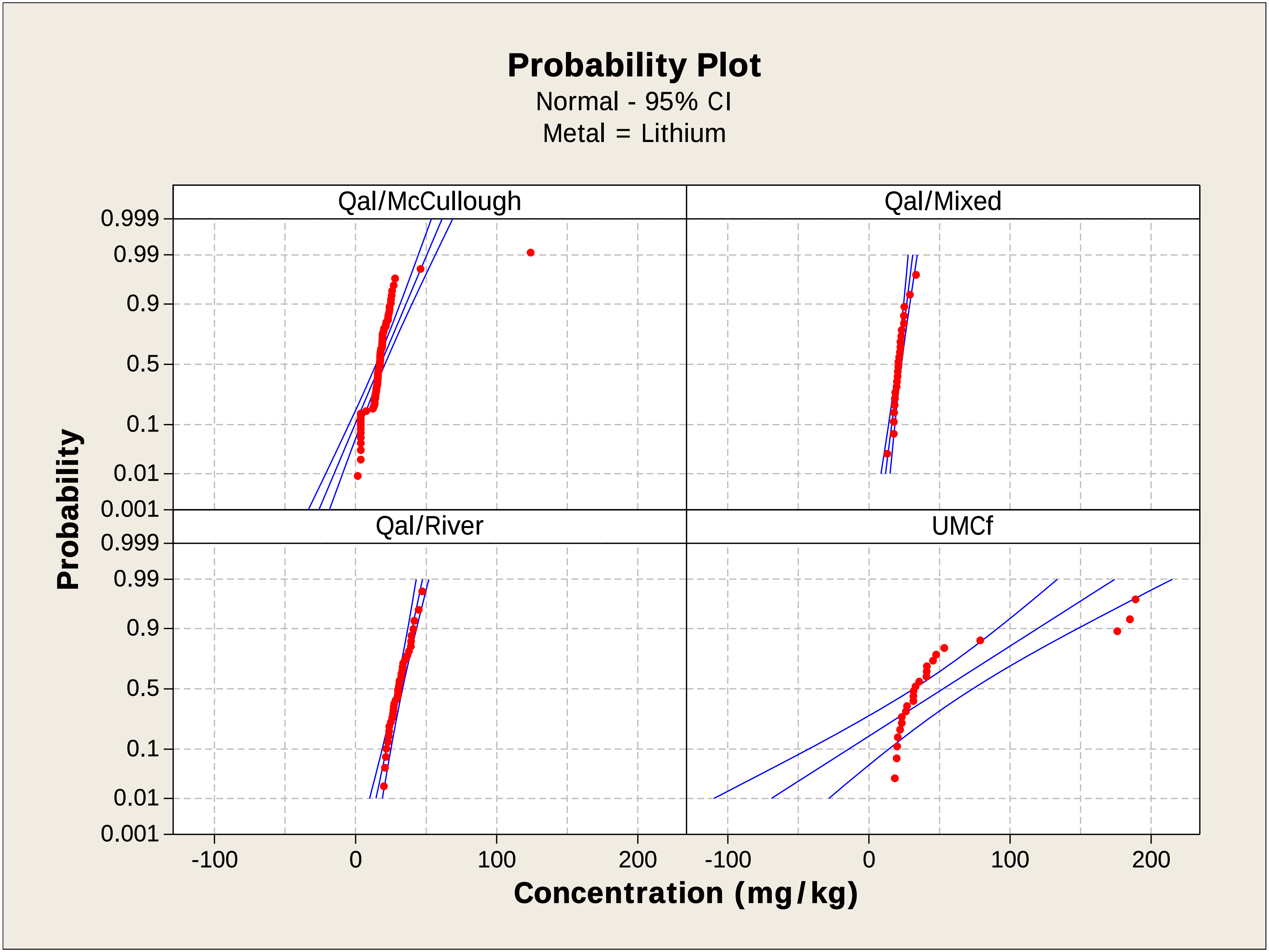
Probability Plot
Normal - 95% CI
Metal = Copper
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
10
20
30
Probability
Concentration (mg/kg)



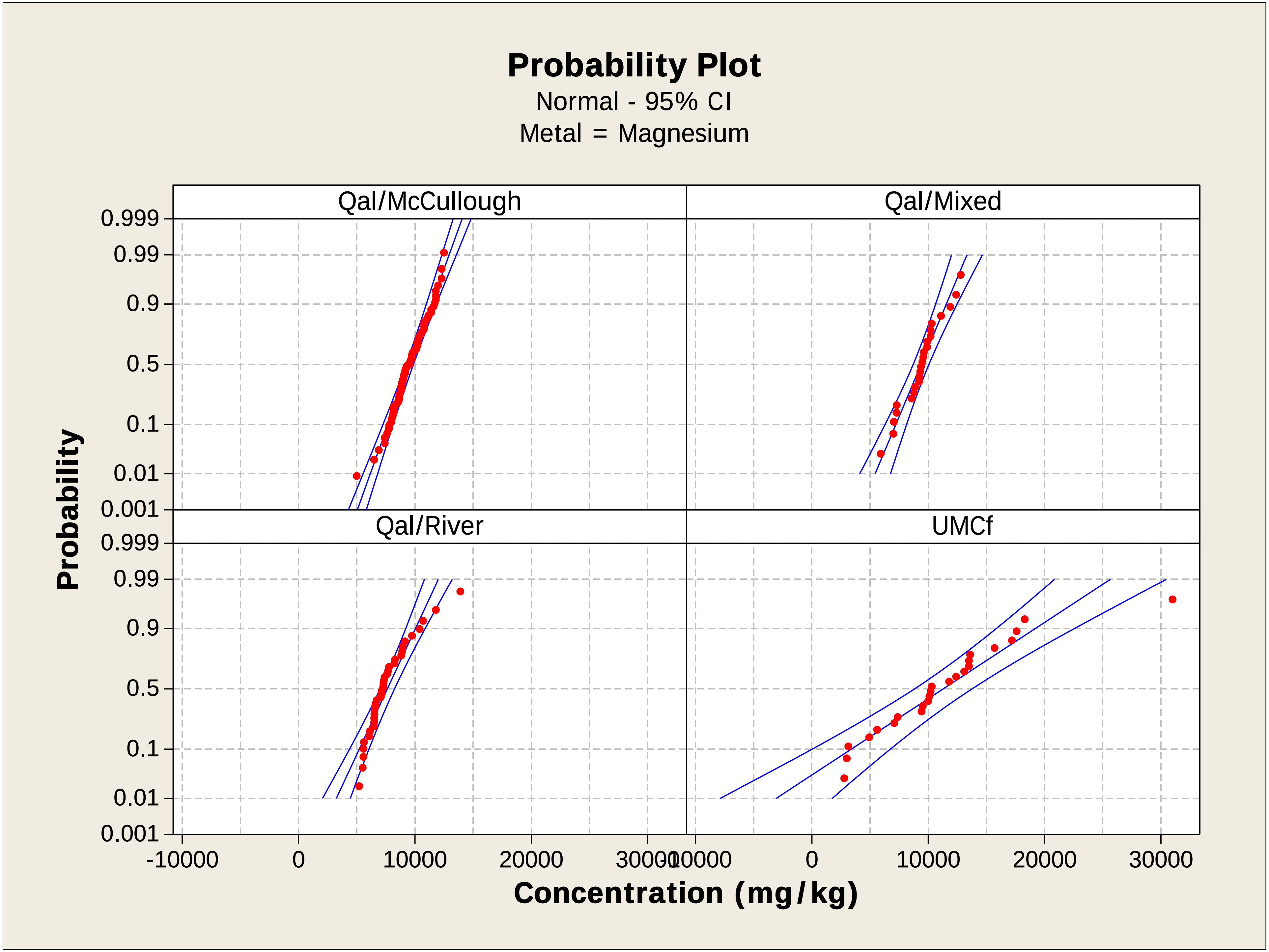
Probability Plot
Normal - 95% CI
Metal = Iron
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
10000
20000
30000
Concentration (mg/kg)



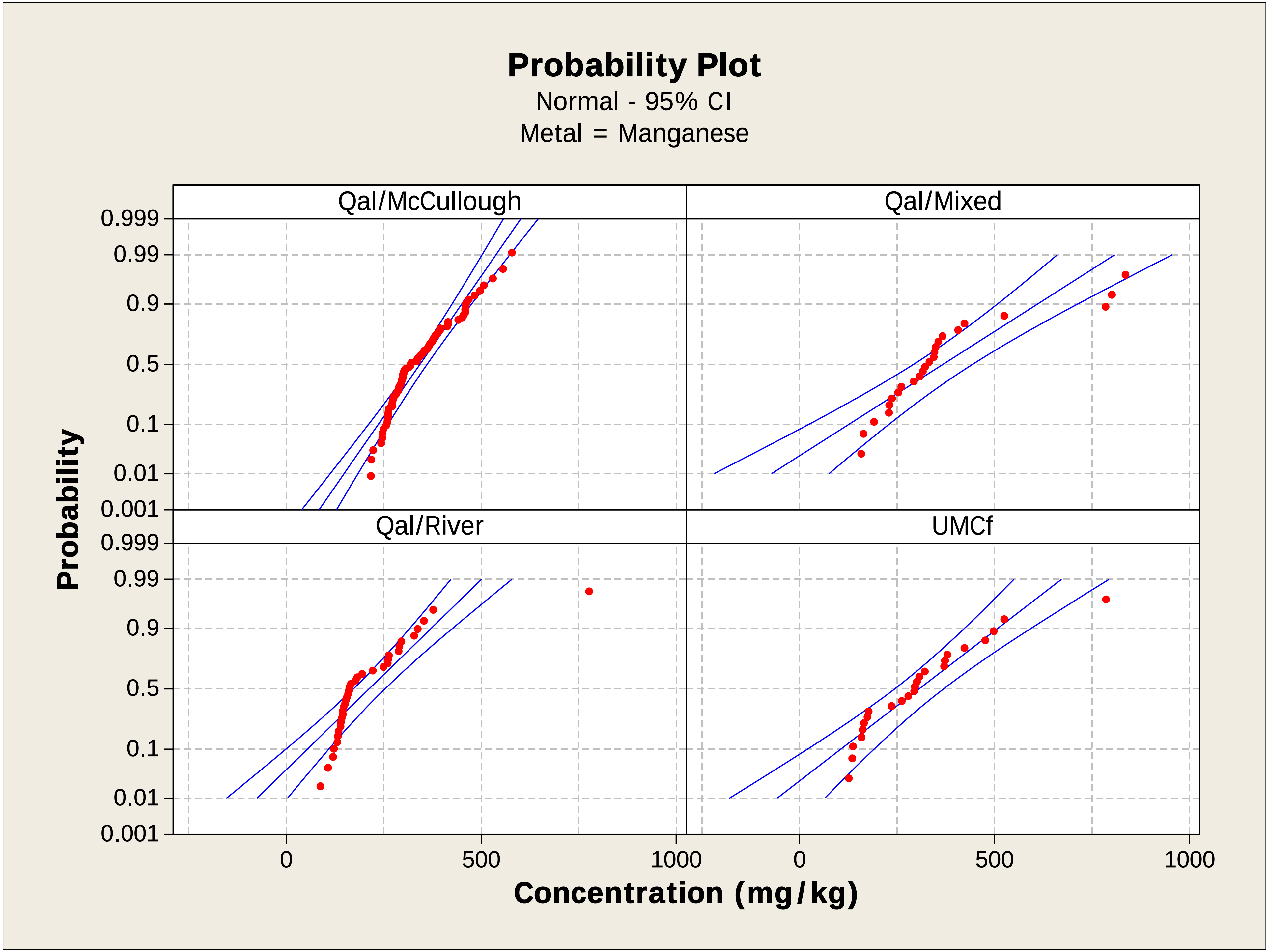
Probability Plot
Normal - 95% CI
Metal = Lead
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
Probability
0
10
20
30
40
Concentration (mg/kg)



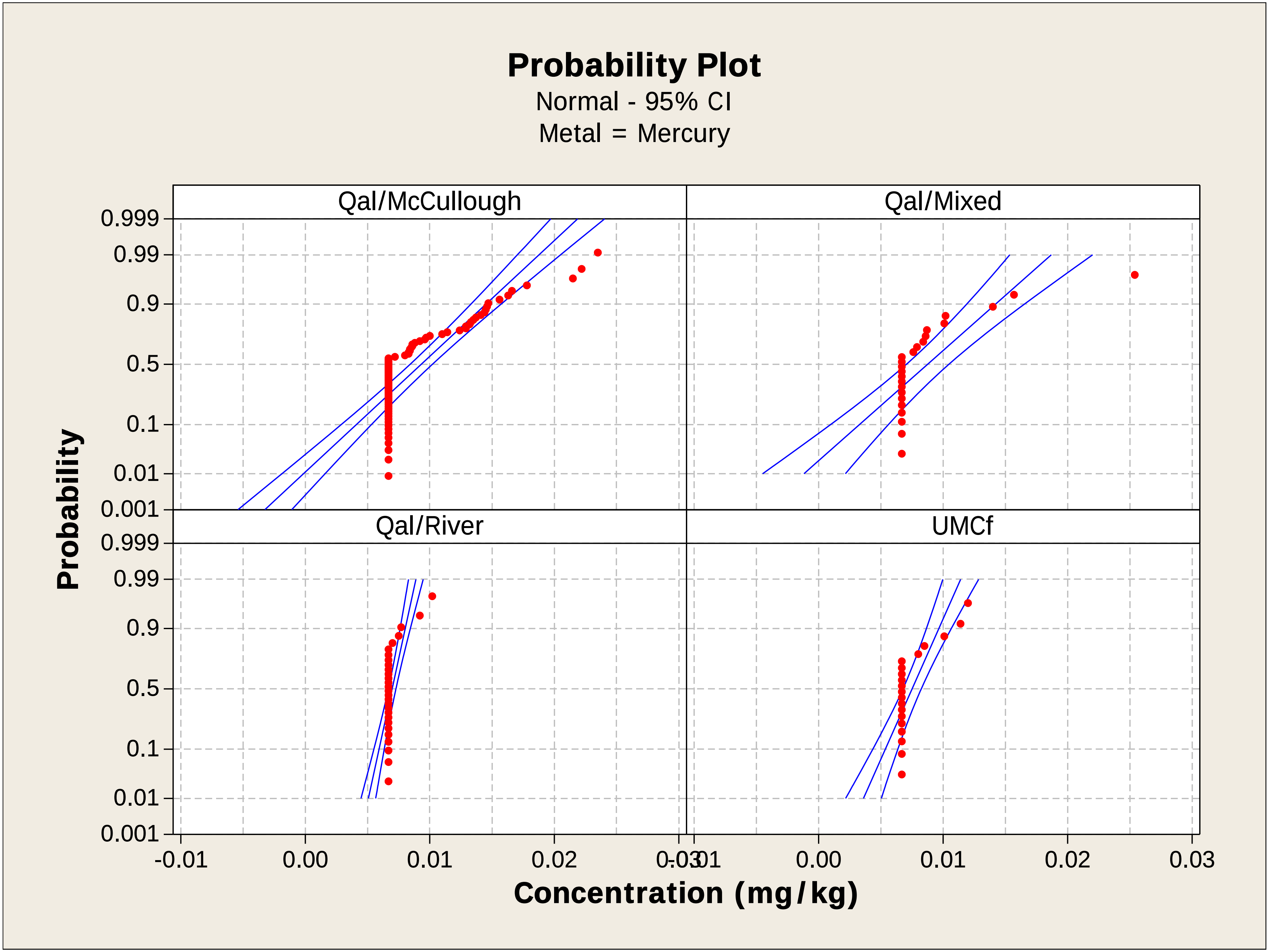
Probability Plot
Normal - 95% CI
Metal = Lithium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-100
0
100
200
Probability
Concentration (mg/kg)



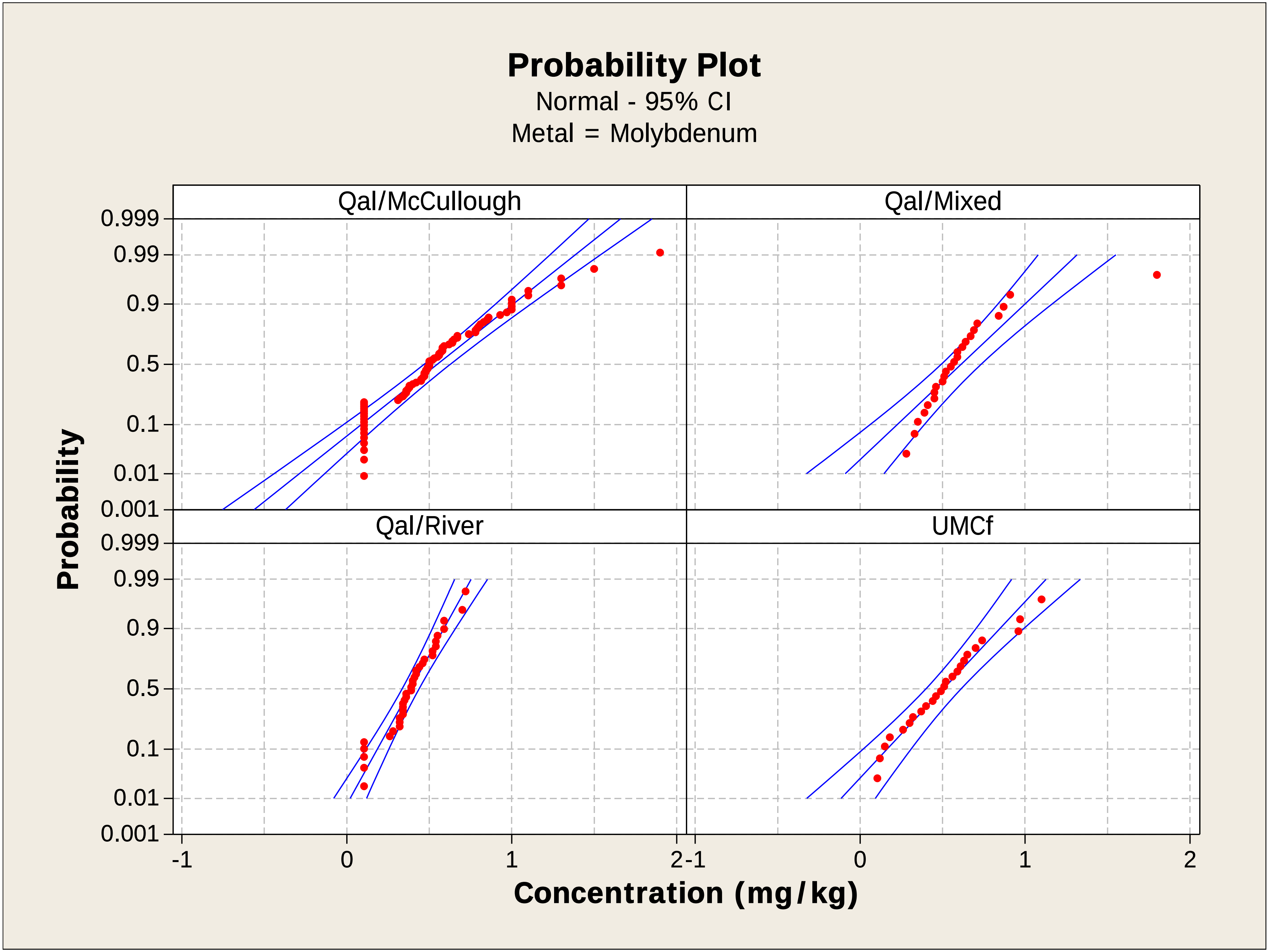
Probability Plot
Normal - 95% CI
Metal = Magnesium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-10000
0
10000
20000
30000
Probability
Concentration (mg/kg)



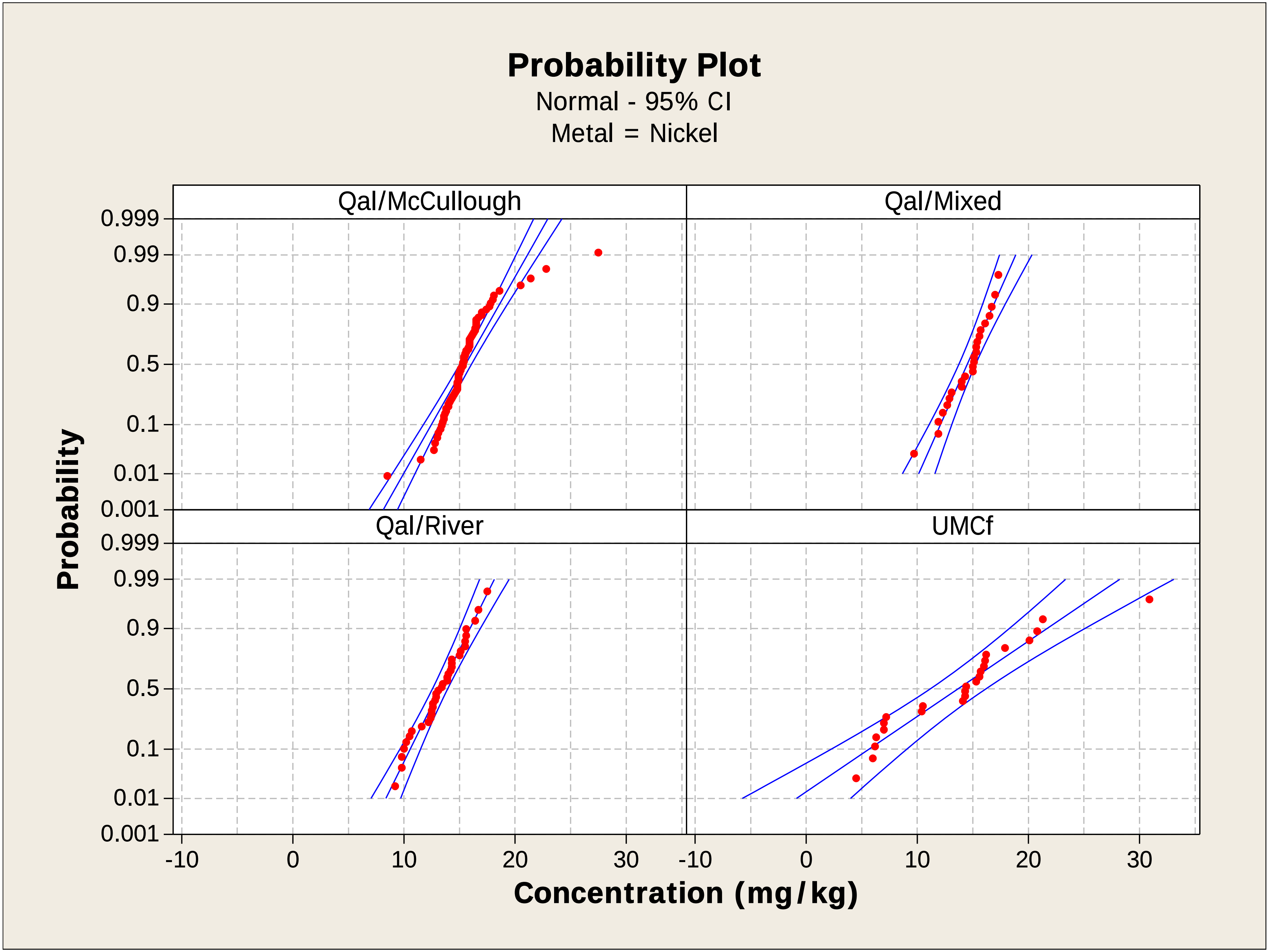
Probability Plot
Normal - 95% CI
Metal = Manganese
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
500
1000
Concentration (mg/kg)



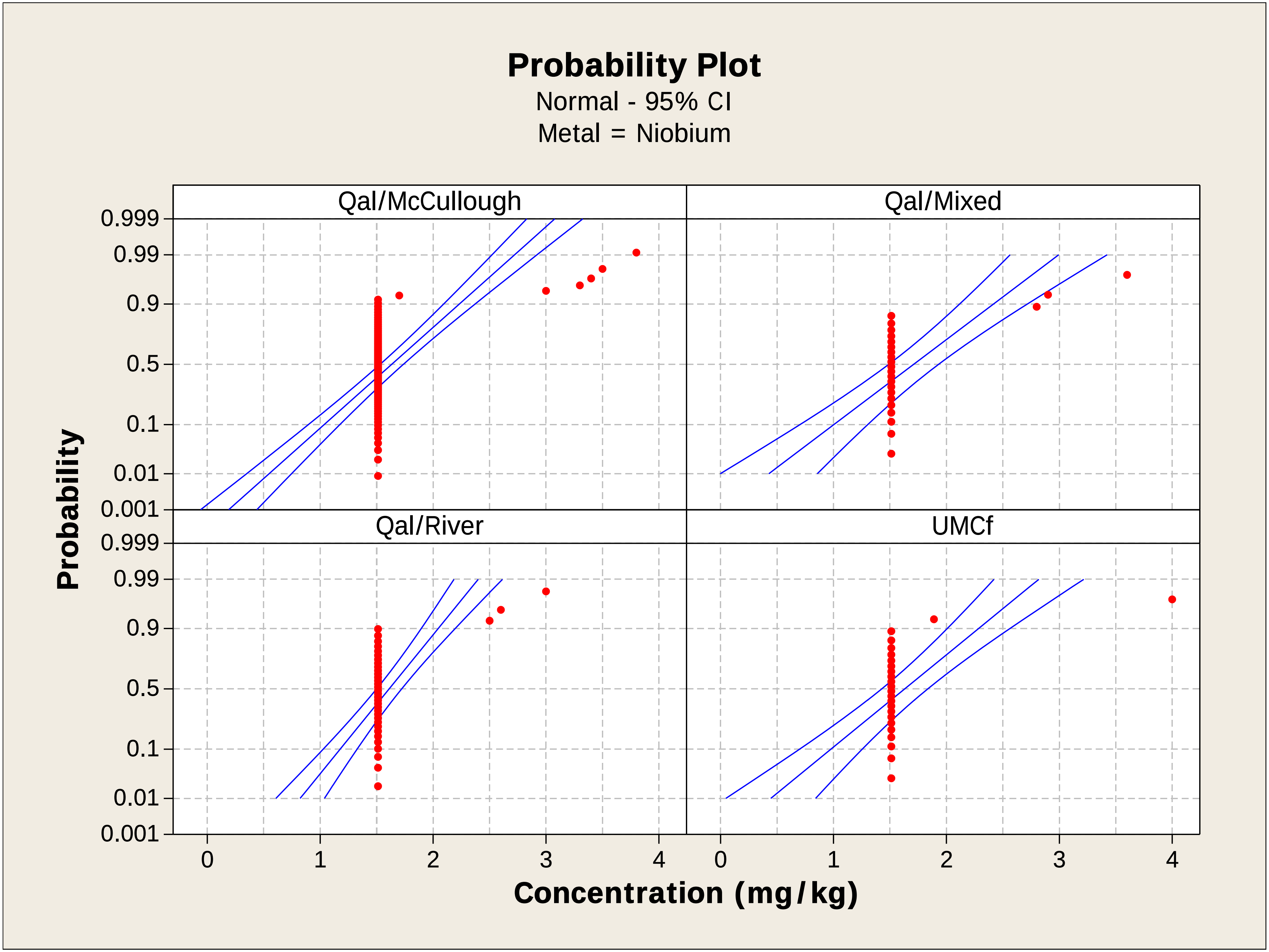
Probability Plot
Normal - 95% CI
Metal = Mercury
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-0.01
0.00
0.01
0.02
0.03
Concentration (mg/kg)



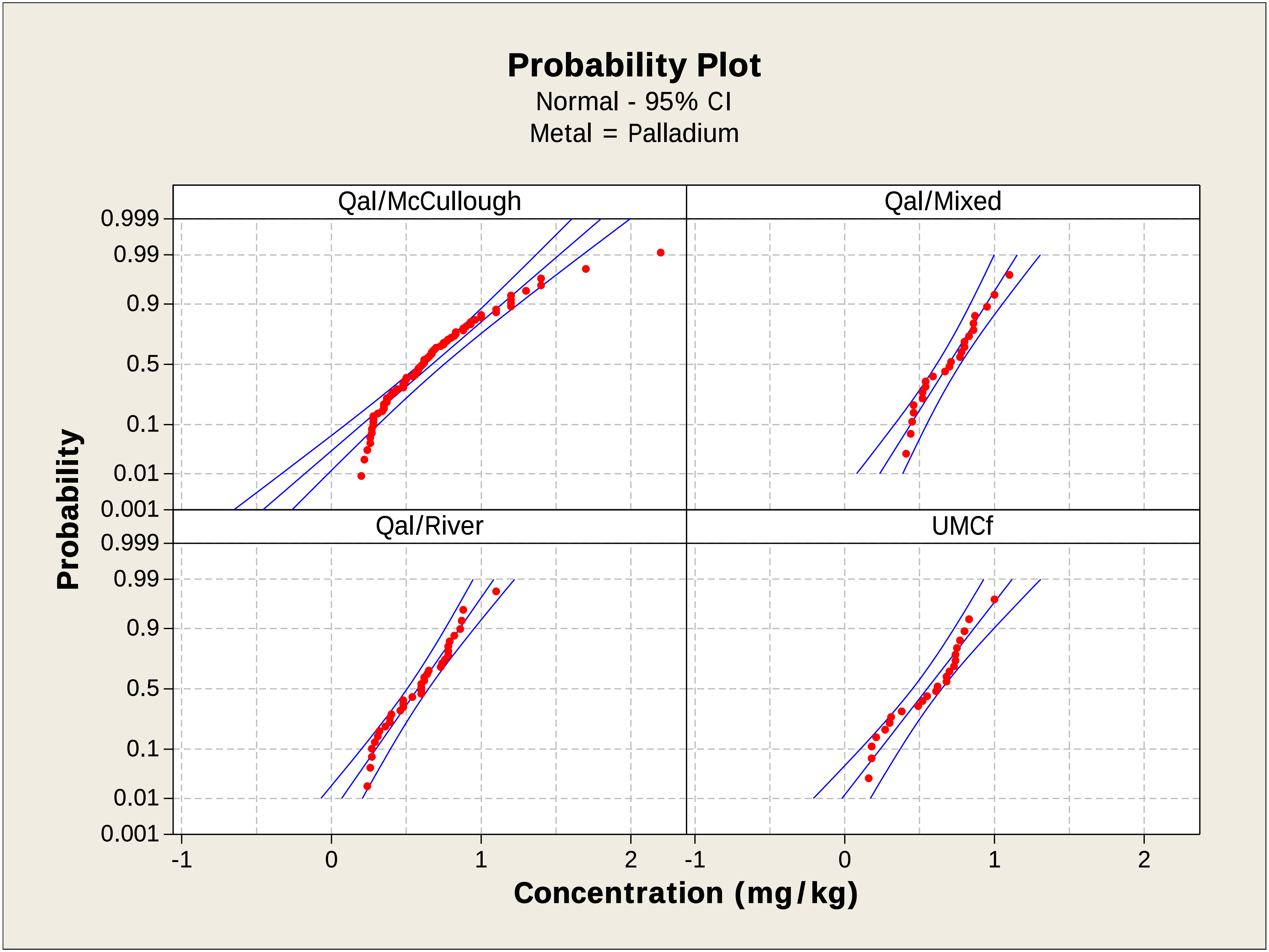
Probability Plot
Normal - 95% CI
Metal = Molybdenum
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-1
0
1
2
Concentration (mg/kg)



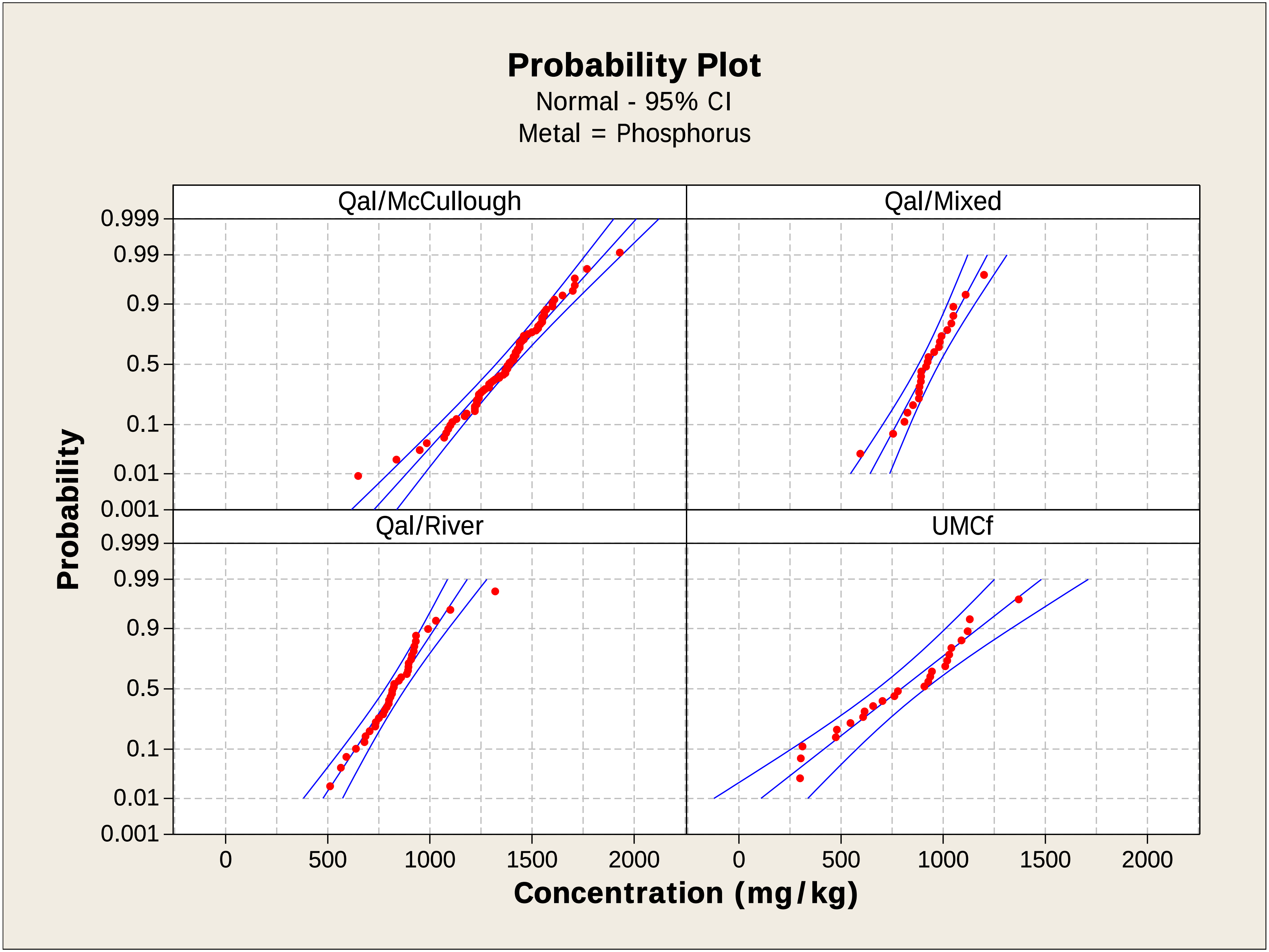
Probability Plot
Normal - 95% CI
Metal = Nickel
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-10
0
10
20
30
Concentration (mg/kg)

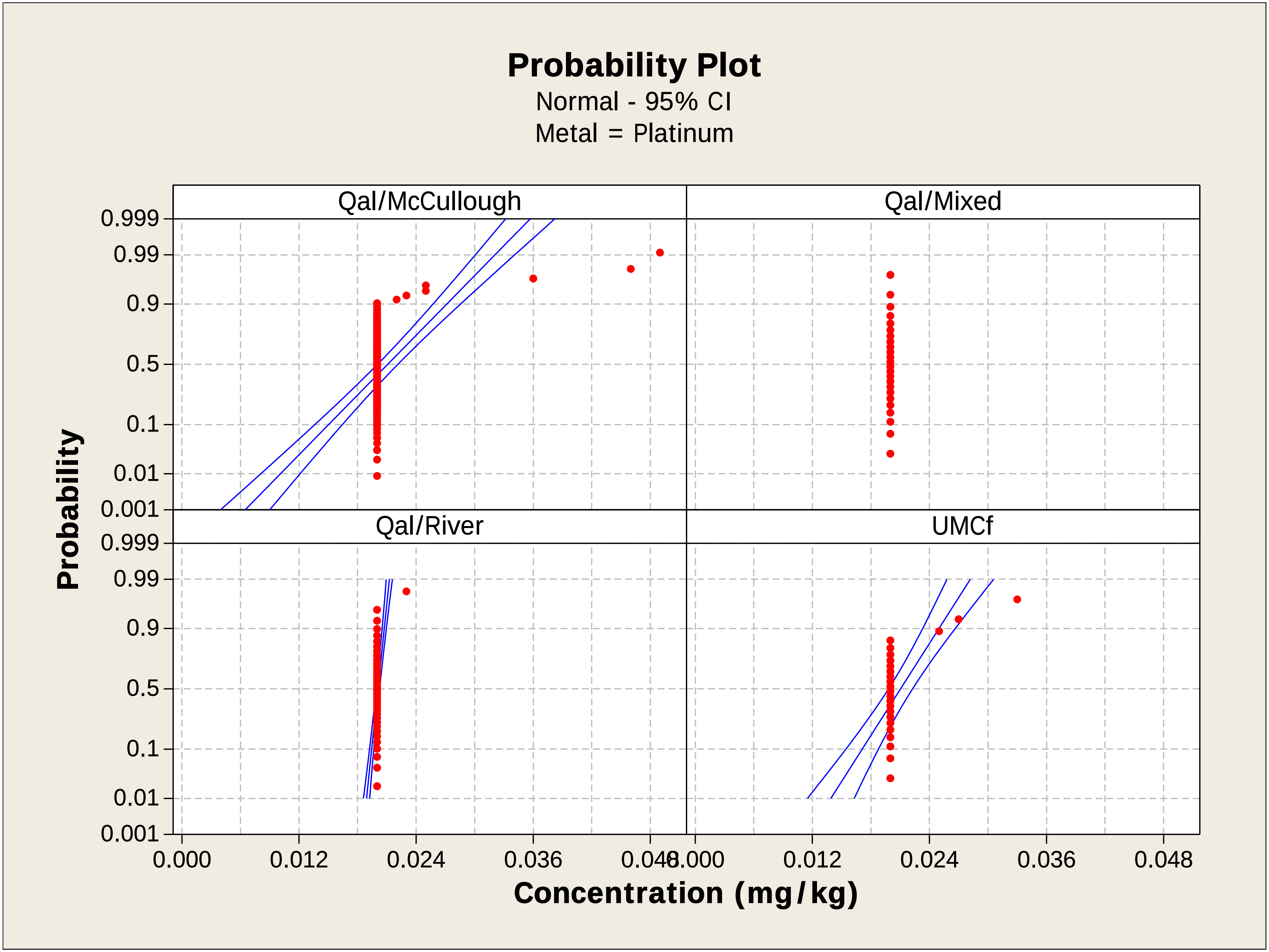


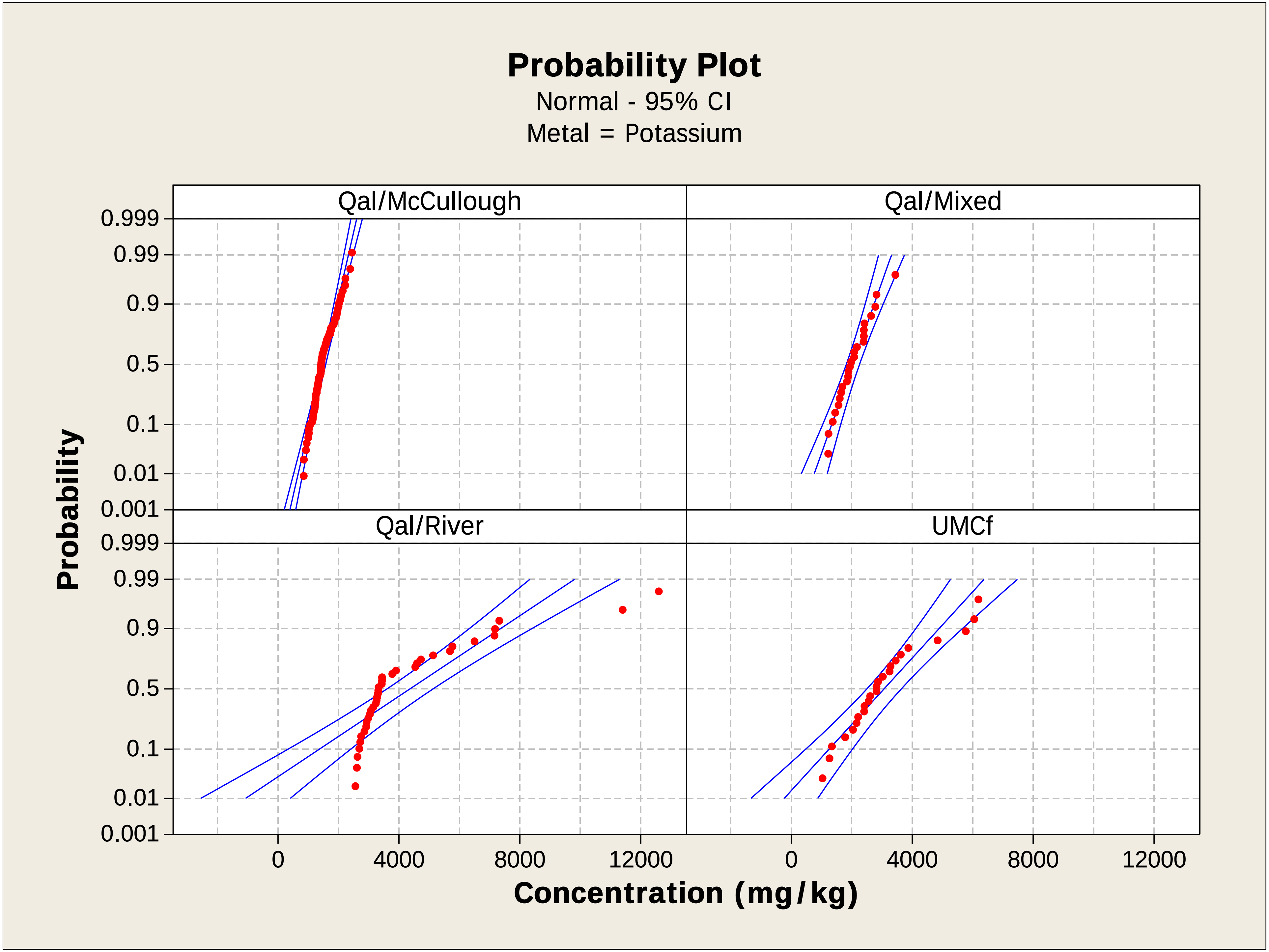
Probability Plot
Normal - 95% CI
Metal = Niobium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
1
2
3
4
Concentration (mg/kg)

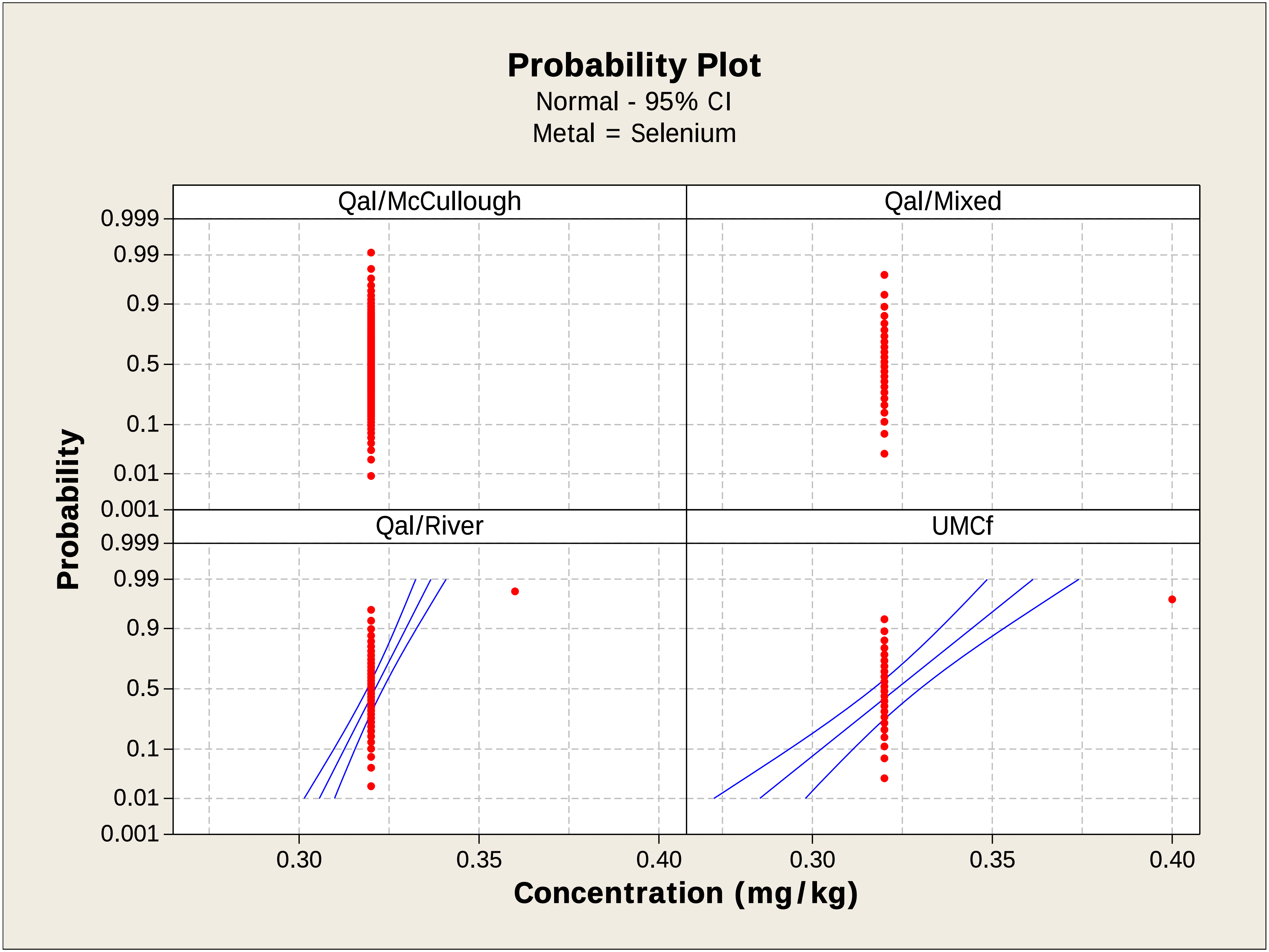


Probability Plot
Normal - 95% CI
Metal = Palladium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-1
0
1
2
Concentration (mg/kg)

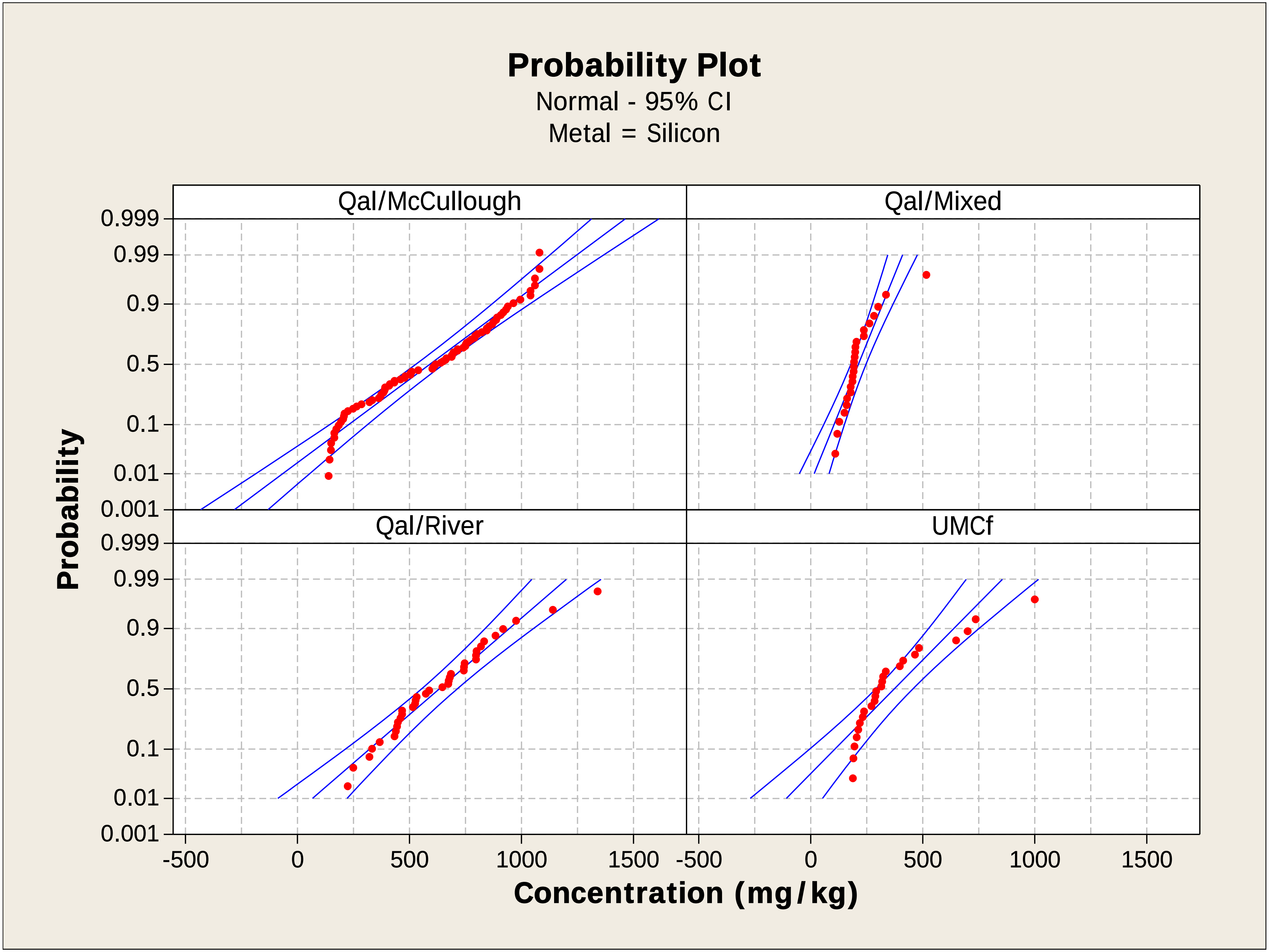

Probability Plot
Normal - 95% CI
Metal = Phosphorus
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
500
1000
1500
2000
Probability
Concentration (mg/kg)

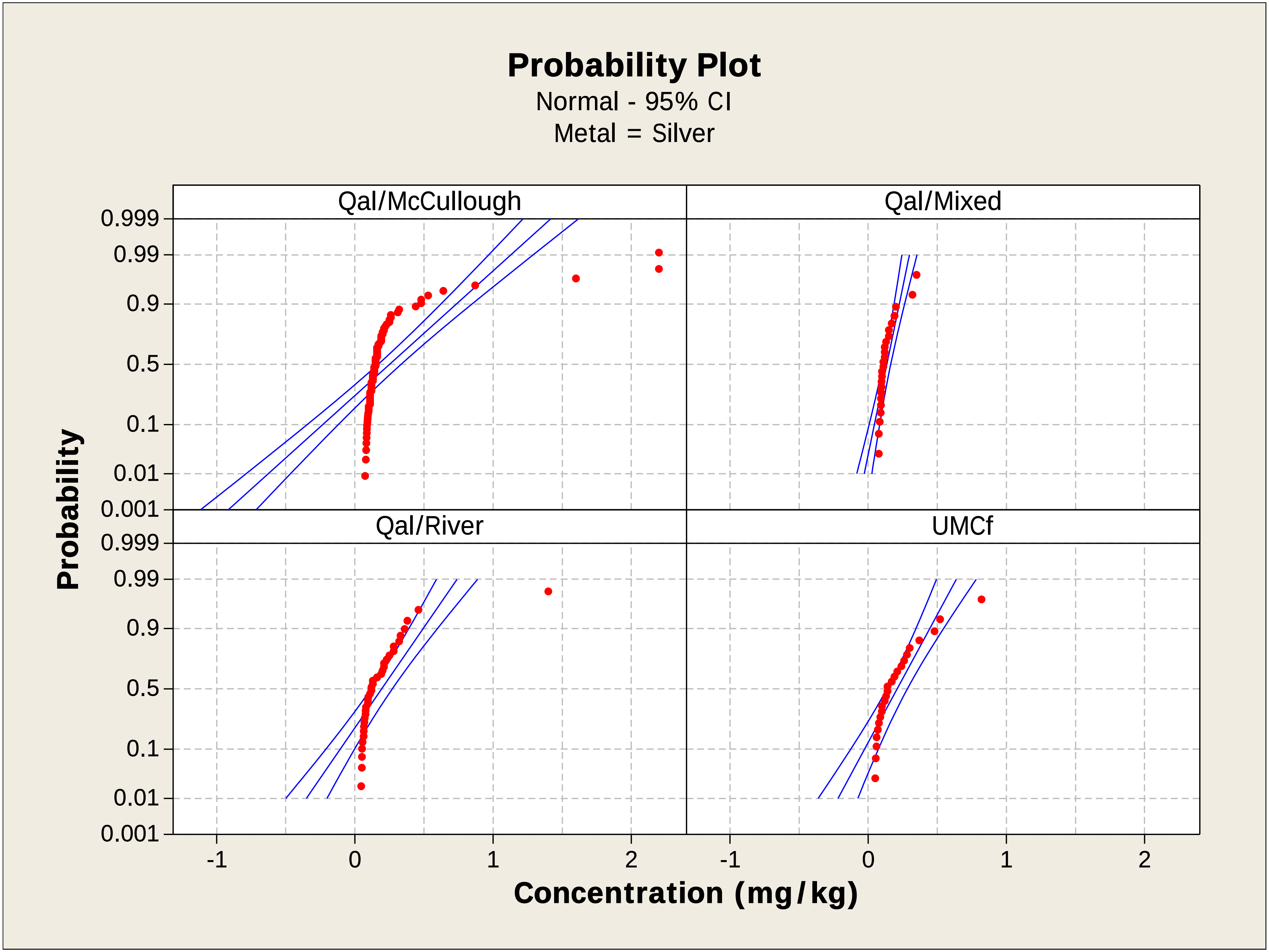

Probability Plot
Normal - 95% CI
Metal = Platinum
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
Probability
0.000
0.012
0.024
0.036
0.048
Concentration (mg/kg)


Probability Plot
Normal - 95% CI
Metal = Potassium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
4000
8000
12000
Concentration (mg/kg)

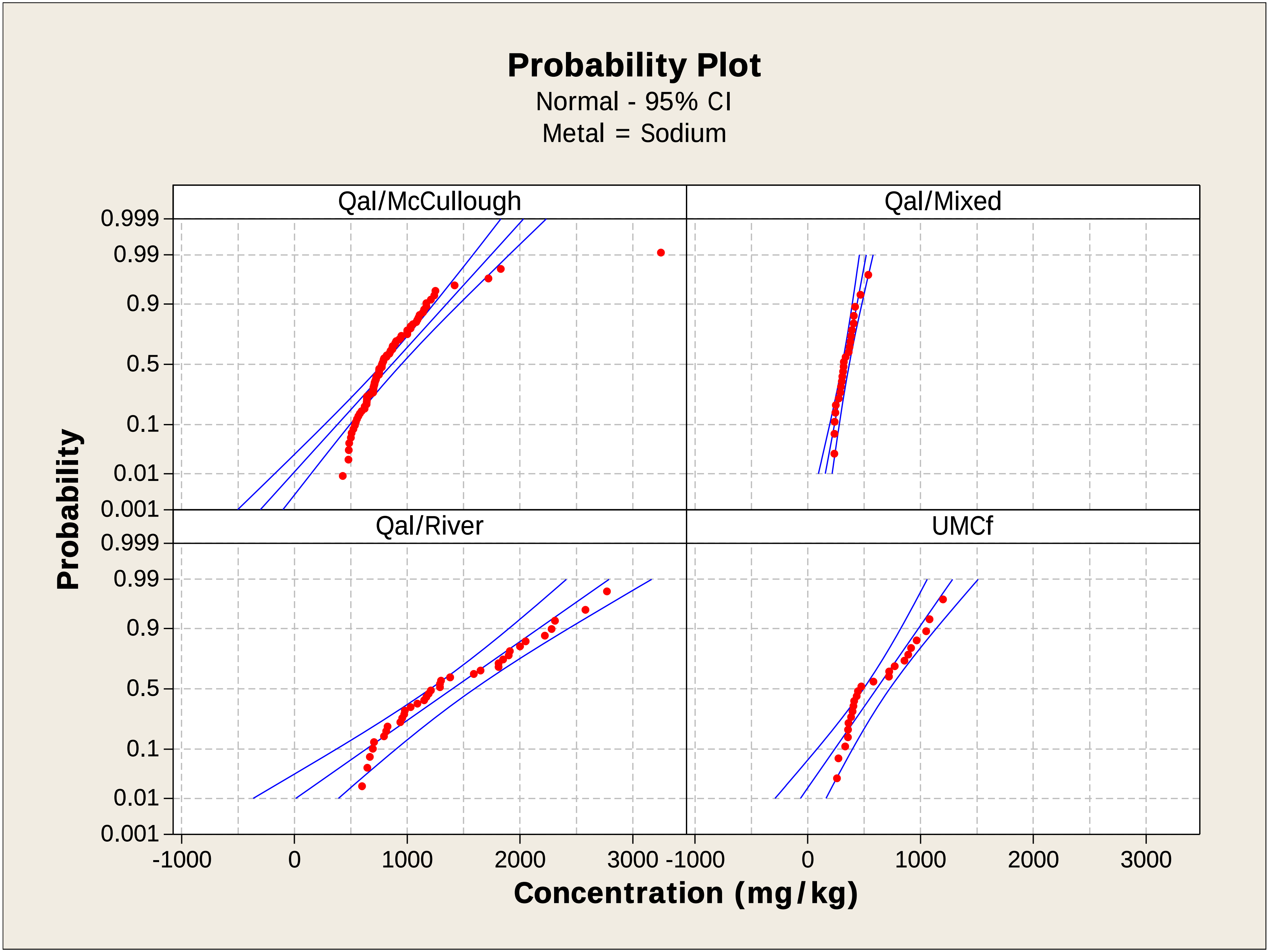


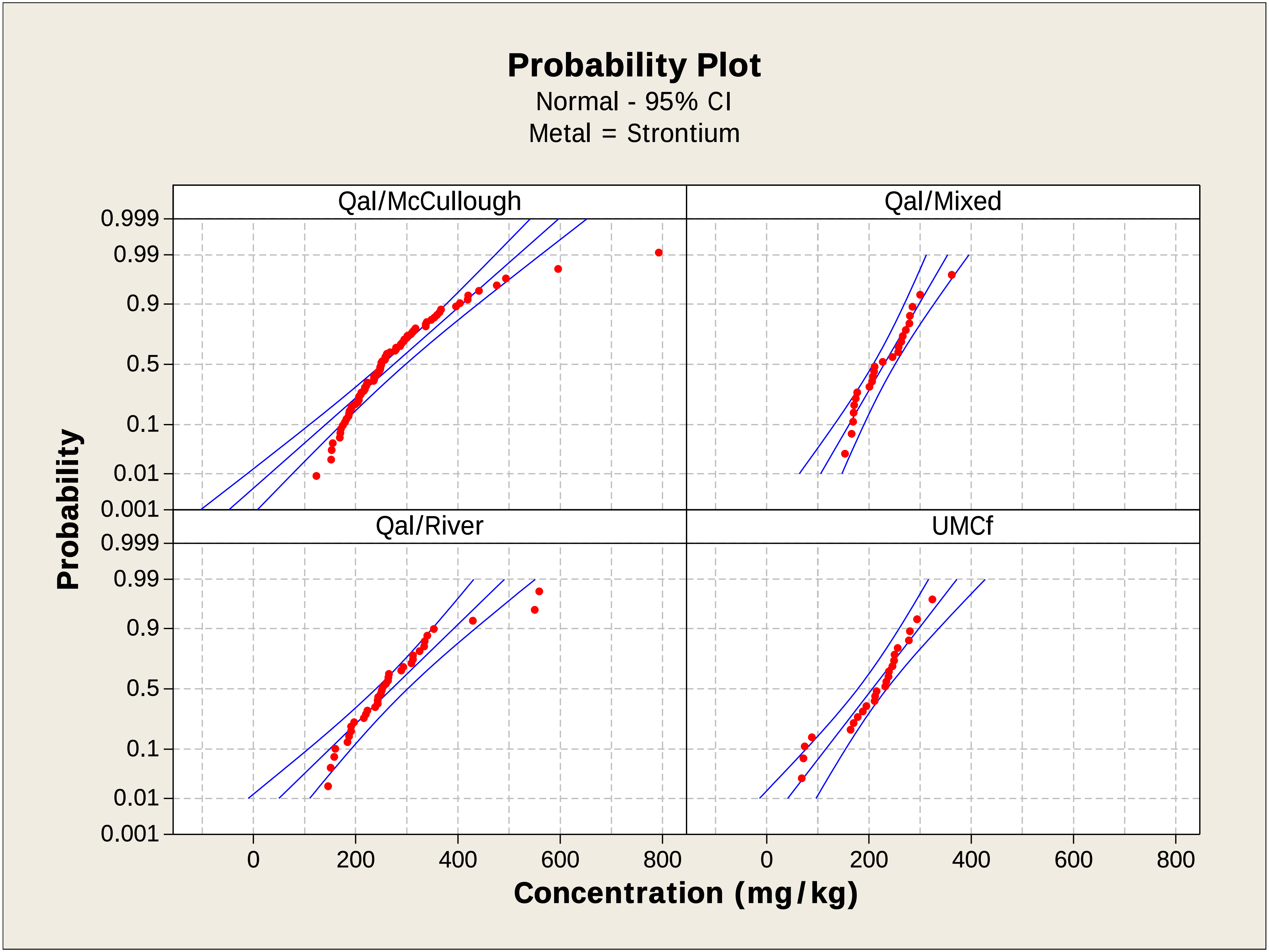
Probability Plot
Normal - 95% CI
Metal = Selenium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.30
0.35
0.40
Probability
Concentration (mg/kg)

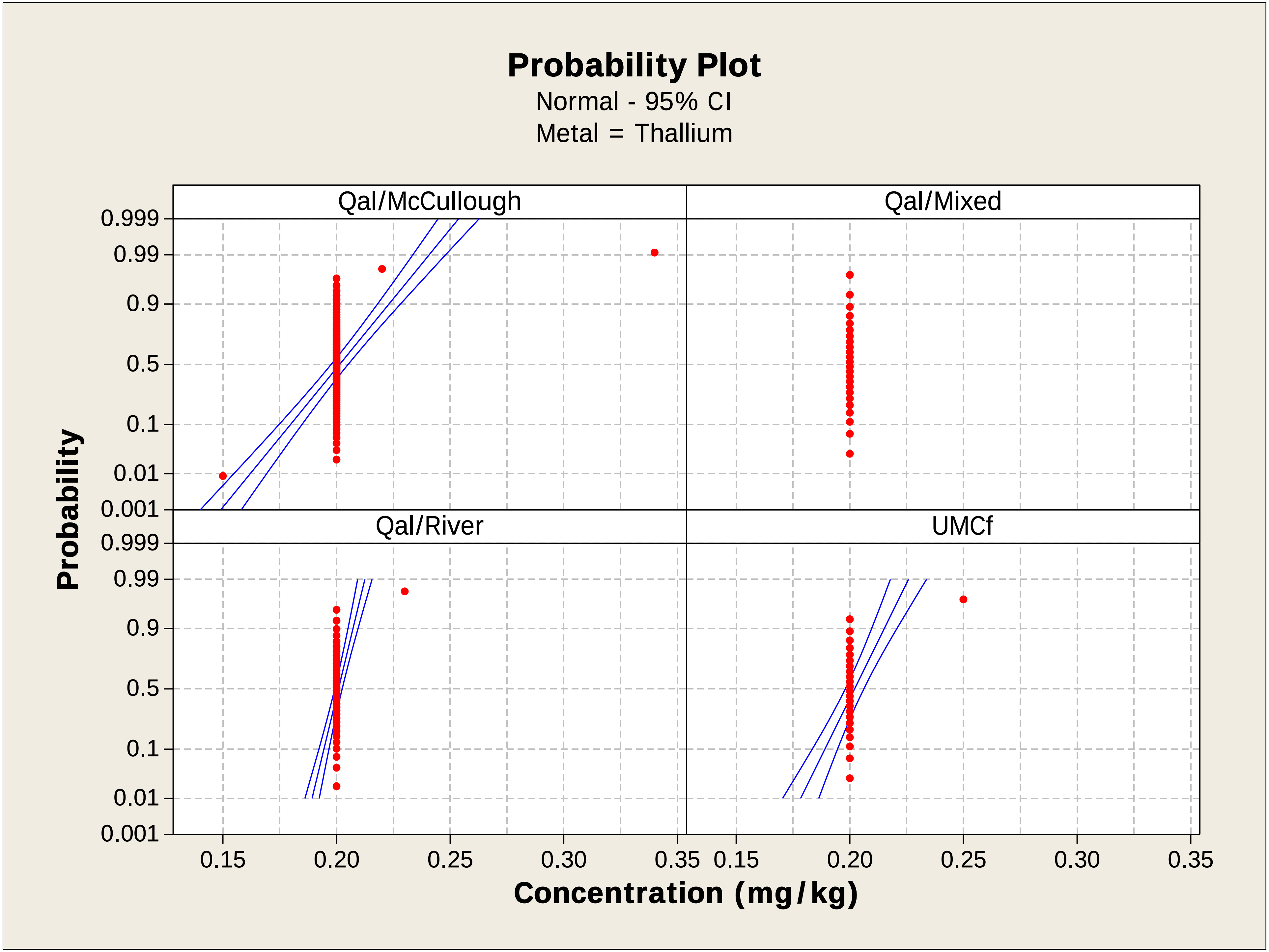

Probability Plot
Normal - 95% CI
Metal = Silicon
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-500
0
500
1000
1500
Concentration (mg/kg)

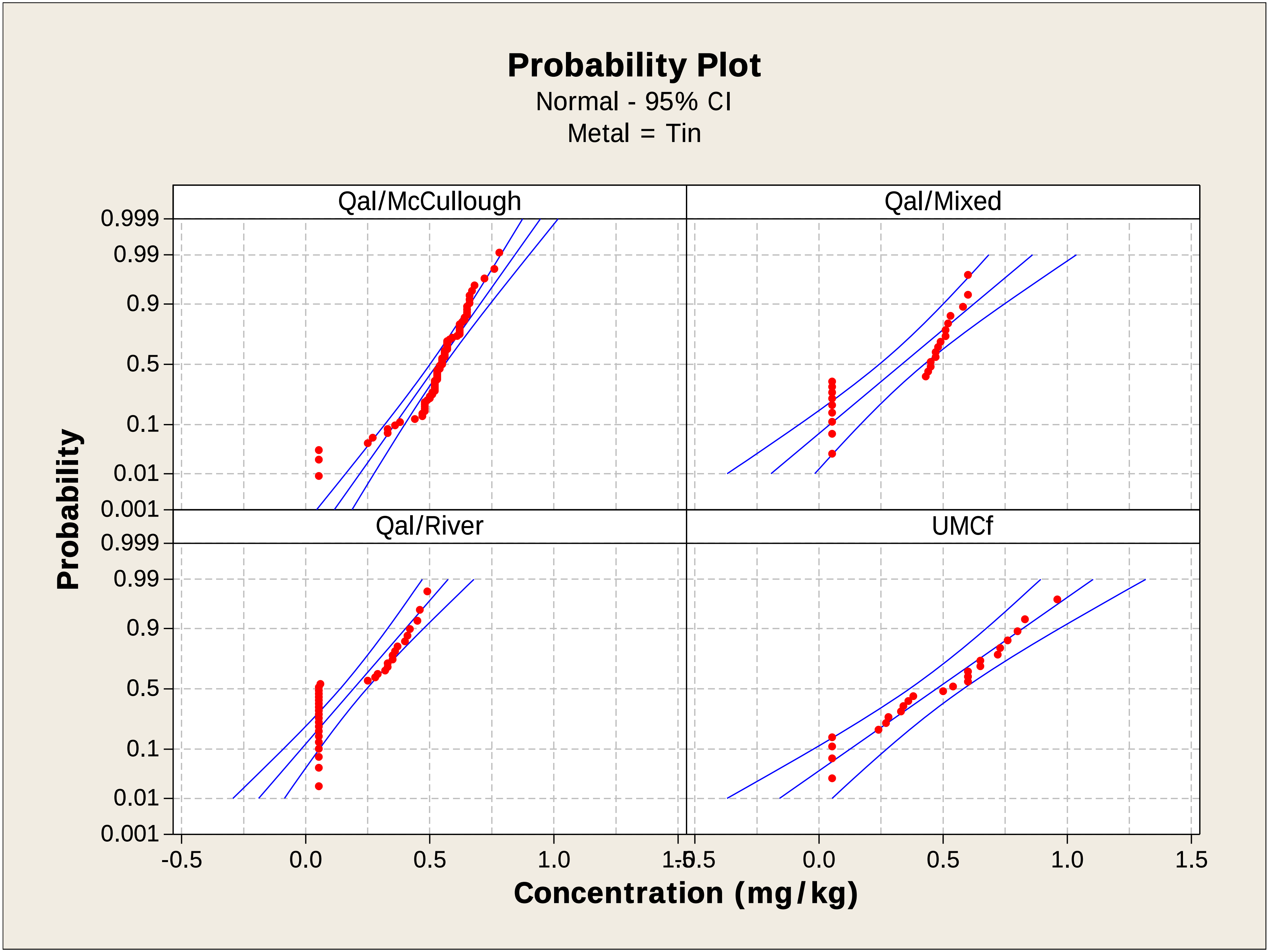


Probability Plot
Normal - 95% CI
Metal = Silver
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-1
0
1
2
Concentration (mg/kg)

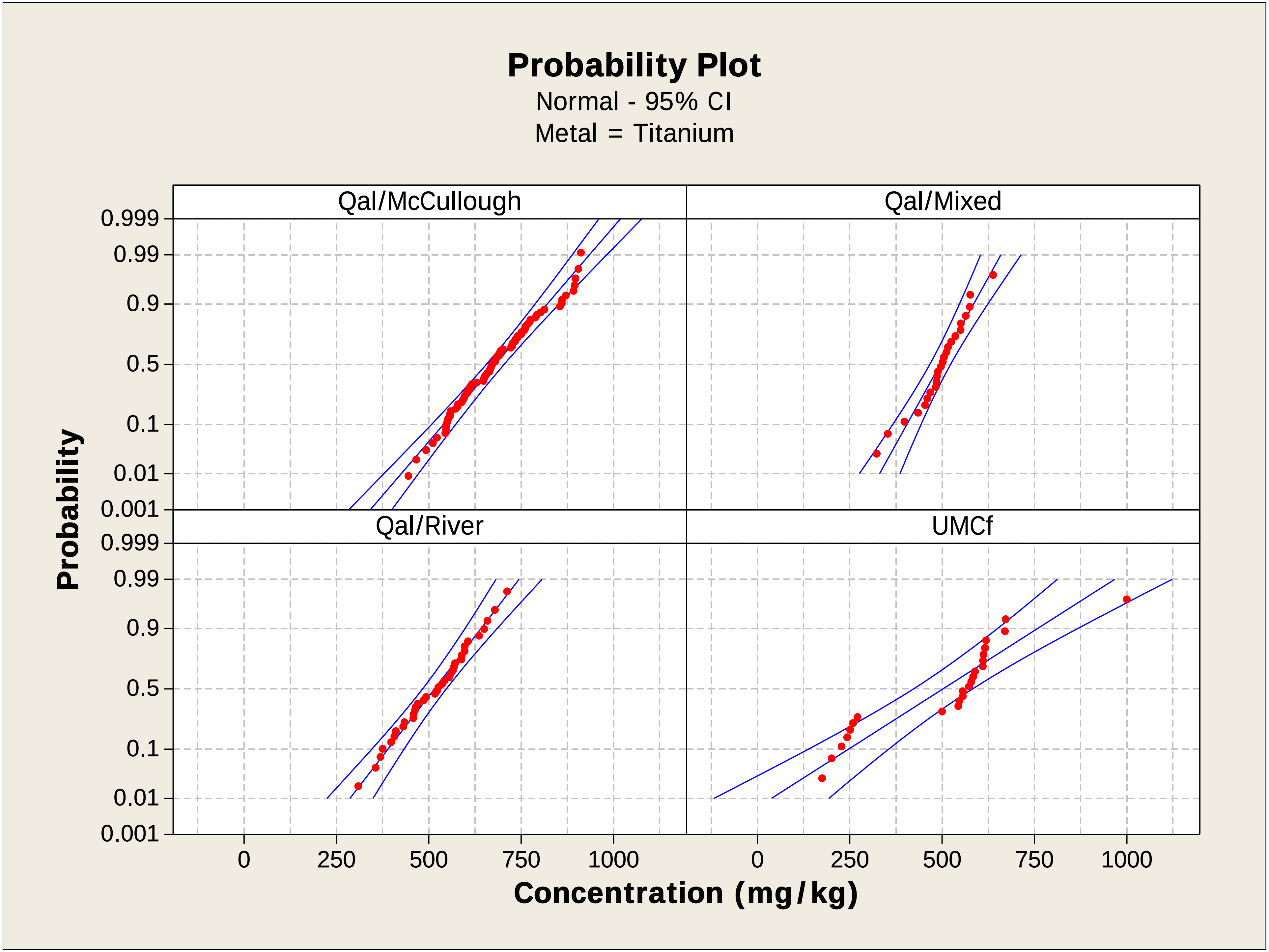

Probability Plot
Normal - 95% CI
Metal = Sodium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-1000
0
1000
2000
3000
Concentration (mg/kg)

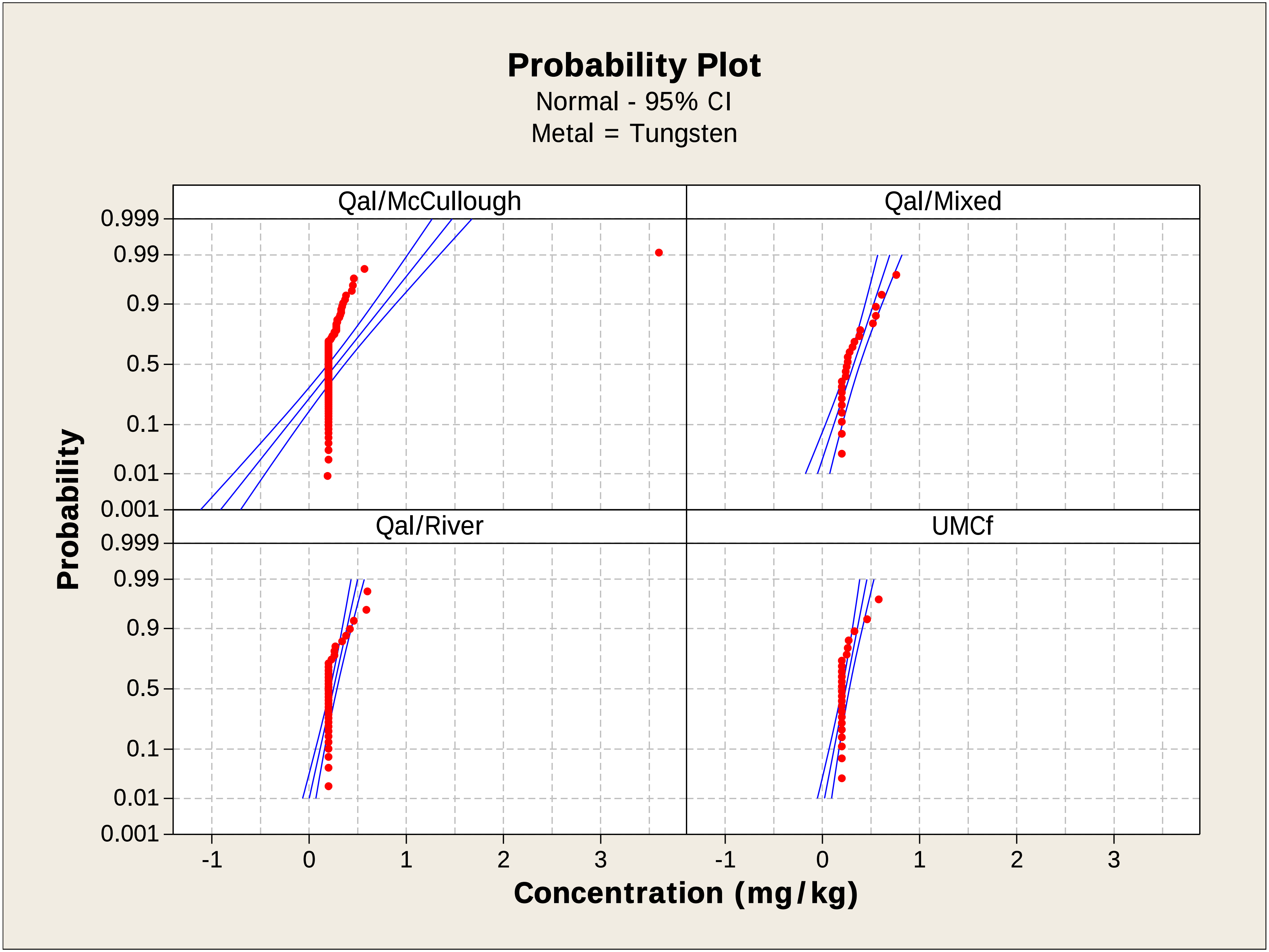

Probability Plot
Normal - 95% CI
Metal = Strontium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
200
400
600
800
Concentration (mg/kg)


Probability Plot
Normal - 95% CI
Metal = Thallium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.15
0.20
0.25
0.30
0.35
Concentration (mg/kg)

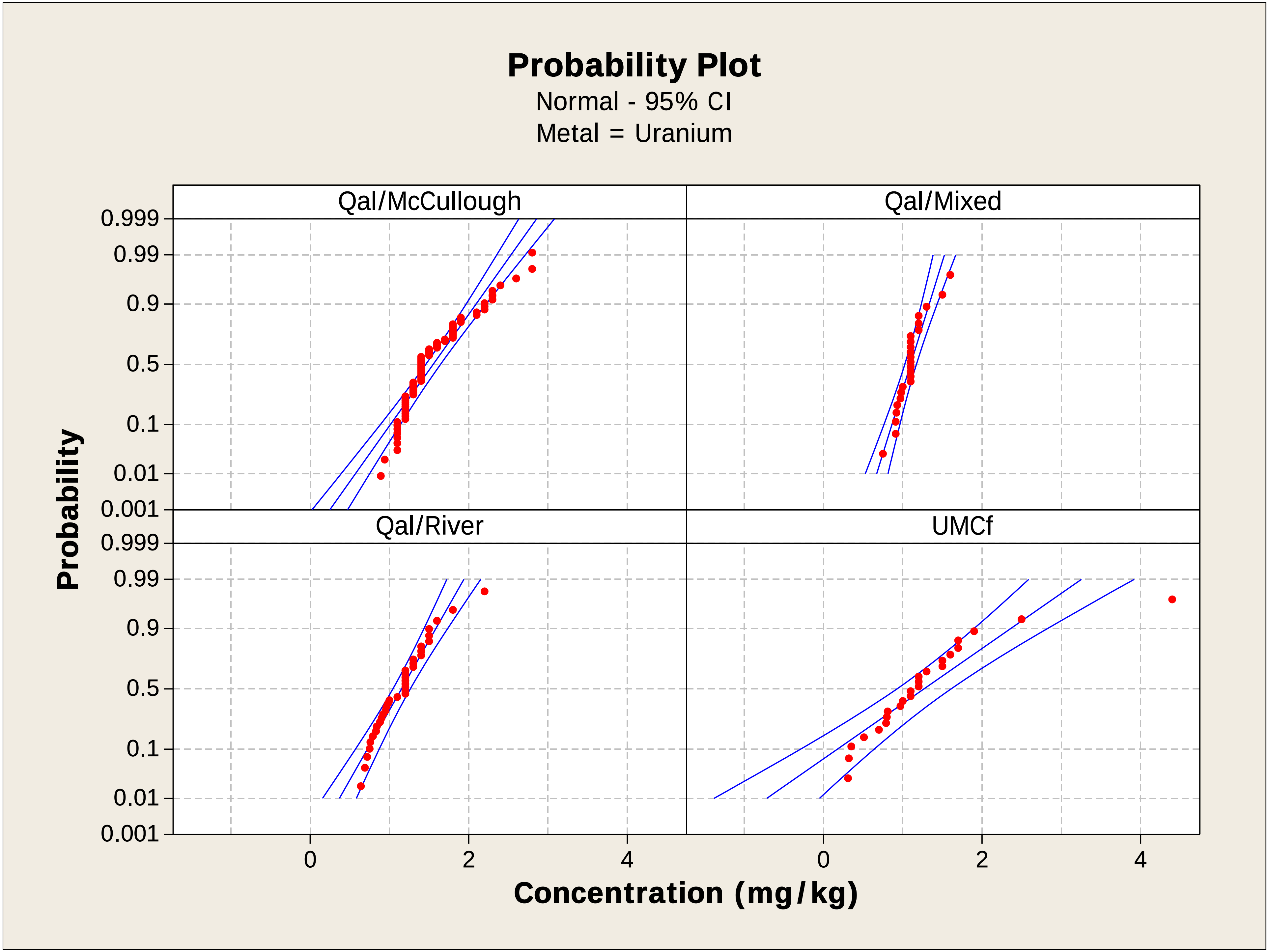


Probability Plot
Normal - 95% CI
Metal = Tin
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-0.5
0.0
0.5
1.0
1.5
Probability
Concentration (mg/kg)

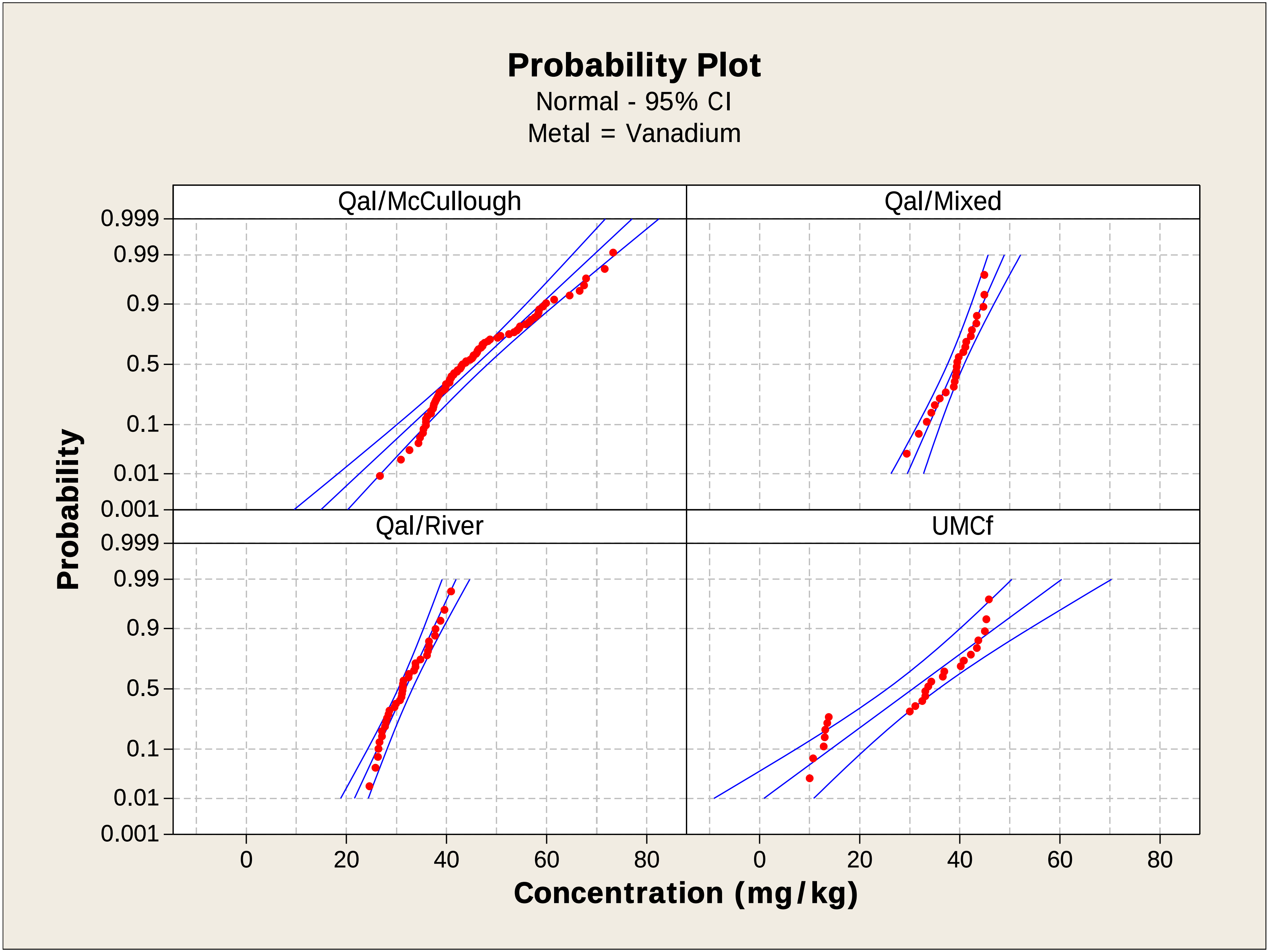

Probability Plot
Normal - 95% CI
Metal = Titanium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
250
500
750
1000
Concentration (mg/kg)



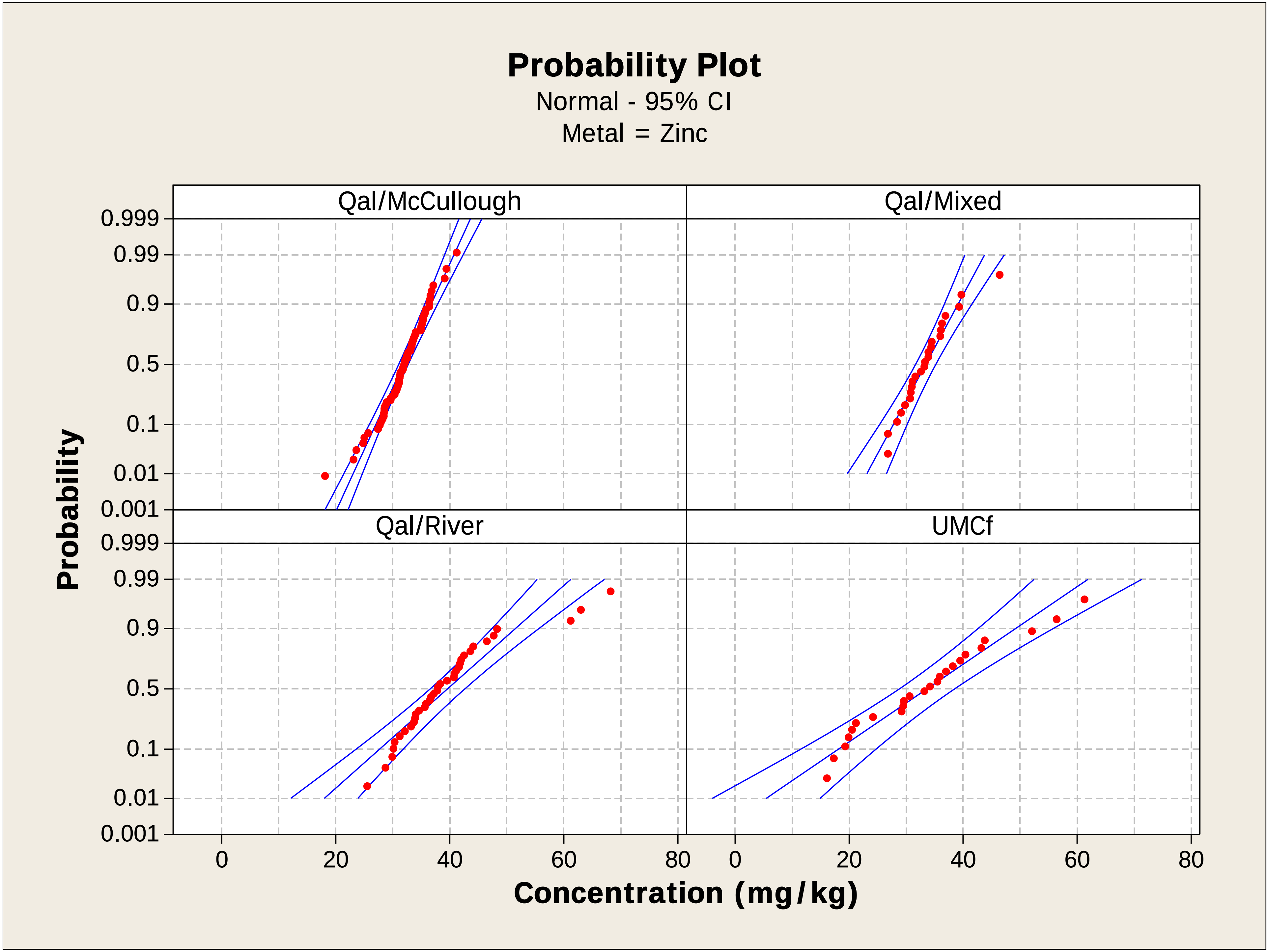
Probability Plot
Normal - 95% CI
Metal = Tungsten
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-1
0
1
2
3
Probability
Concentration (mg/kg)



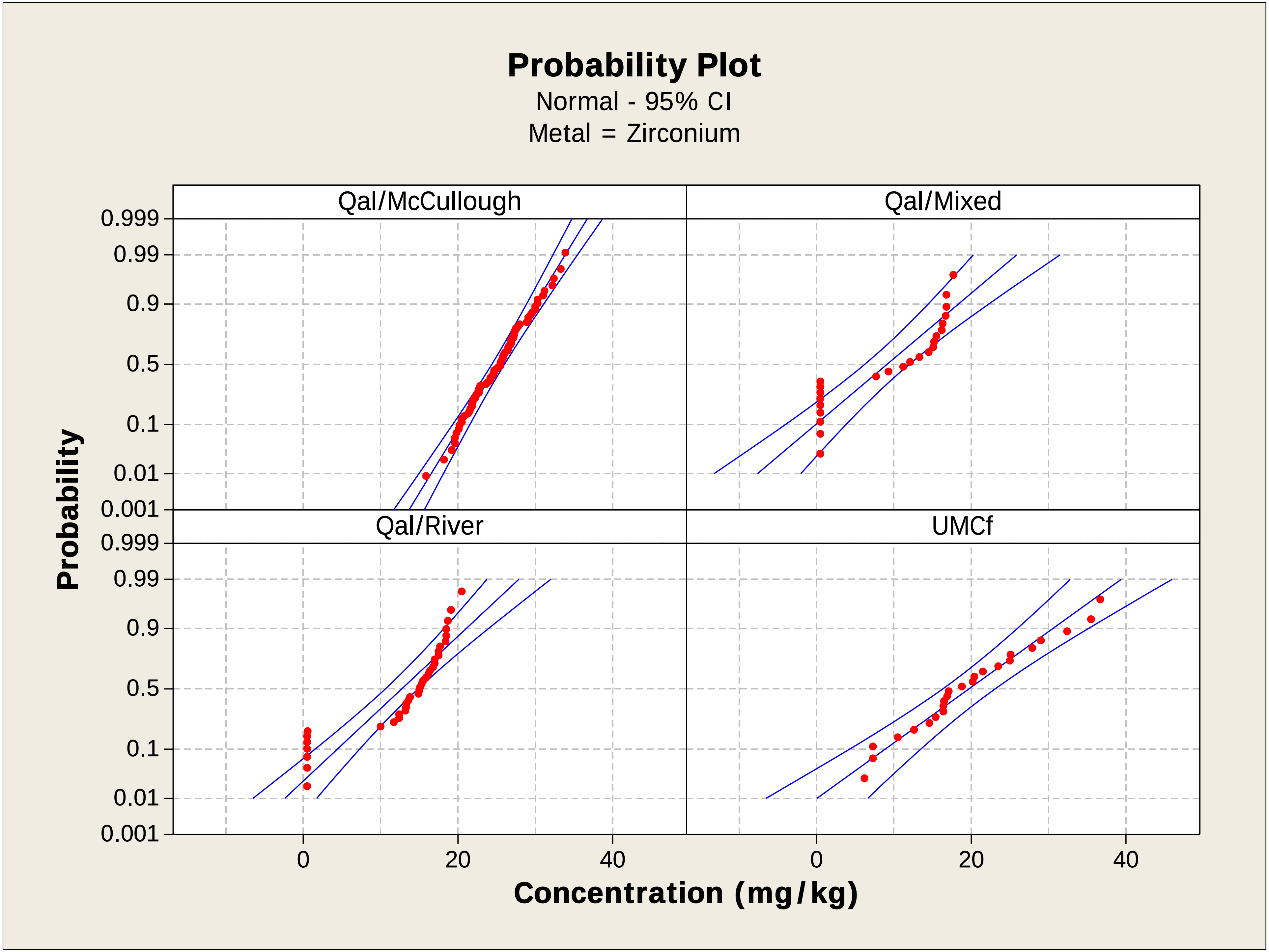
Probability Plot
Normal - 95% CI
Metal = Uranium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
2
4
Concentration (mg/kg)



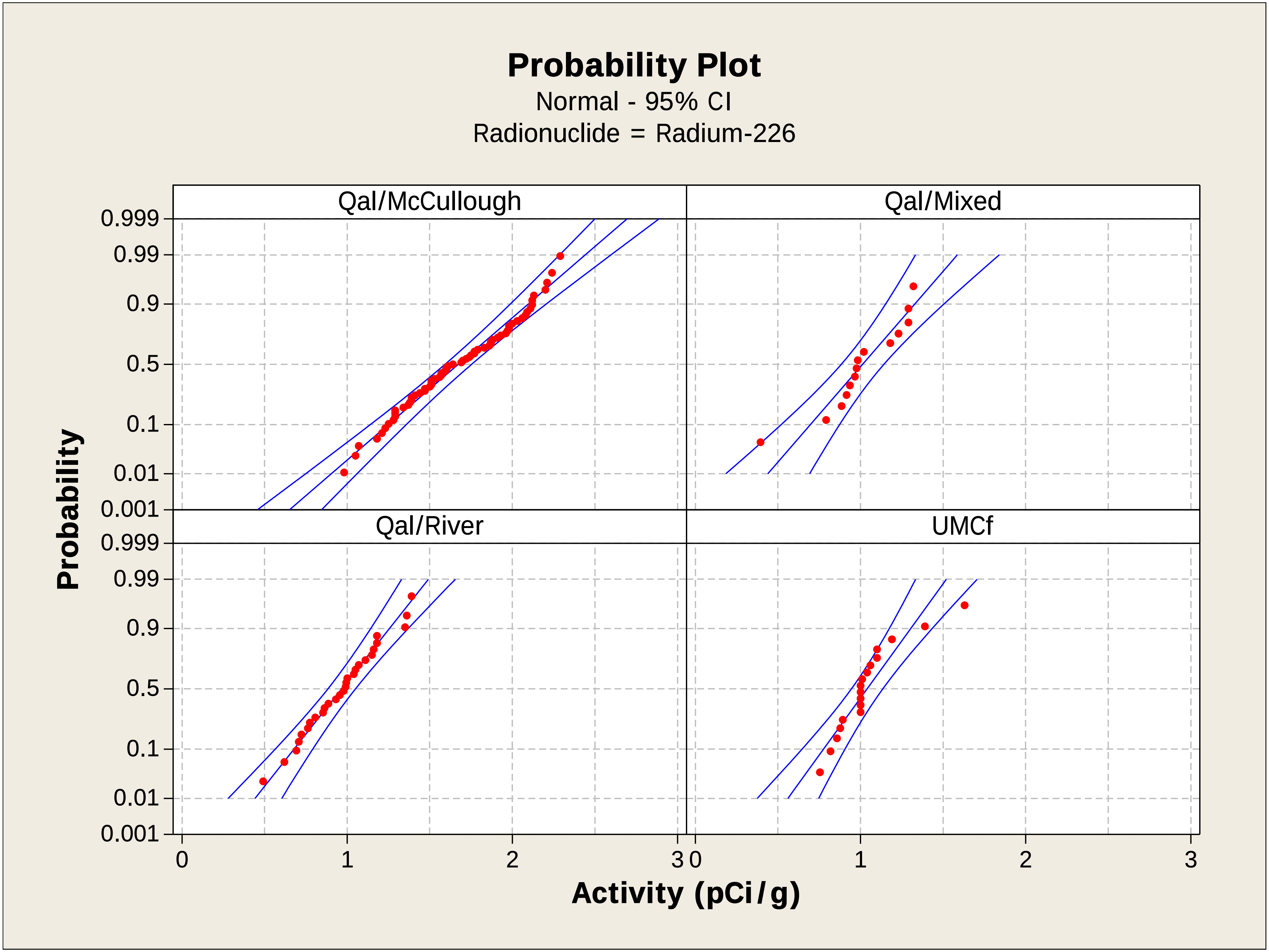
Probability Plot
Normal - 95% CI
Metal = Vanadium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
20
40
60
80
Probability
Concentration (mg/kg)



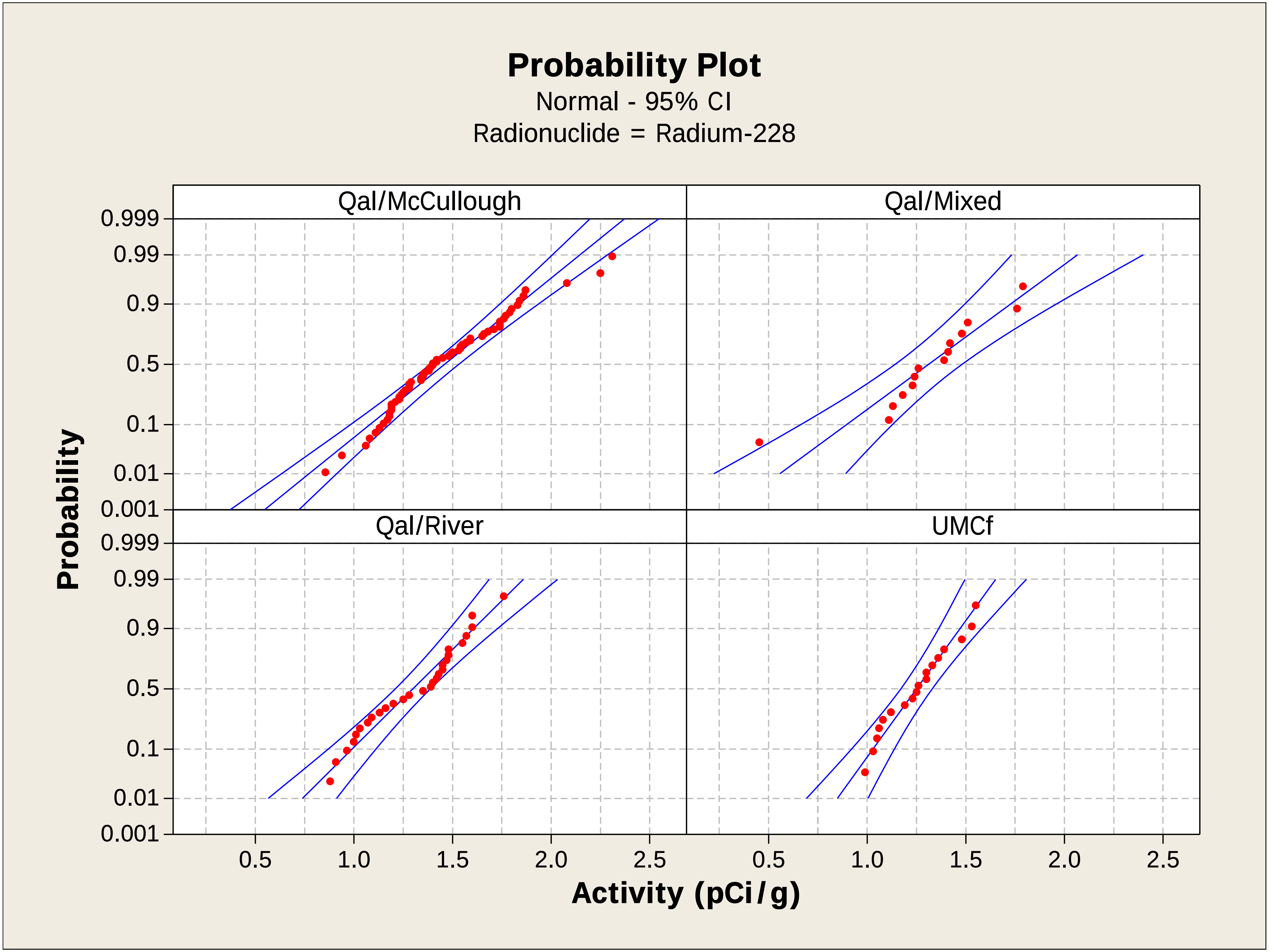
Probability Plot
Normal - 95% CI
Metal = Zinc
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
20
40
60
80
Concentration (mg/kg)

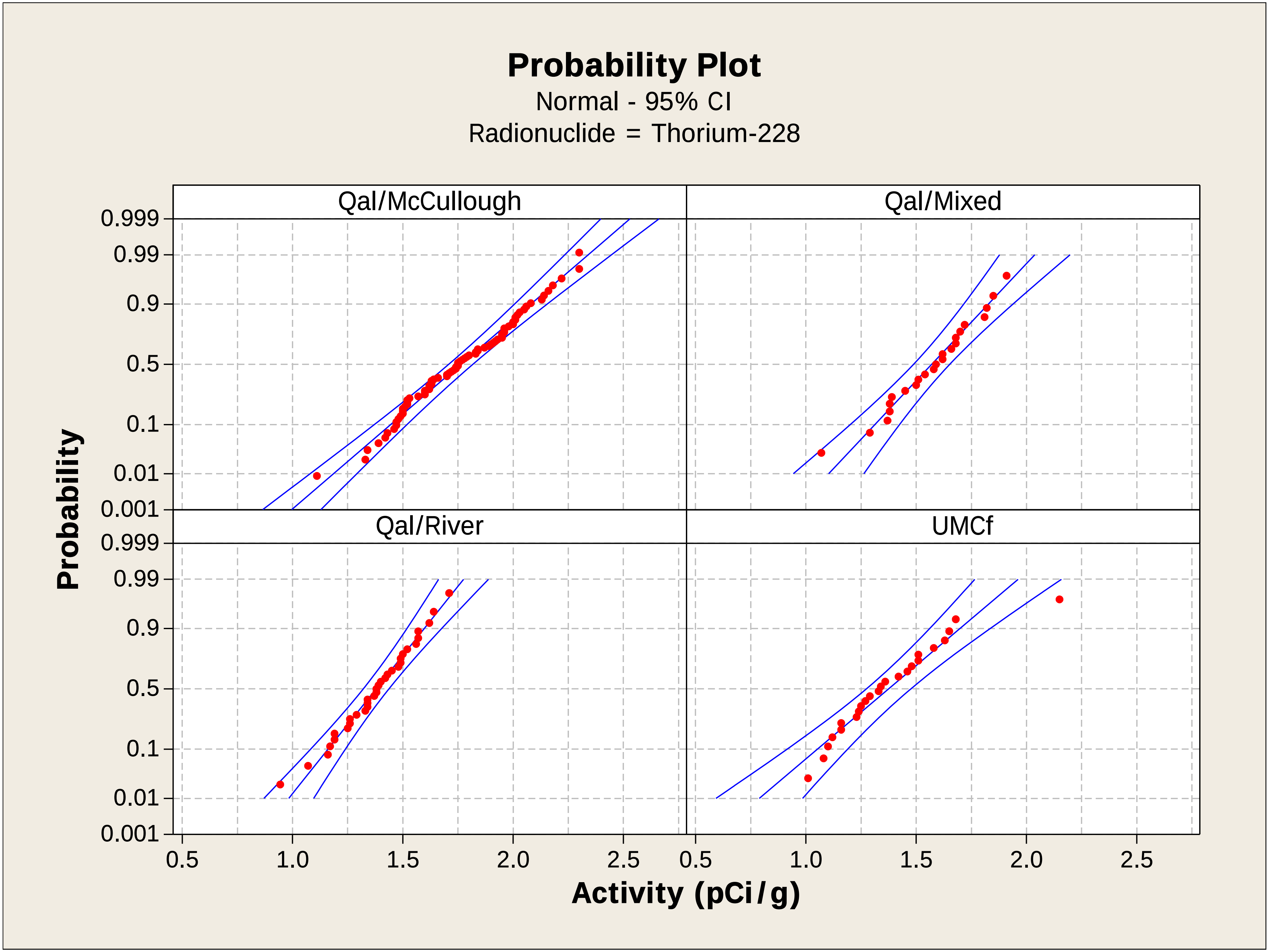


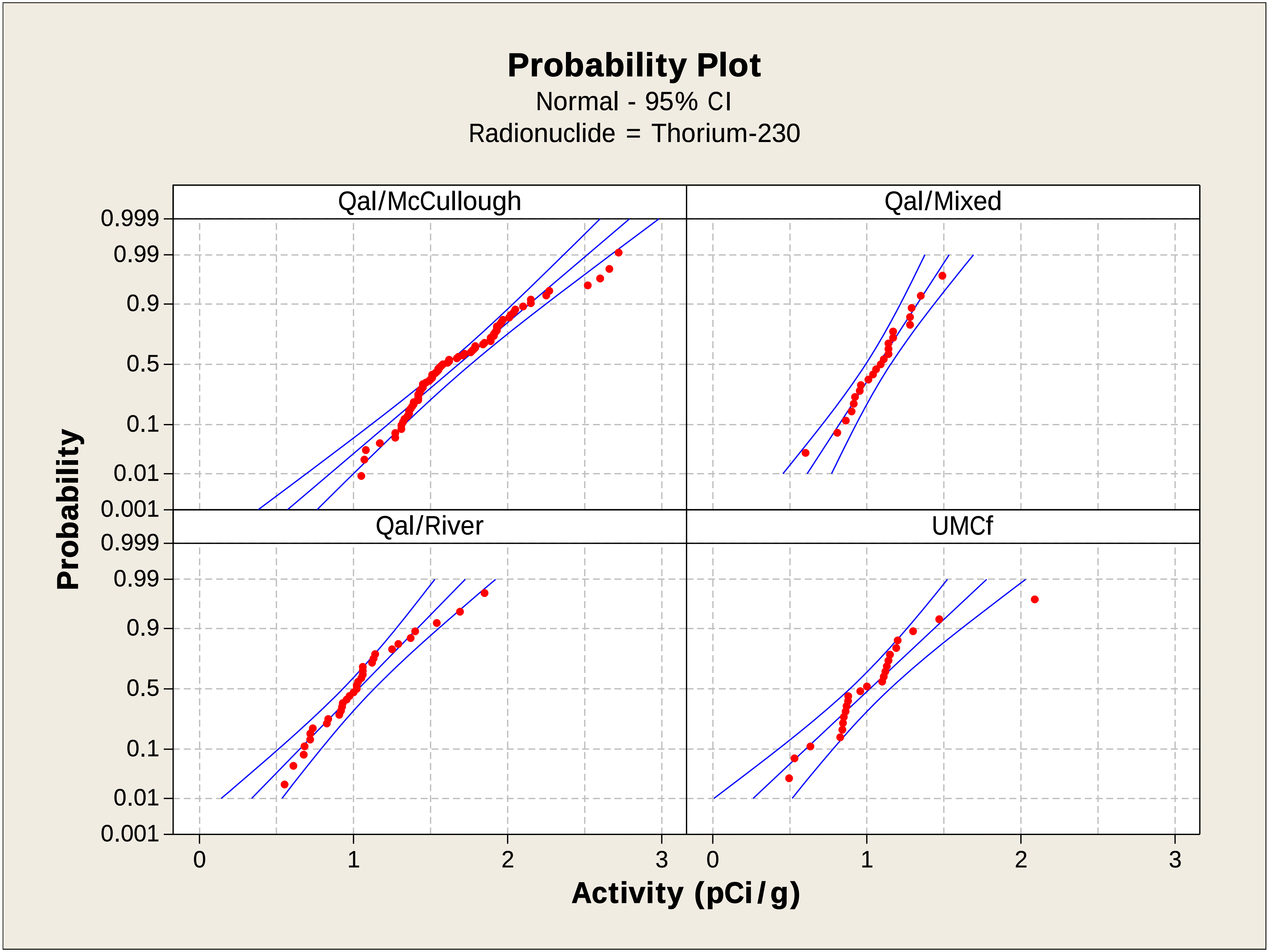
Probability Plot
Normal - 95% CI
Metal = Zirconium
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
20
40
Probability
Concentration (mg/kg)



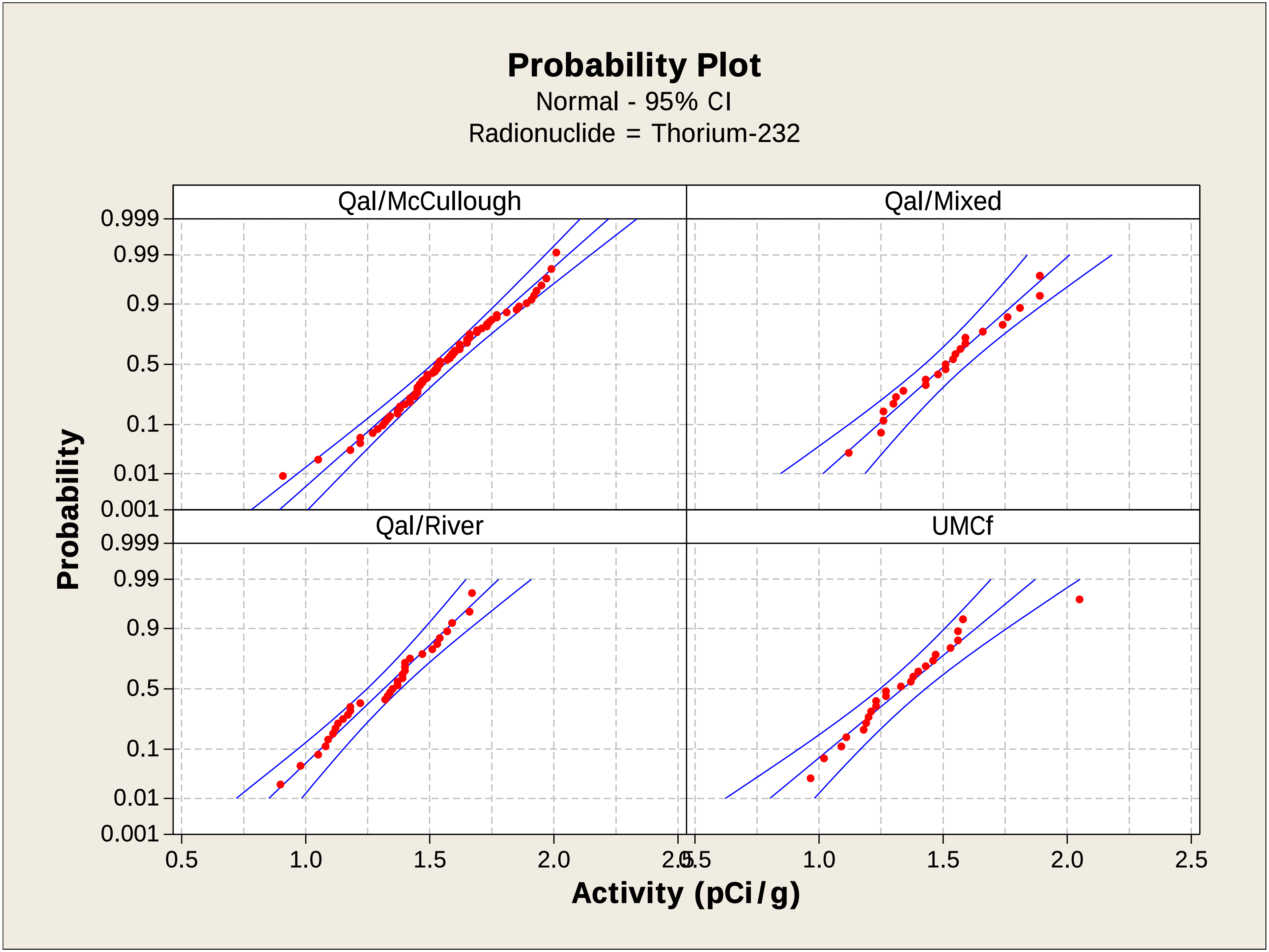
Probability Plot
Normal - 95% CI
Radionuclide = Radium-226
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
1
2
3
Activity (pCi/g)

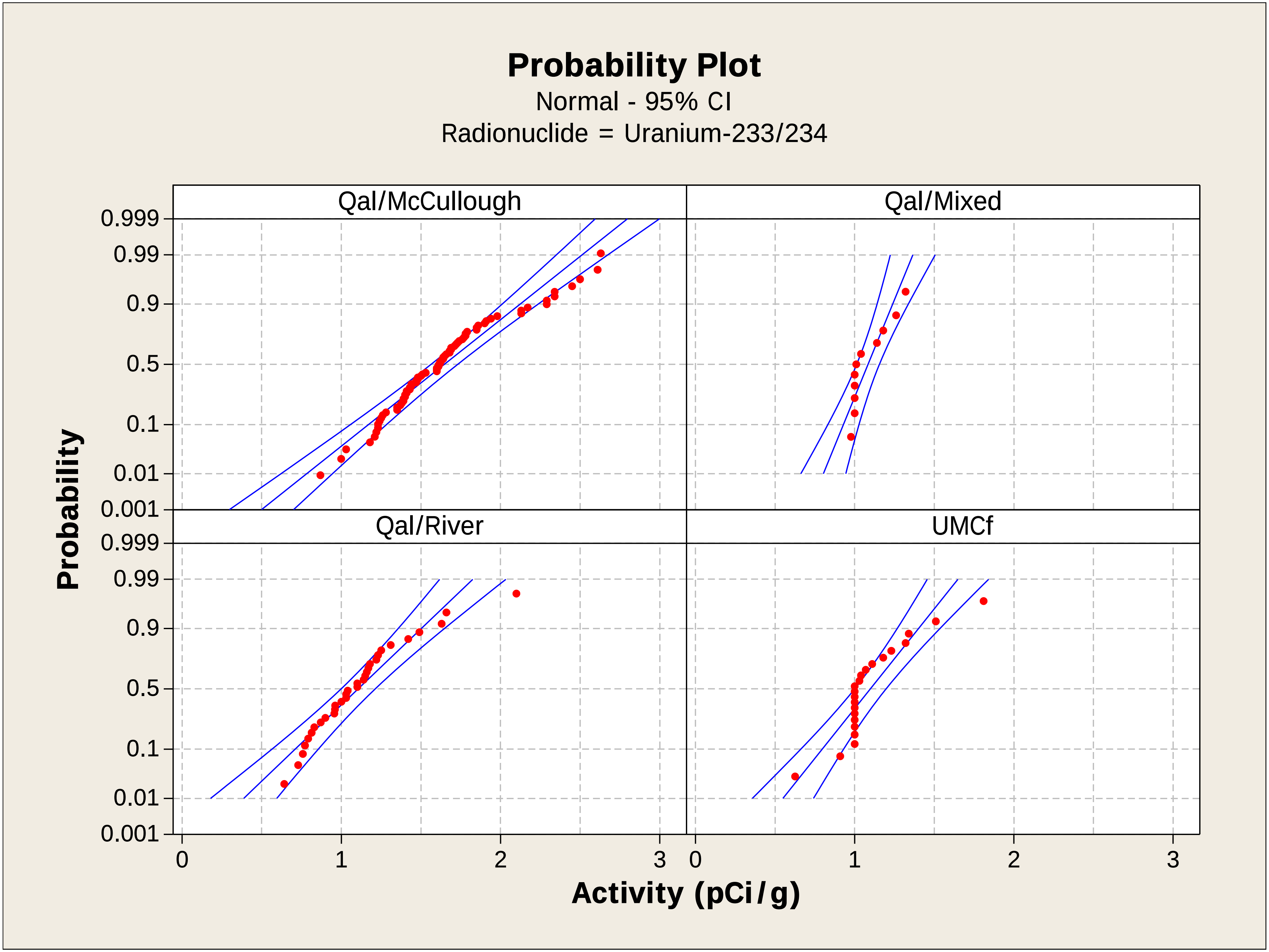

Probability Plot
Normal - 95% CI
Radionuclide = Radium-228
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.5
1.0
1.5
2.0
2.5
Activity (pCi/g)


Probability Plot
Normal - 95% CI
Radionuclide = Thorium-228
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.5
1.0
1.5
2.0
2.5
Probability
Activity (pCi/g)

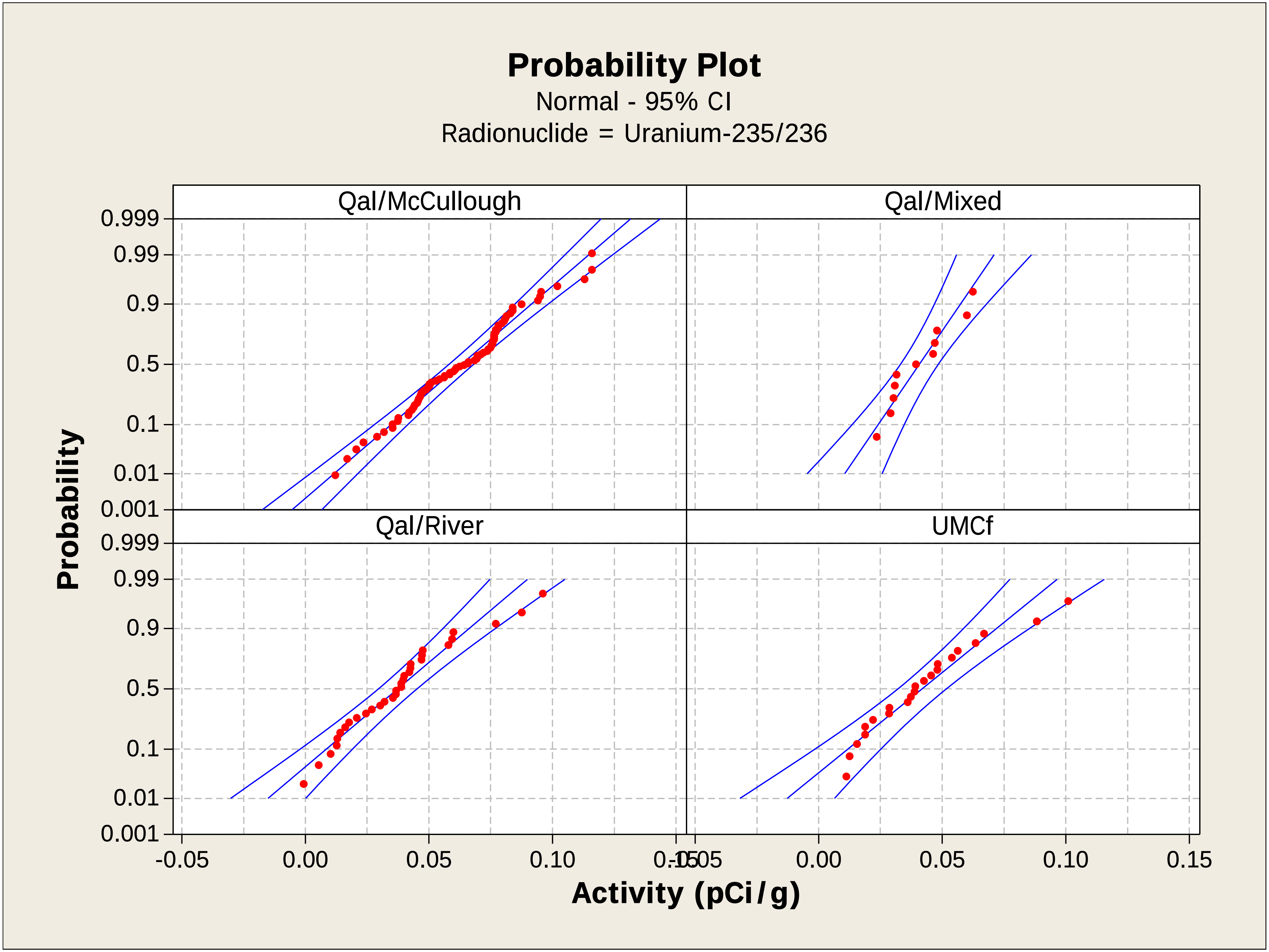


Probability Plot
Normal - 95% CI
Radionuclide = Thorium-230
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
Probability
0
1
2
3
Activity (pCi/g)

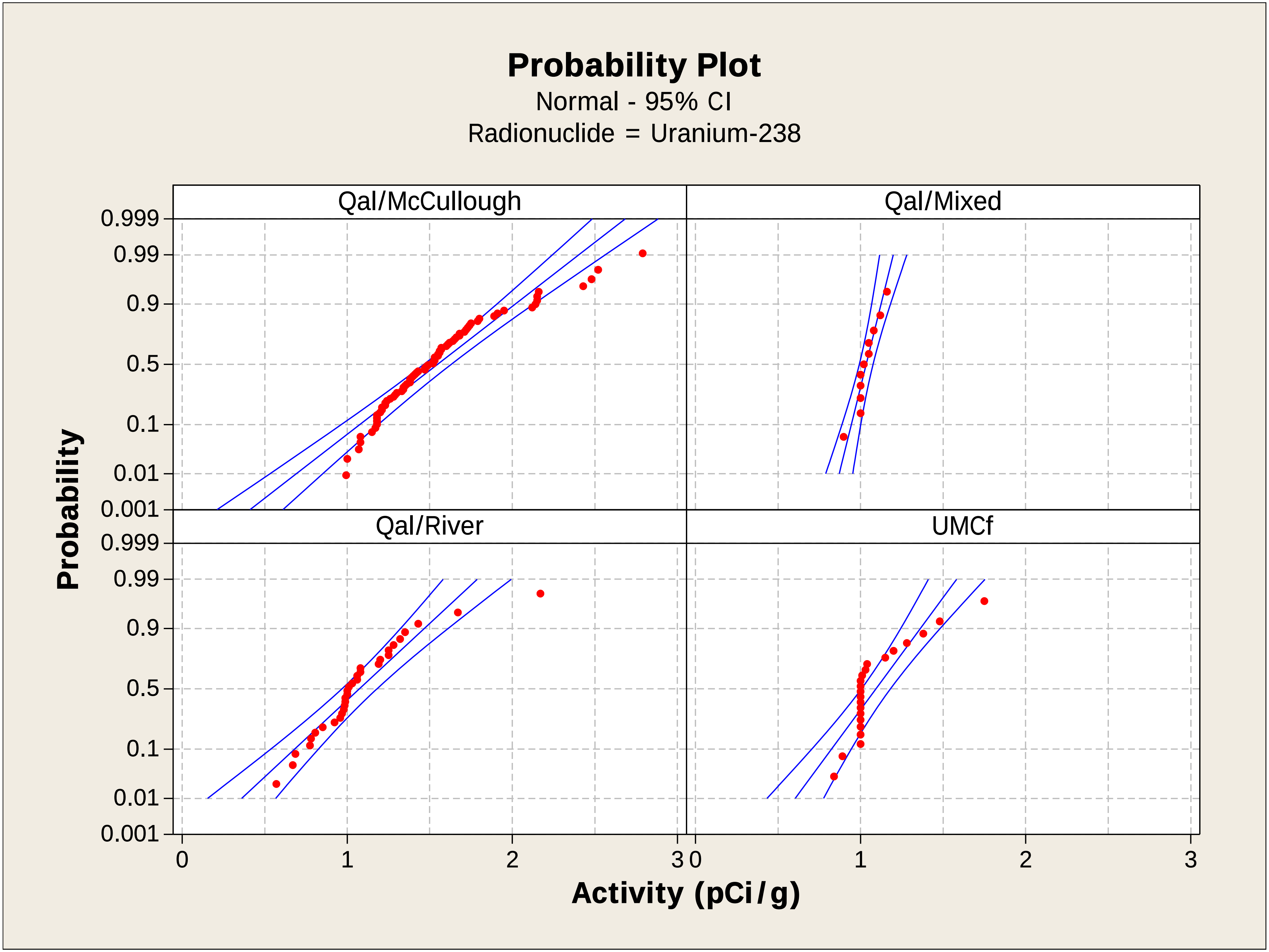

Probability Plot
Normal - 95% CI
Radionuclide = Thorium-232
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.5
1.0
1.5
2.0
2.5
Activity (pCi/g)



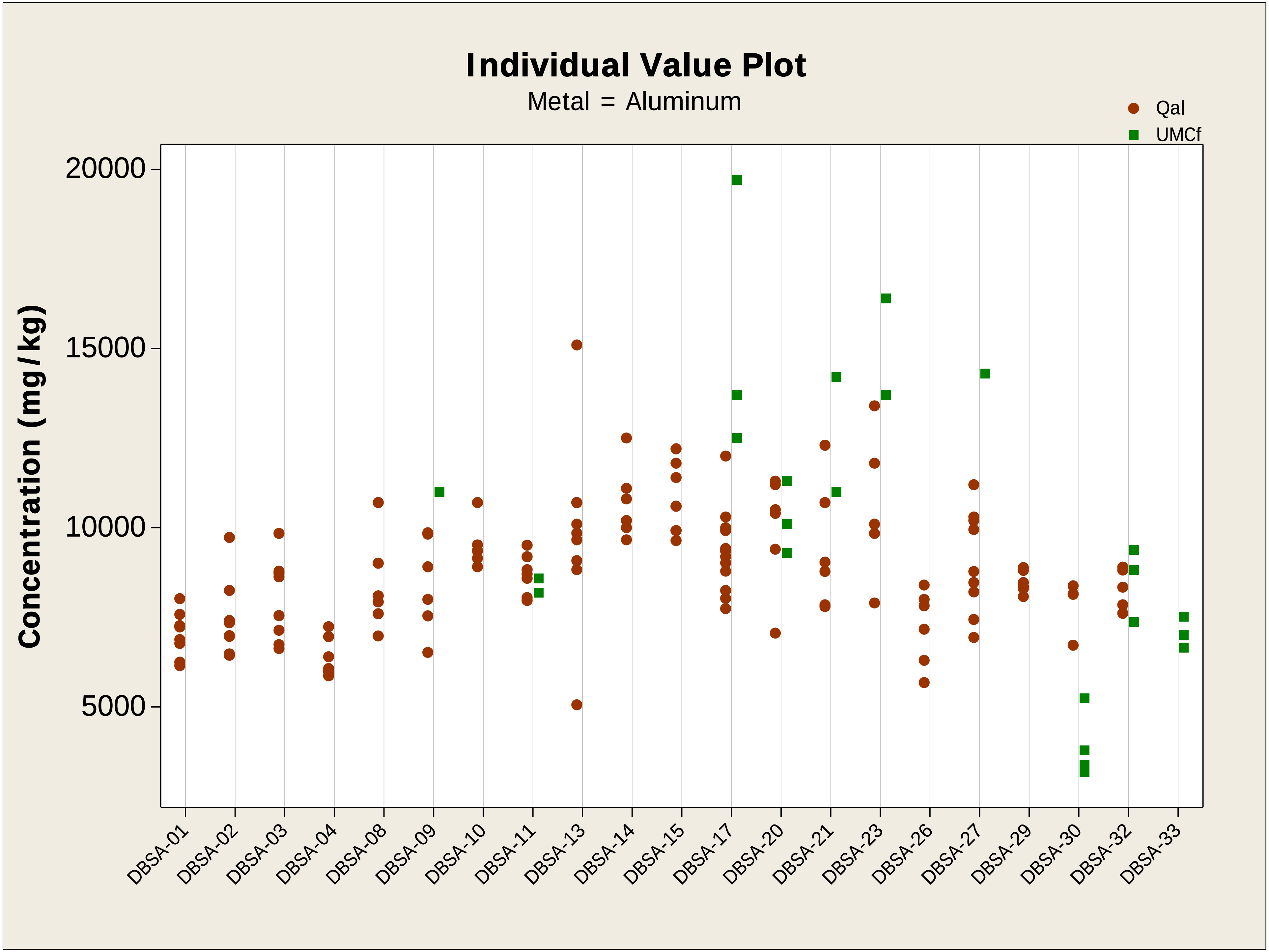
Probability Plot
Normal - 95% CI
Radionuclide = Uranium-233/234
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
0.999
0.99
0.9
0.5
0.1
0.01
0.001
Probability
0
1
2
3
Activity (pCi/g)



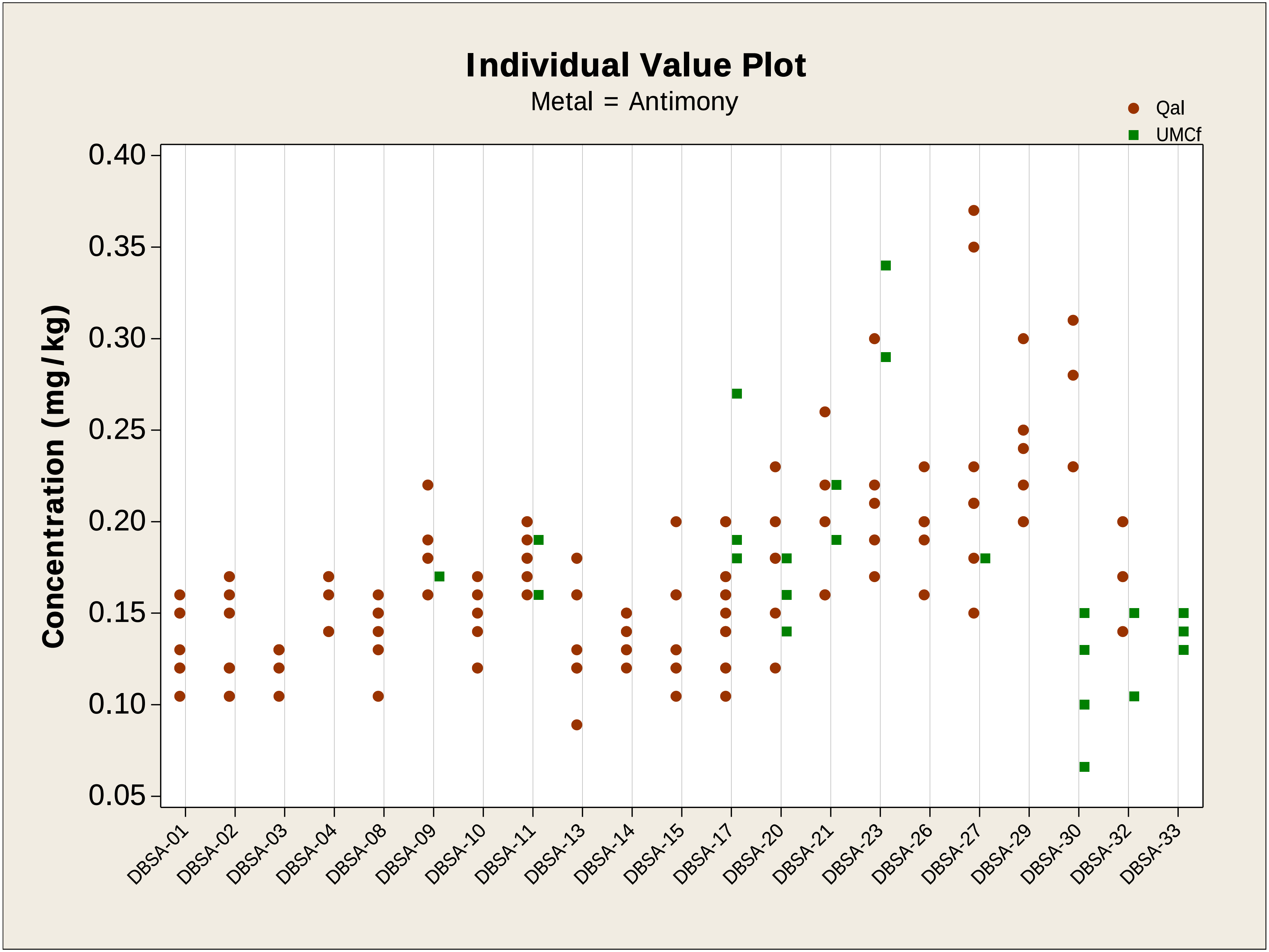
Probability Plot
Normal - 95% CI
Radionuclide = Uranium-235/236
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
-0.05
0.00
0.05
0.10
0.15
Activity (pCi/g)


Probability Plot
Normal - 95% CI
Radionuclide = Uranium-238
Qal/McCullough
Qal/Mixed
Qal/River
UMCf
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0
1
2
3
Activity (pCi/g)

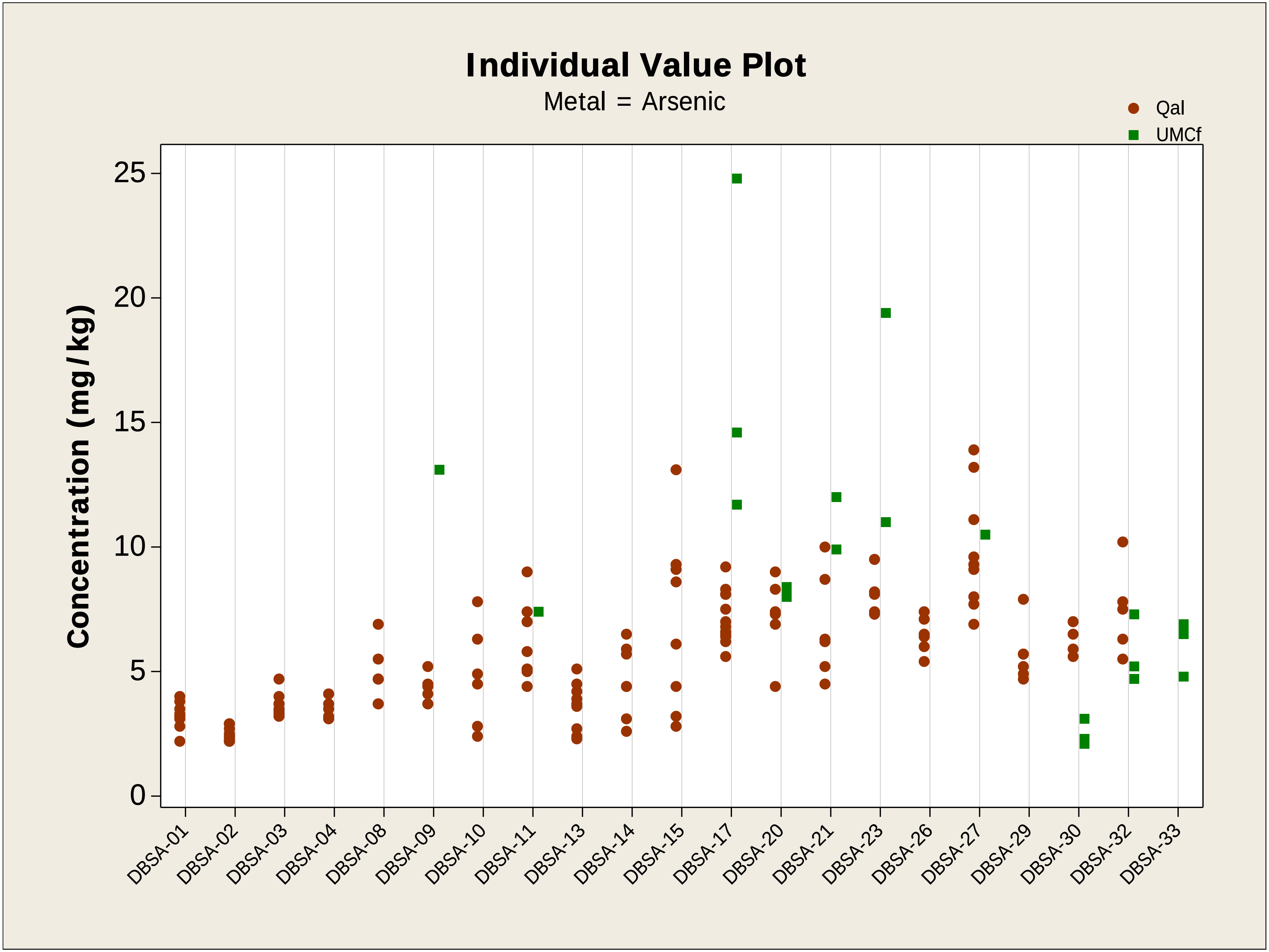
INDIVIDUAL VALUE PLOTS



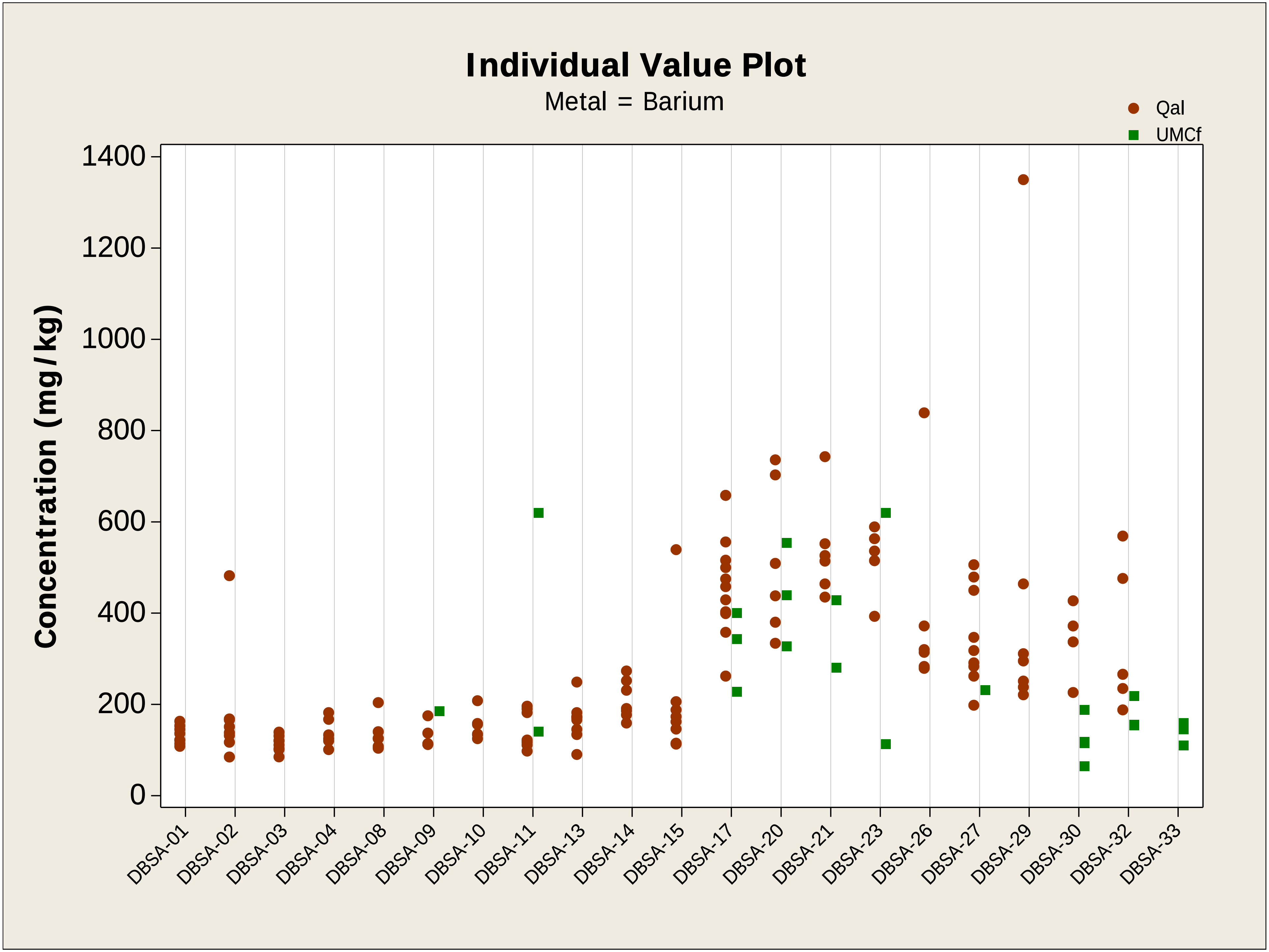
Individual Value Plot
Metal = Aluminum
Qal
UMCf
Concentration (mg/kg)
20000
15000
10000
5000
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33



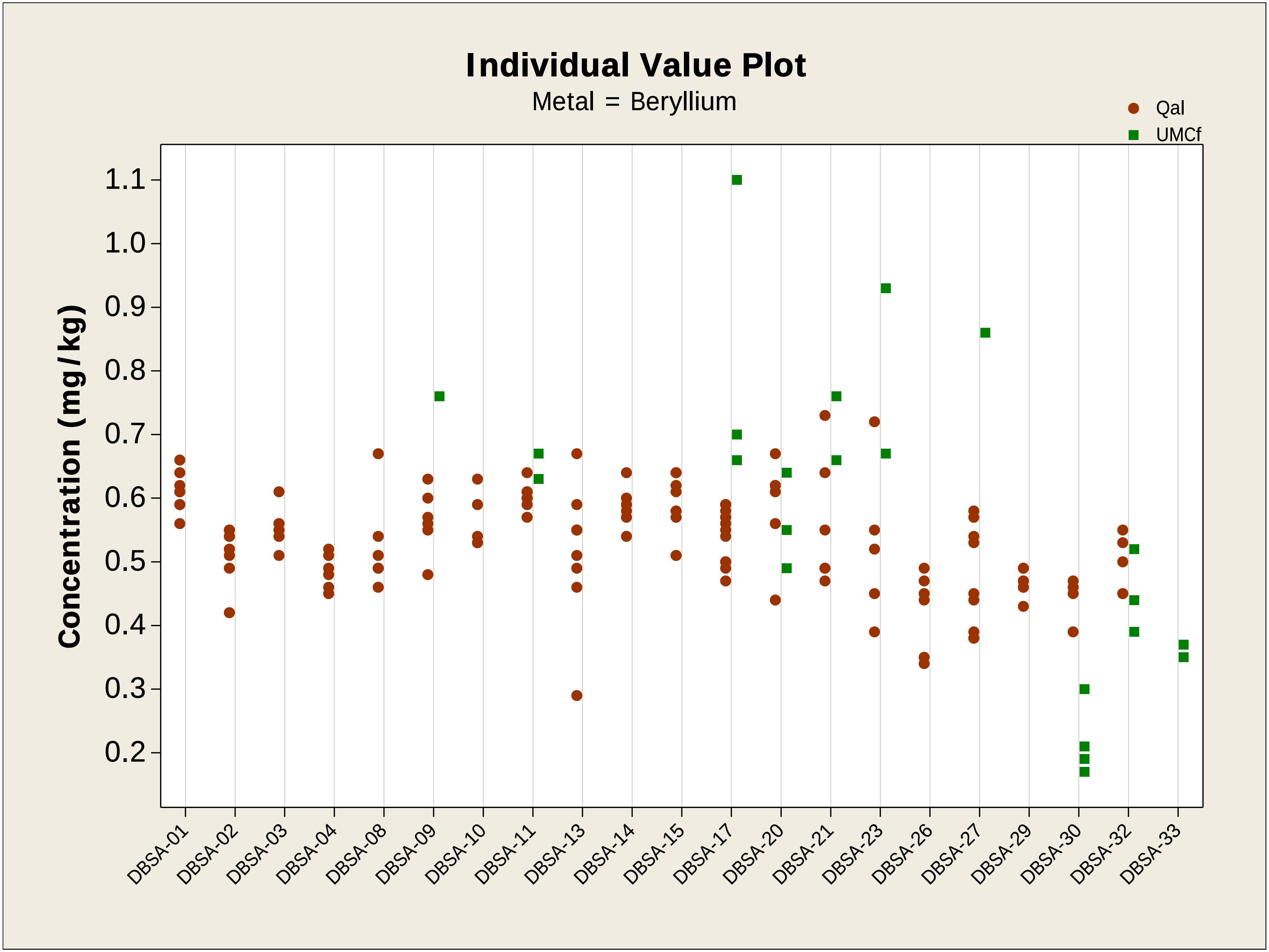
Individual Value Plot
Metal = Antimony
Qal
UMCf
Concentration (mg/kg)
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33

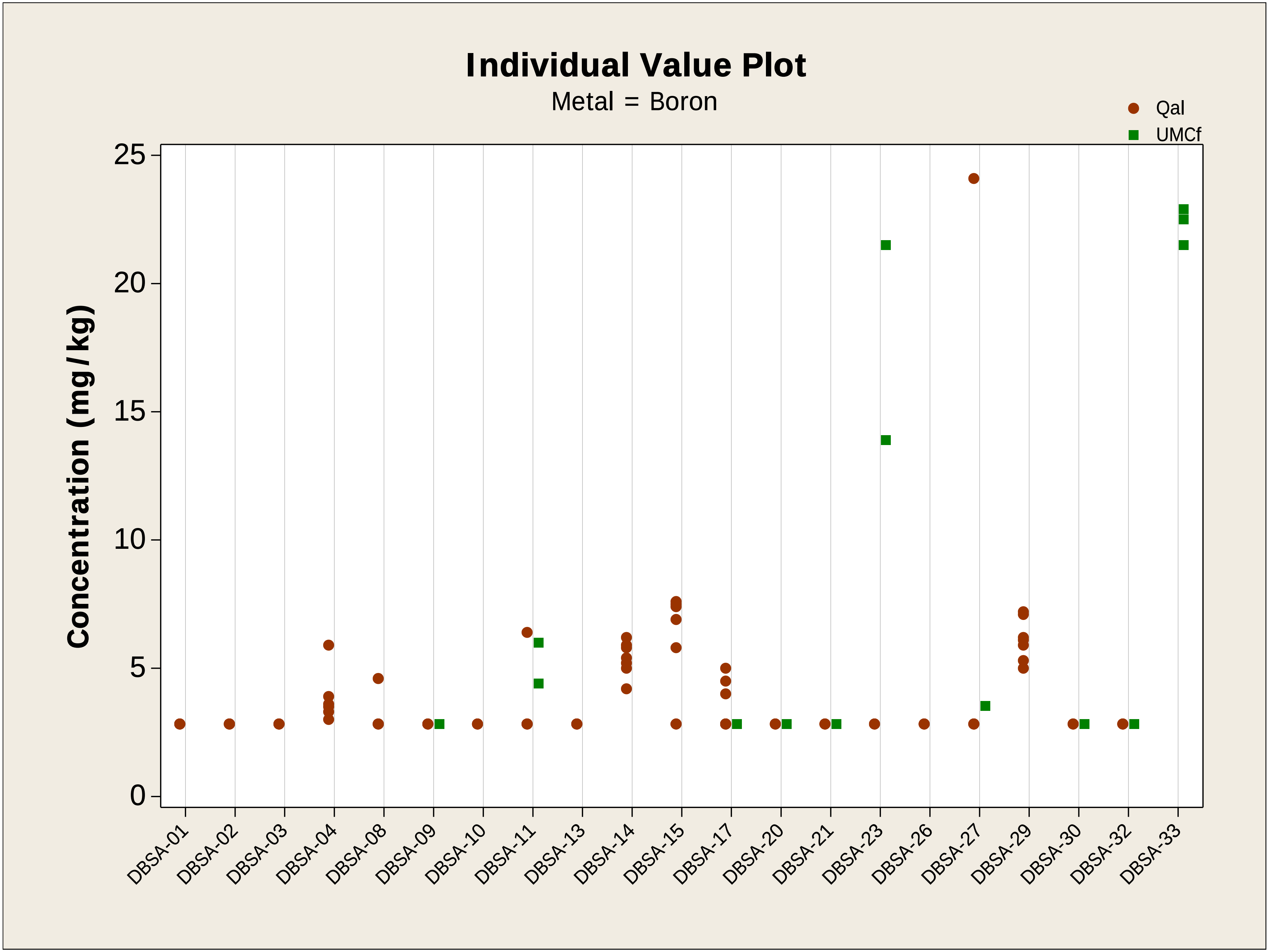


Individual Value Plot
Metal = Arsenic
Qal
UMCf
Concentration (mg/kg)
0
5
10
15
20
25
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33

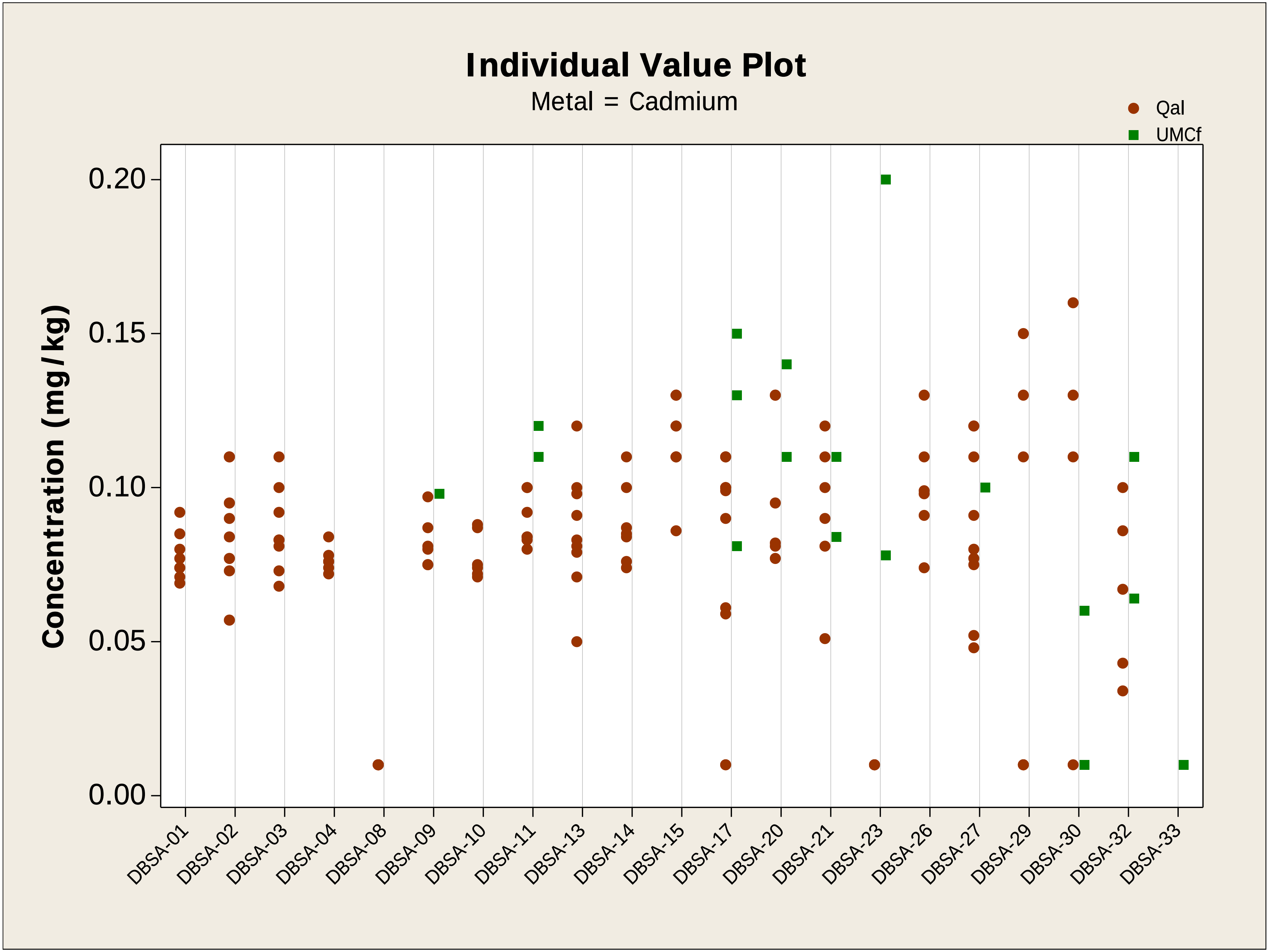


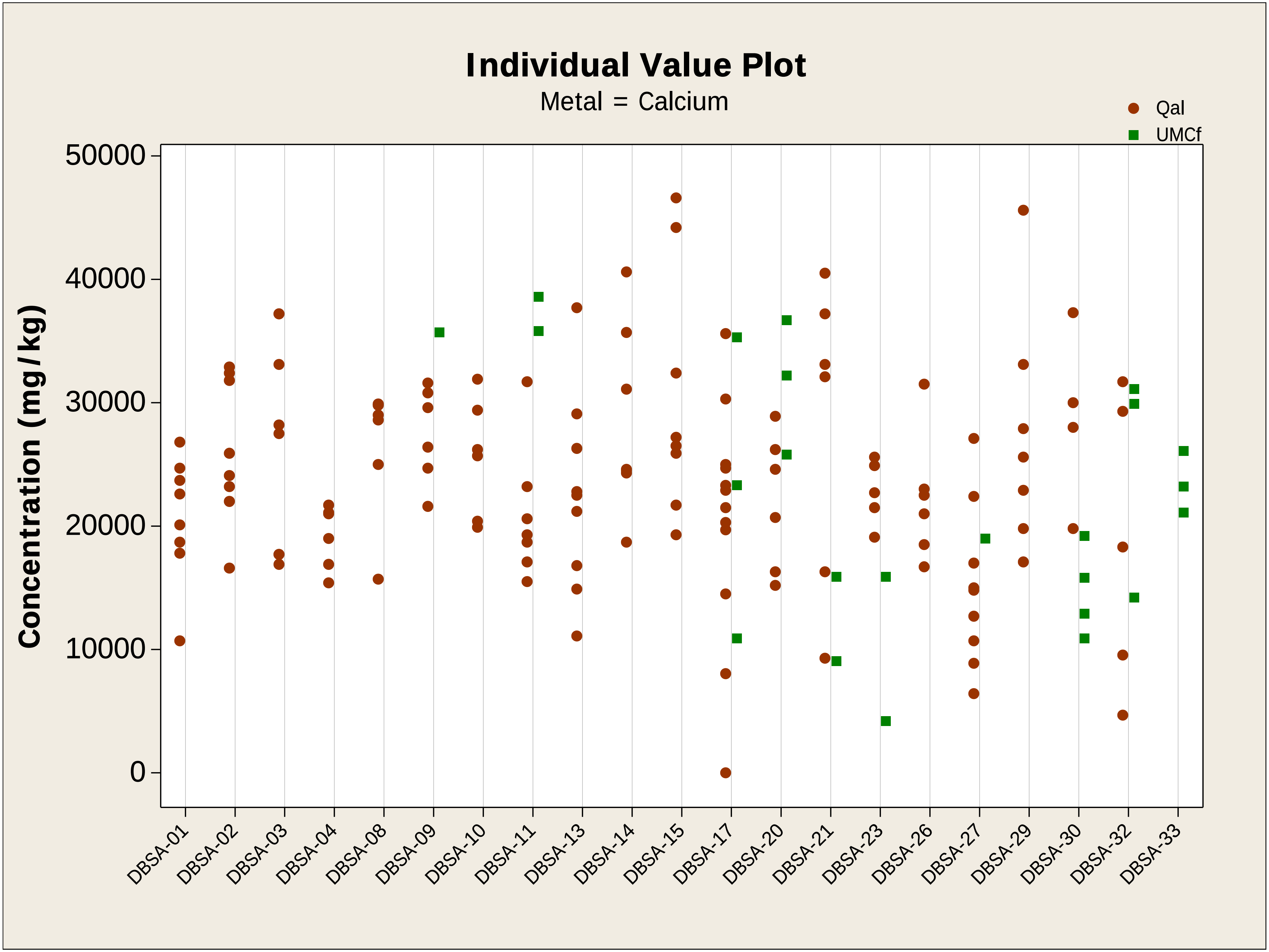
Individual Value Plot
Metal = Barium
Qal
UMCf
Concentration (mg/kg)
1400
1200
1000
800
600
400
200
0
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33


Individual Value Plot
Metal = Beryllium
Qal
UMCf
Concentration (mg/kg)
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Boron
Qal
UMCf
Concentration (mg/kg)
0
5
10
15
20
25
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33


Individual Value Plot
Metal = Cadmium
Qal
UMCf
Concentration (mg/kg)
0.20
0.15
0.10
0.05
0.00
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Calcium
Qal
UMCf
Concentration (mg/kg)
50000
40000
30000
20000
10000
0
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
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DBSA-26
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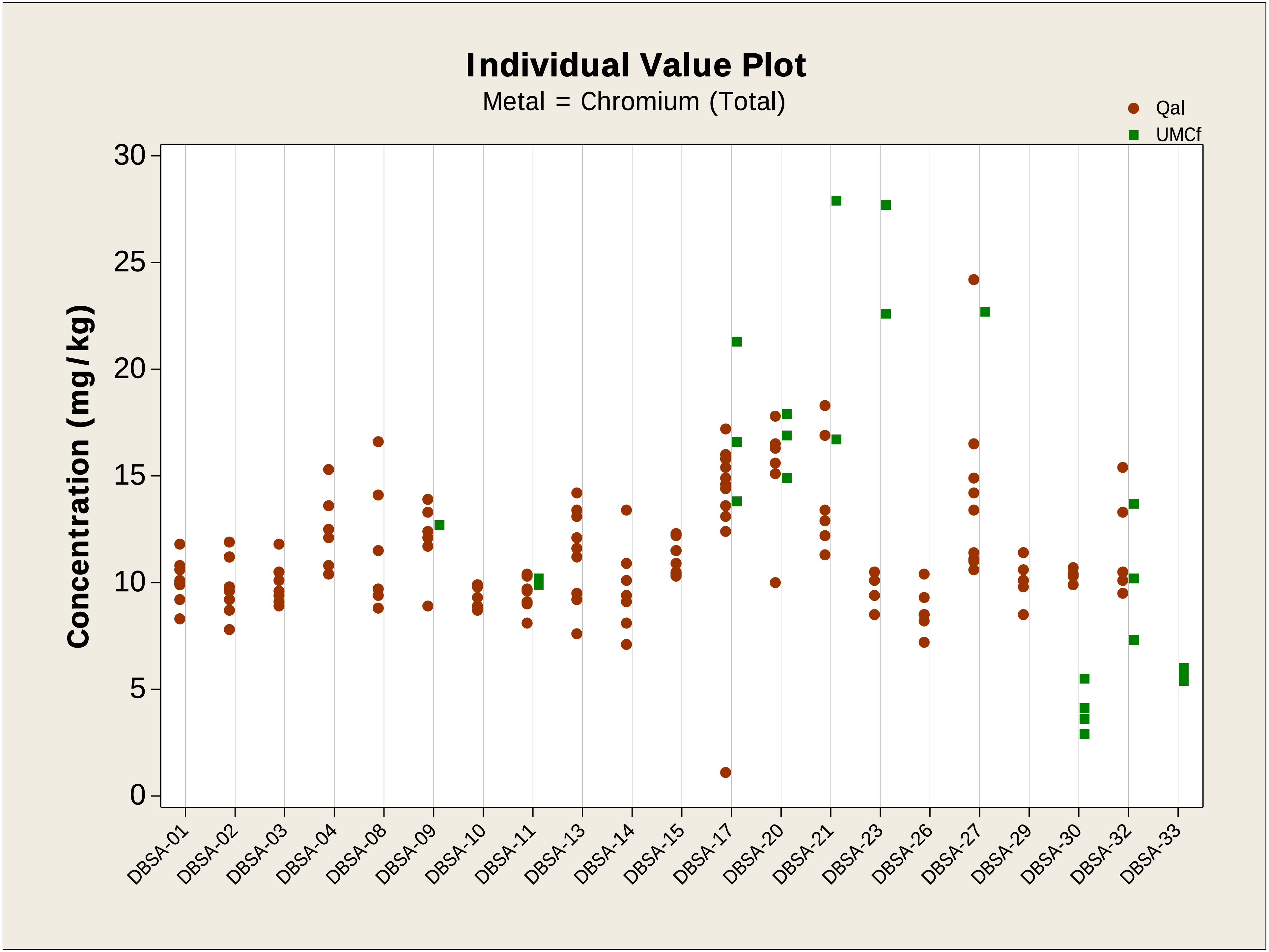
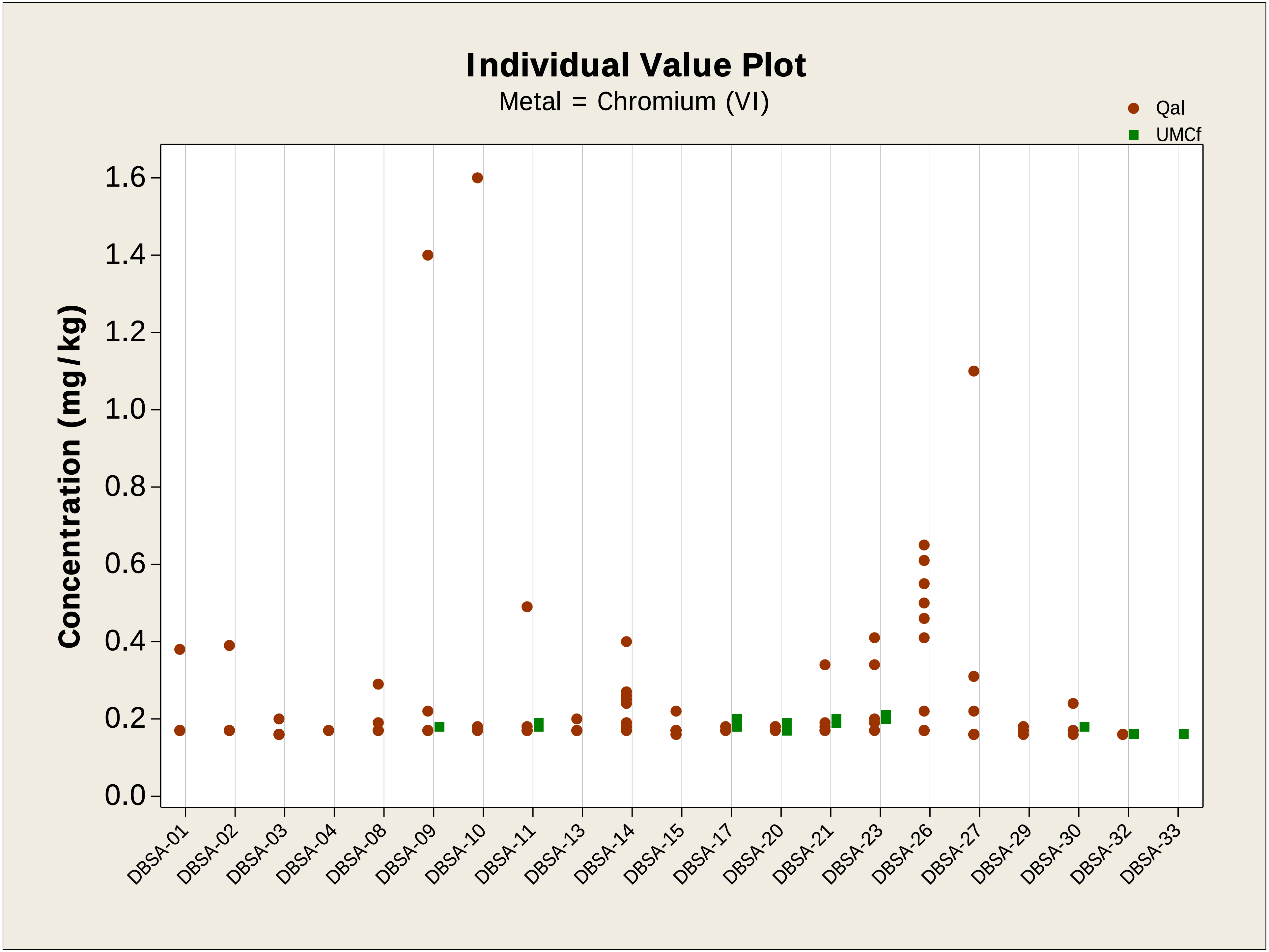
DBSA-32
DBSA-33



Individual Value Plot
Metal = Chromium (Total)
Qal
UMCf
Concentration (mg/kg)
0
5
10
15
20
25
30
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33


Individual Value Plot
Metal = Chromium (VI)
Qal
UMCf
Concentration (mg/kg)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
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DBSA-26
DBSA-27
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DBSA-30
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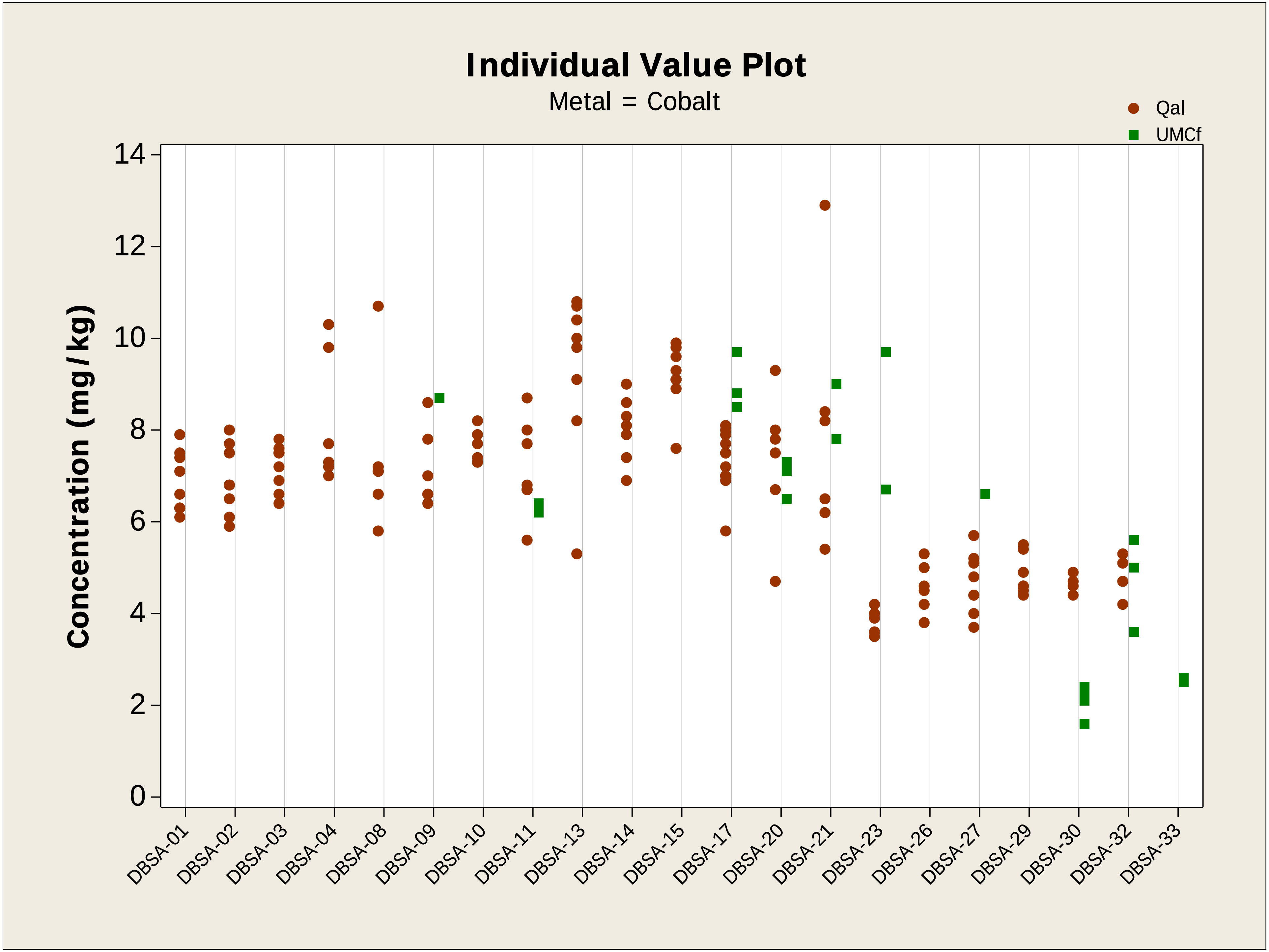
DBSA-33



Individual Value Plot
Metal = Cobalt
Qal
UMCf
Concentration (mg/kg)
0
2
4
6
8
10
12
14
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
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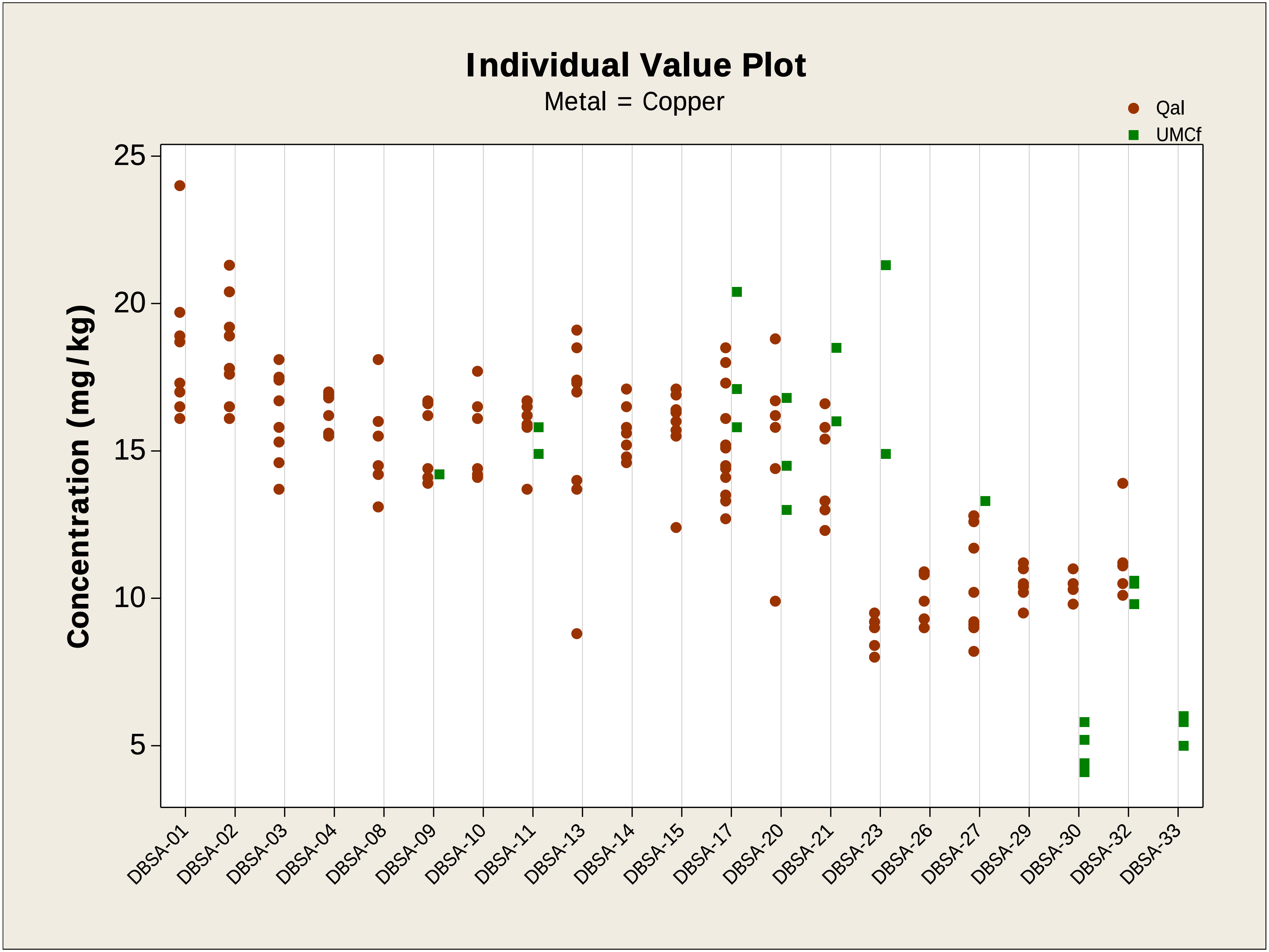
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Copper
Qal
UMCf
Concentration (mg/kg)
25
20
15
10
5
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
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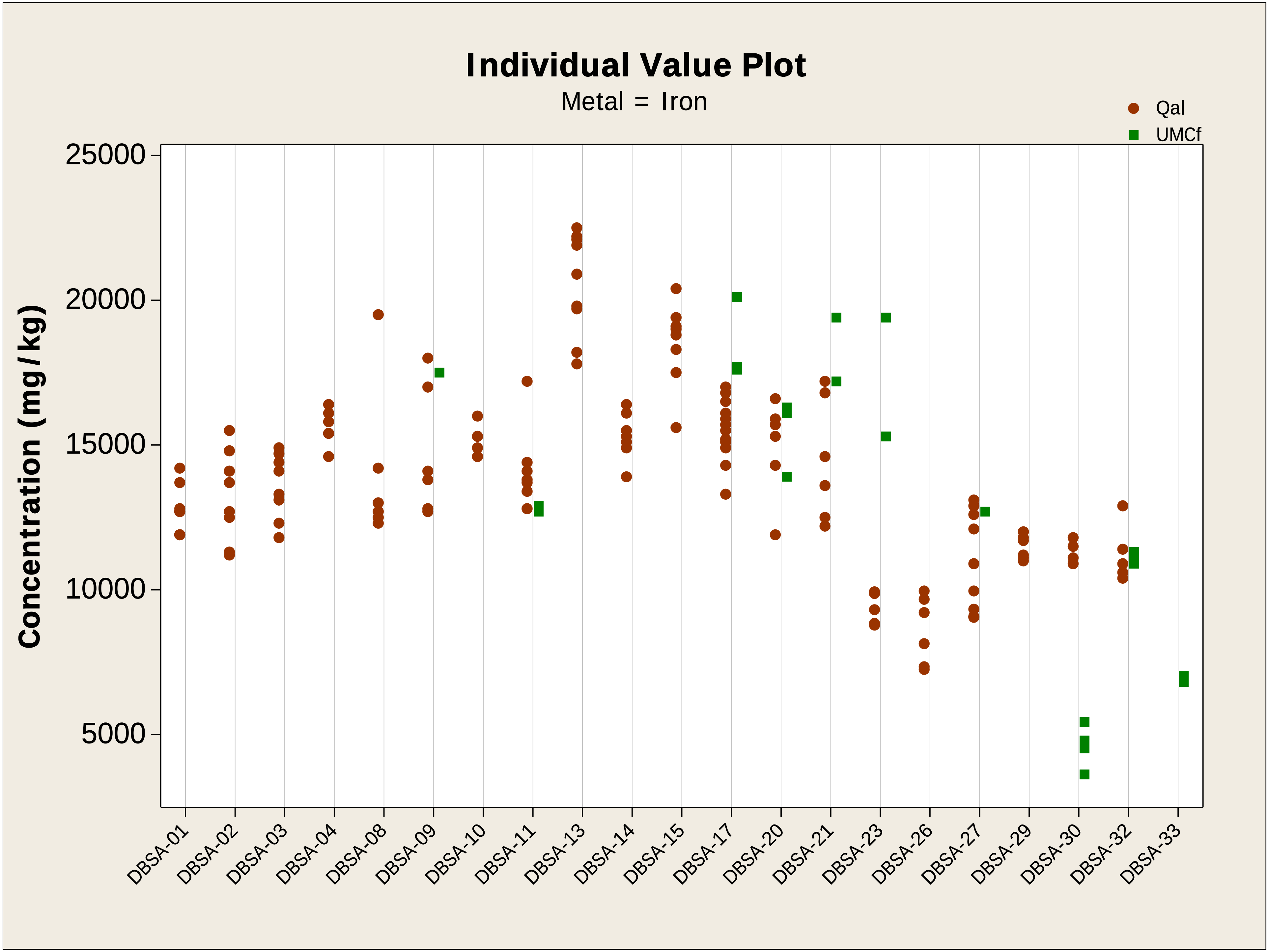
DBSA-32
DBSA-33


Individual Value Plot
Metal = Iron
Qal
UMCf
Concentration (mg/kg)
25000
20000
15000
10000
5000
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
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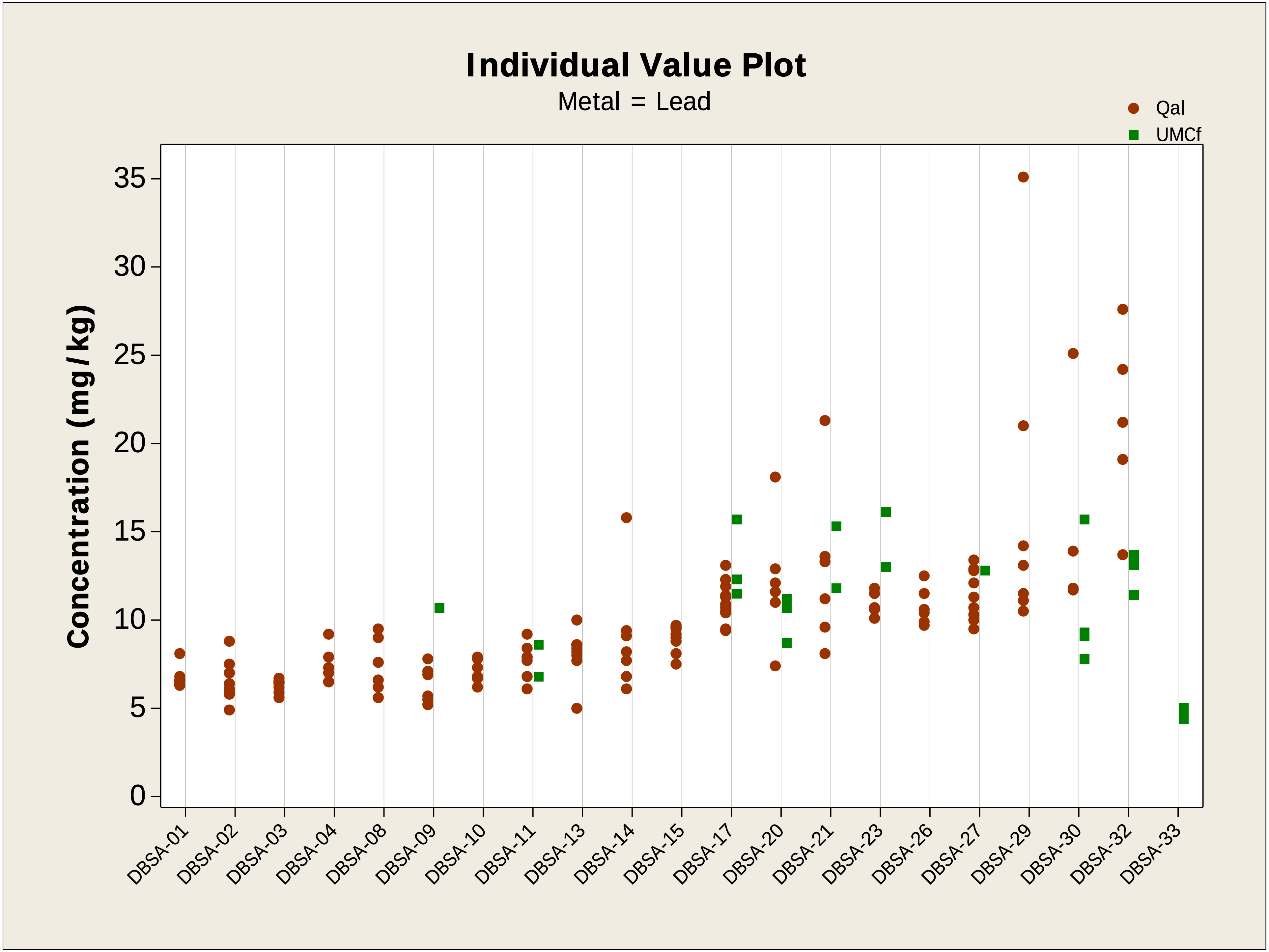
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Lead
Qal
UMCf
Concentration (mg/kg)
35
30
25
20
15
10
5
0
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
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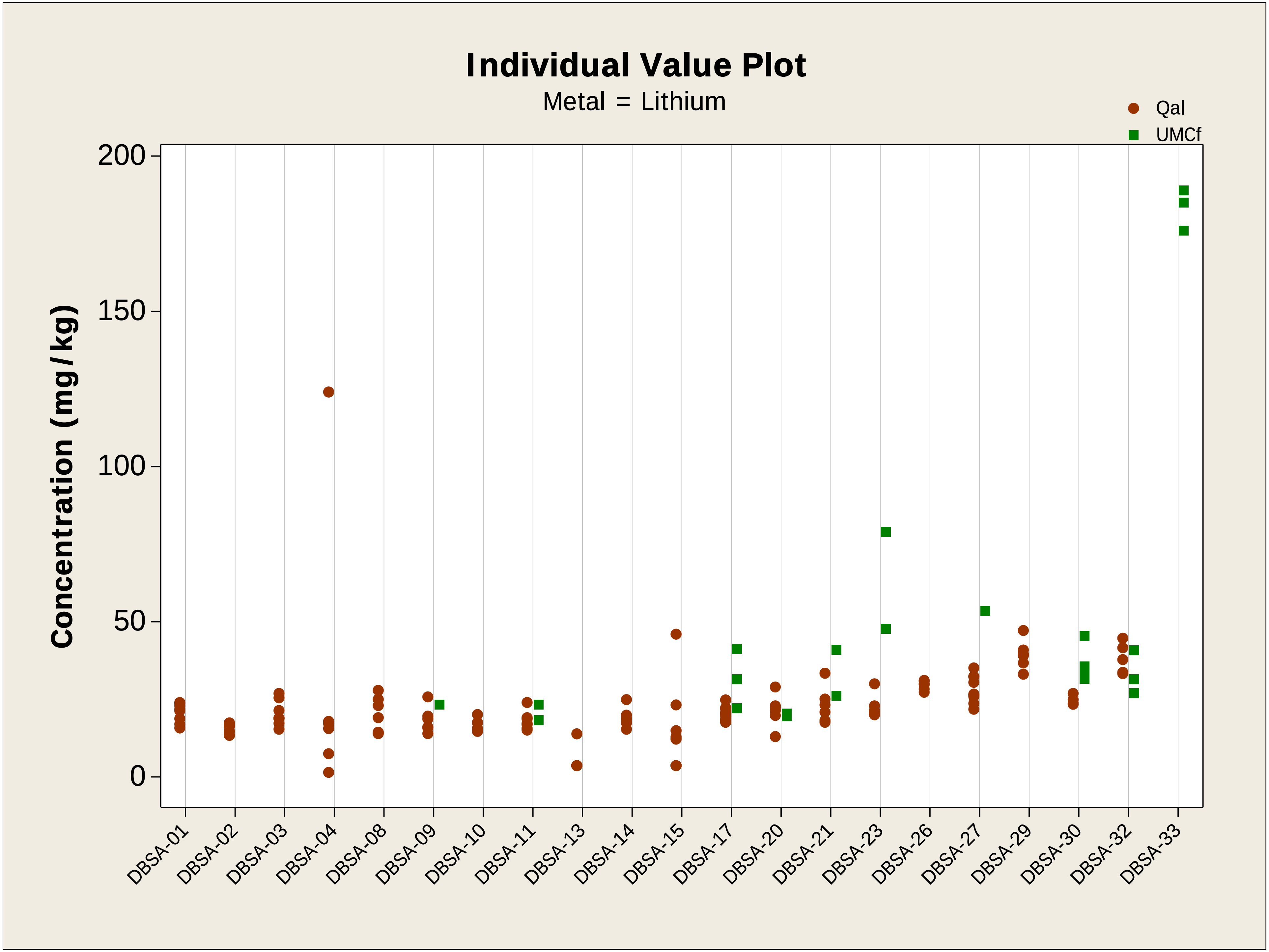
DBSA-32
DBSA-33



Individual Value Plot
Metal = Lithium
Qal
UMCf
Concentration (mg/kg)
200
150
100
50
0
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
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DBSA-26
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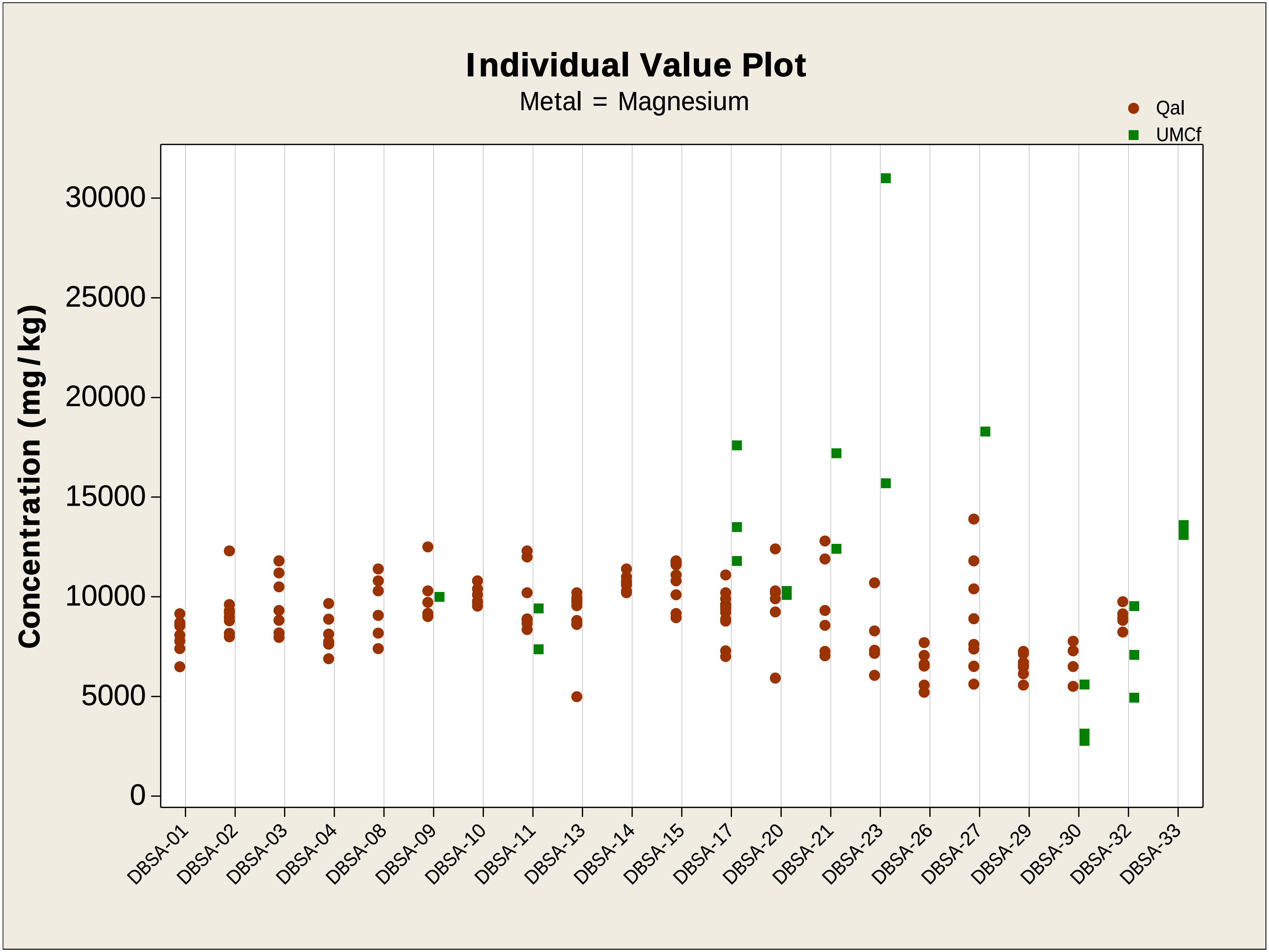
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Magnesium
Qal
UMCf
Concentration (mg/kg)
30000
25000
20000
15000
10000
5000
0
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
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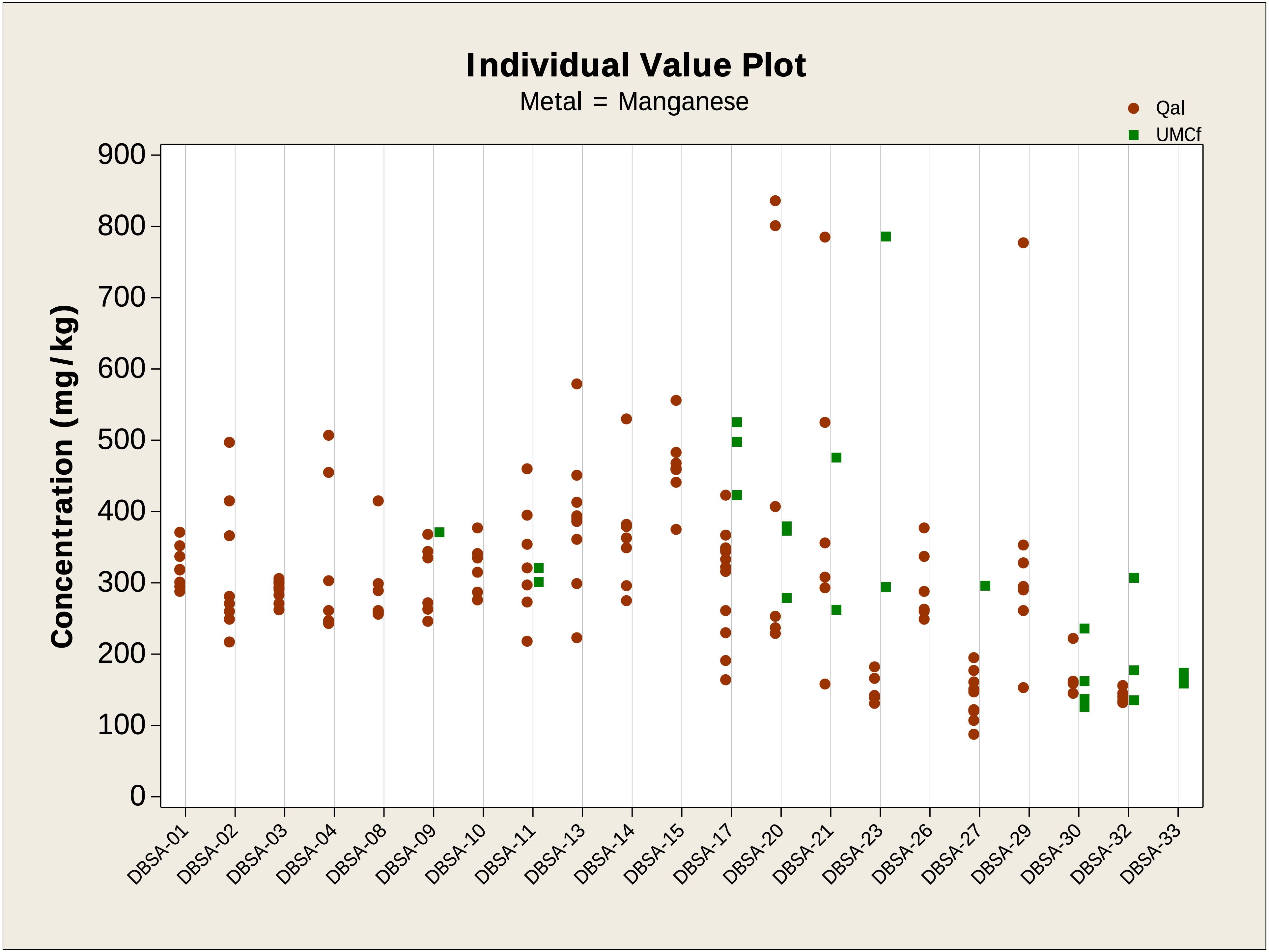
DBSA-32
DBSA-33



Individual Value Plot
Metal = Manganese
Qal
UMCf
Concentration (mg/kg)
900
800
700
600
500
400
300
200
100
0
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
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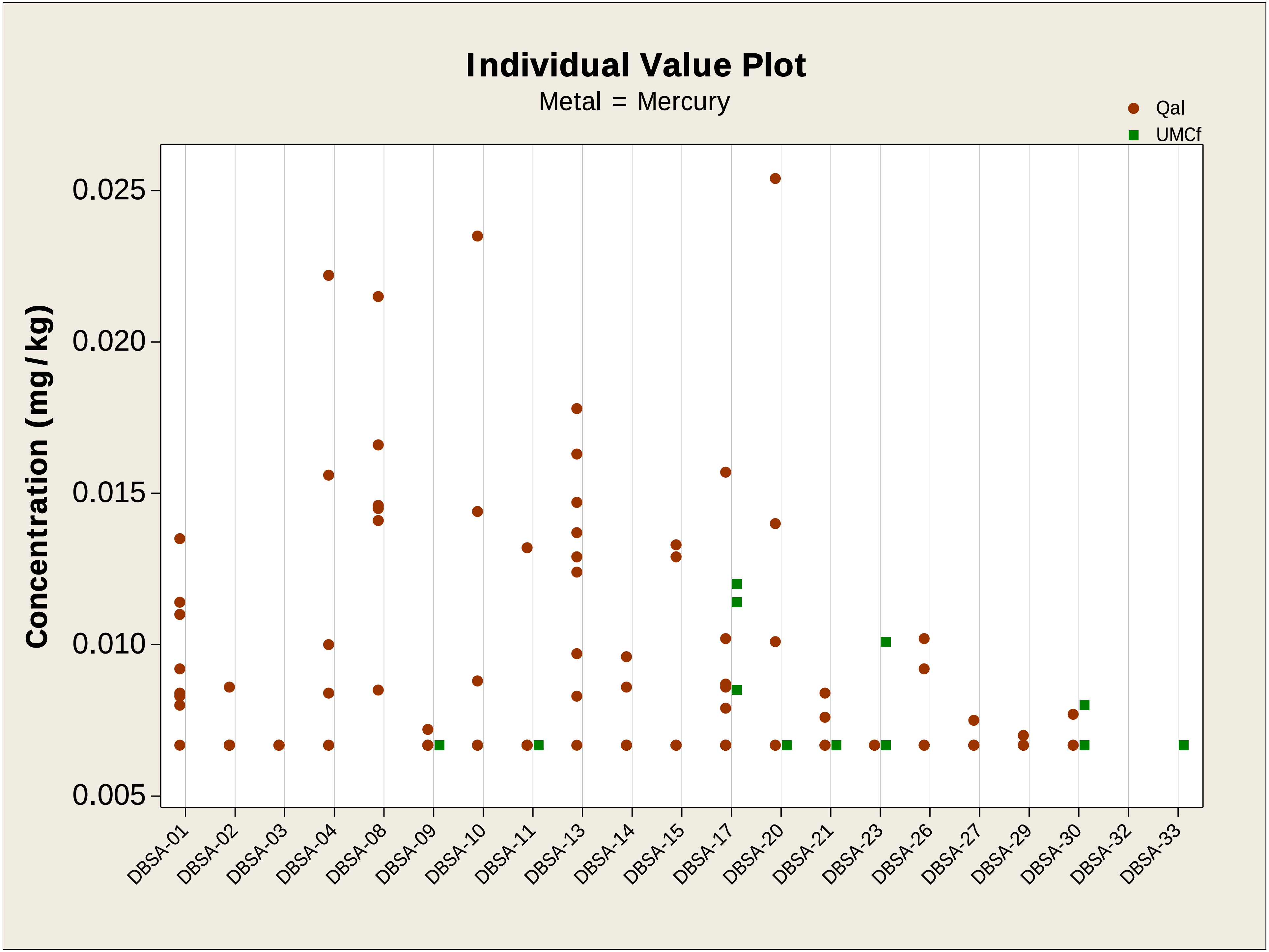
DBSA-30
DBSA-32
DBSA-33


Individual Value Plot
Metal = Mercury
Qal
UMCf
Concentration (mg/kg)
0.025
0.020
0.015
0.010
0.005
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
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DBSA-26
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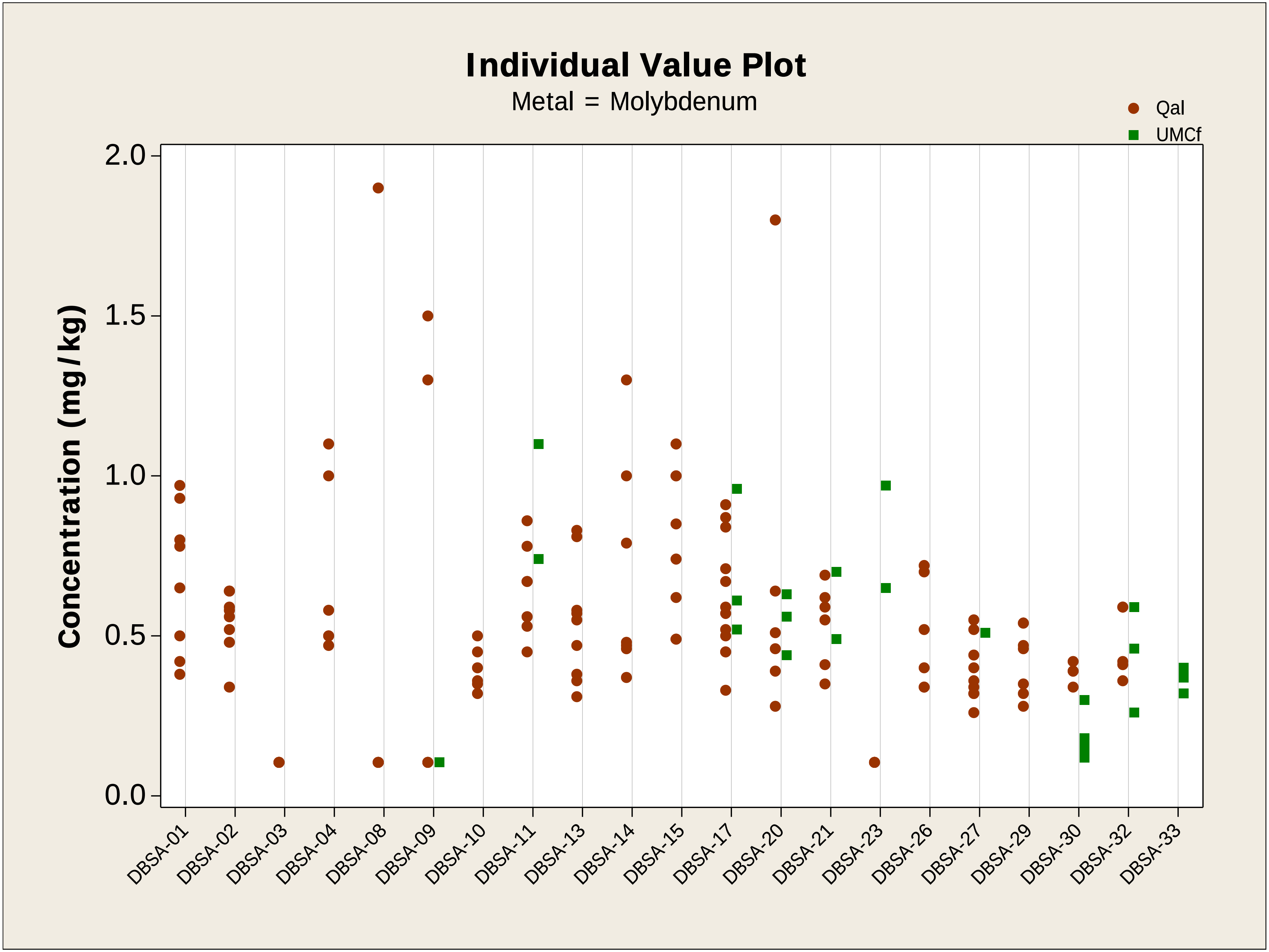
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Molybdenum
Qal
UMCf
Concentration (mg/kg)
2.0
1.5
1.0
0.5
0.0
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
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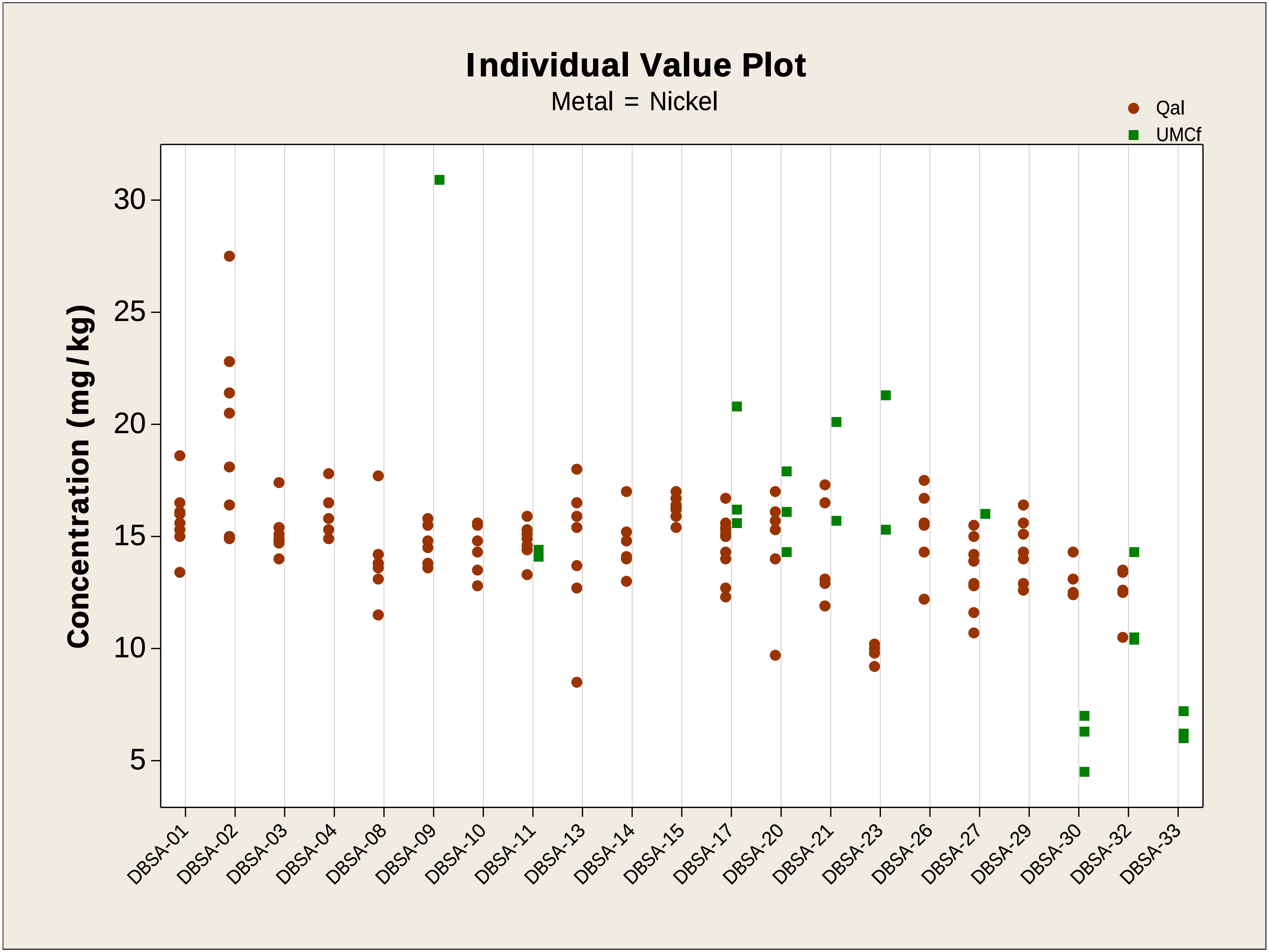
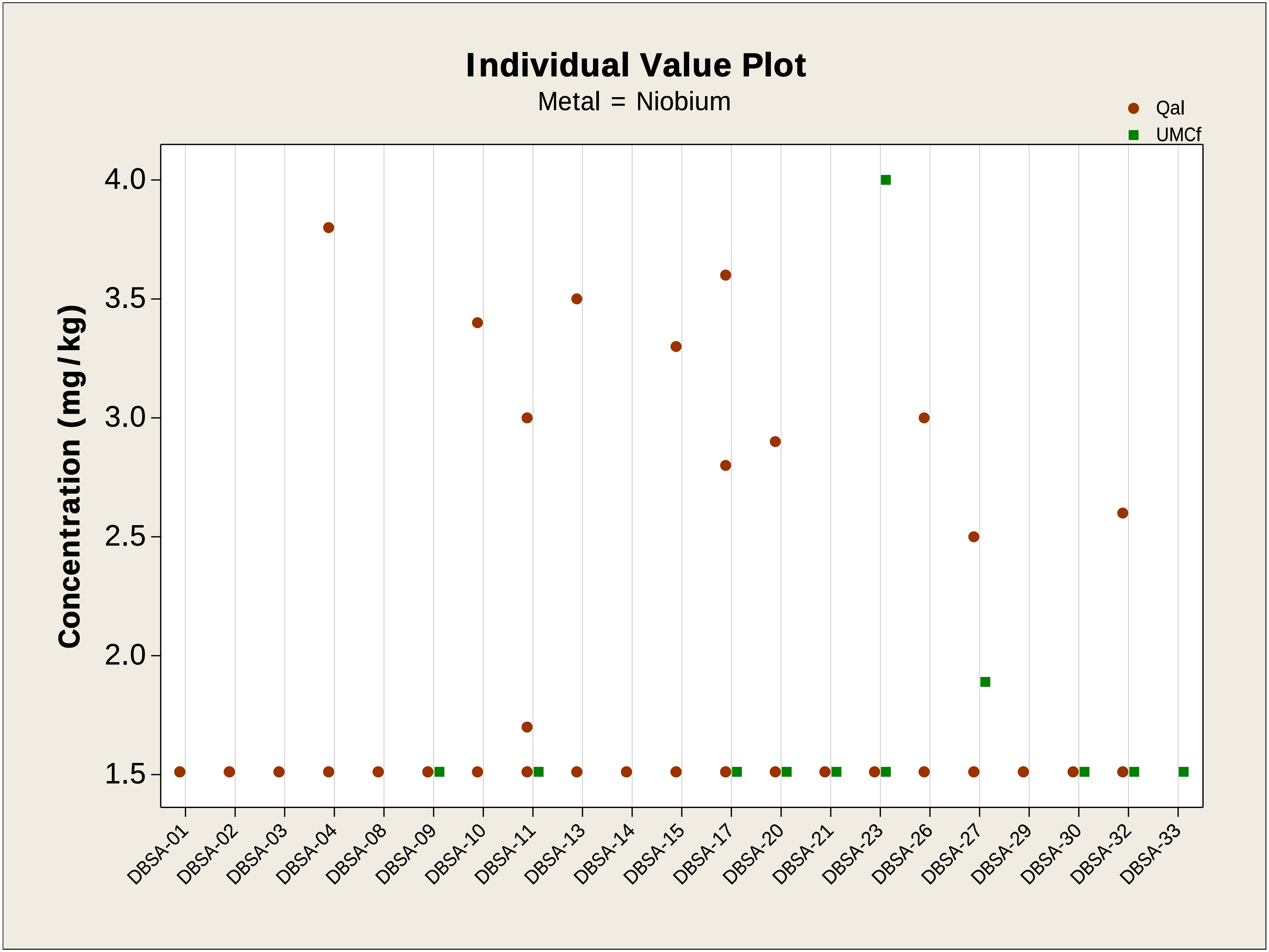
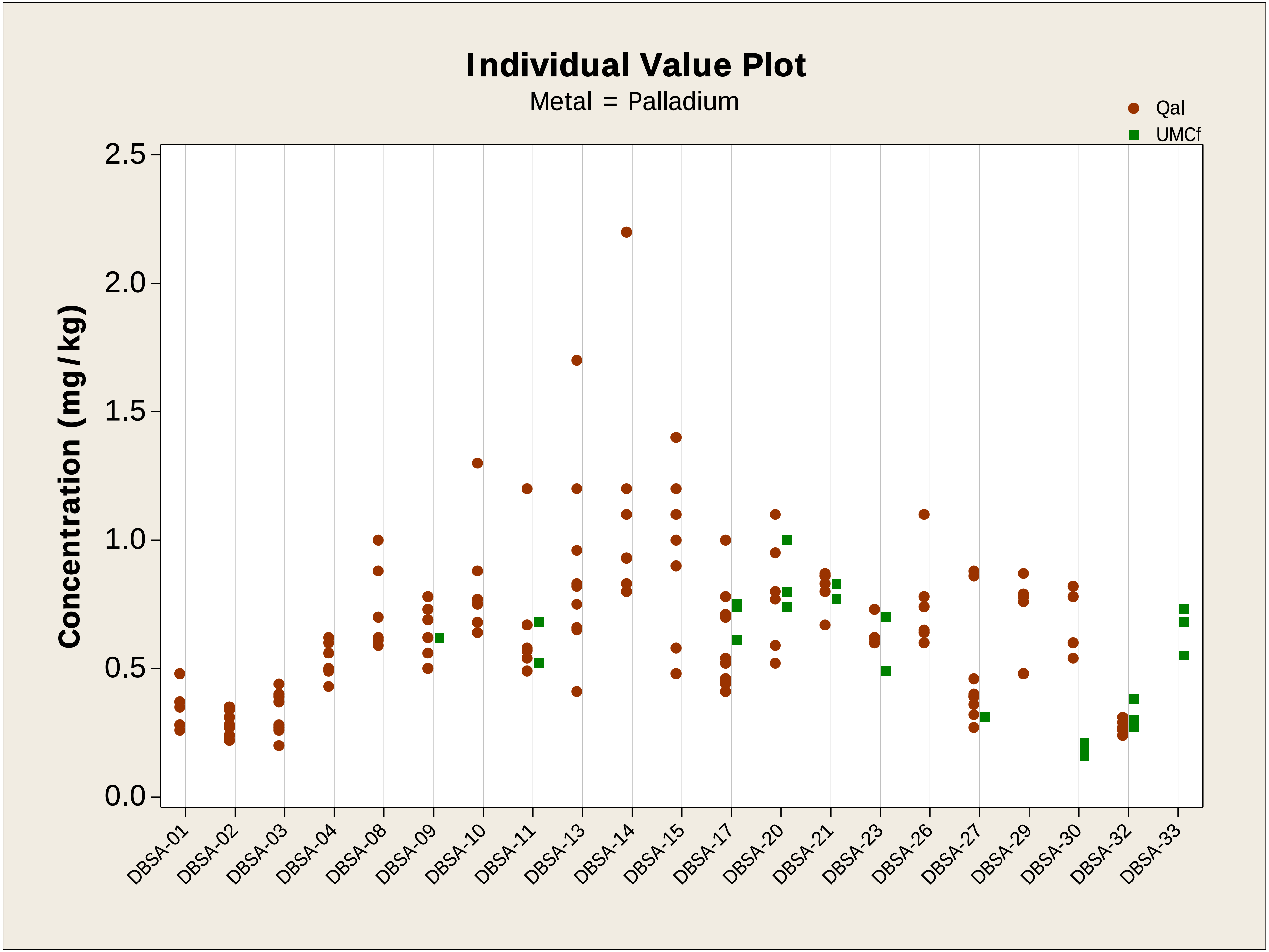
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33

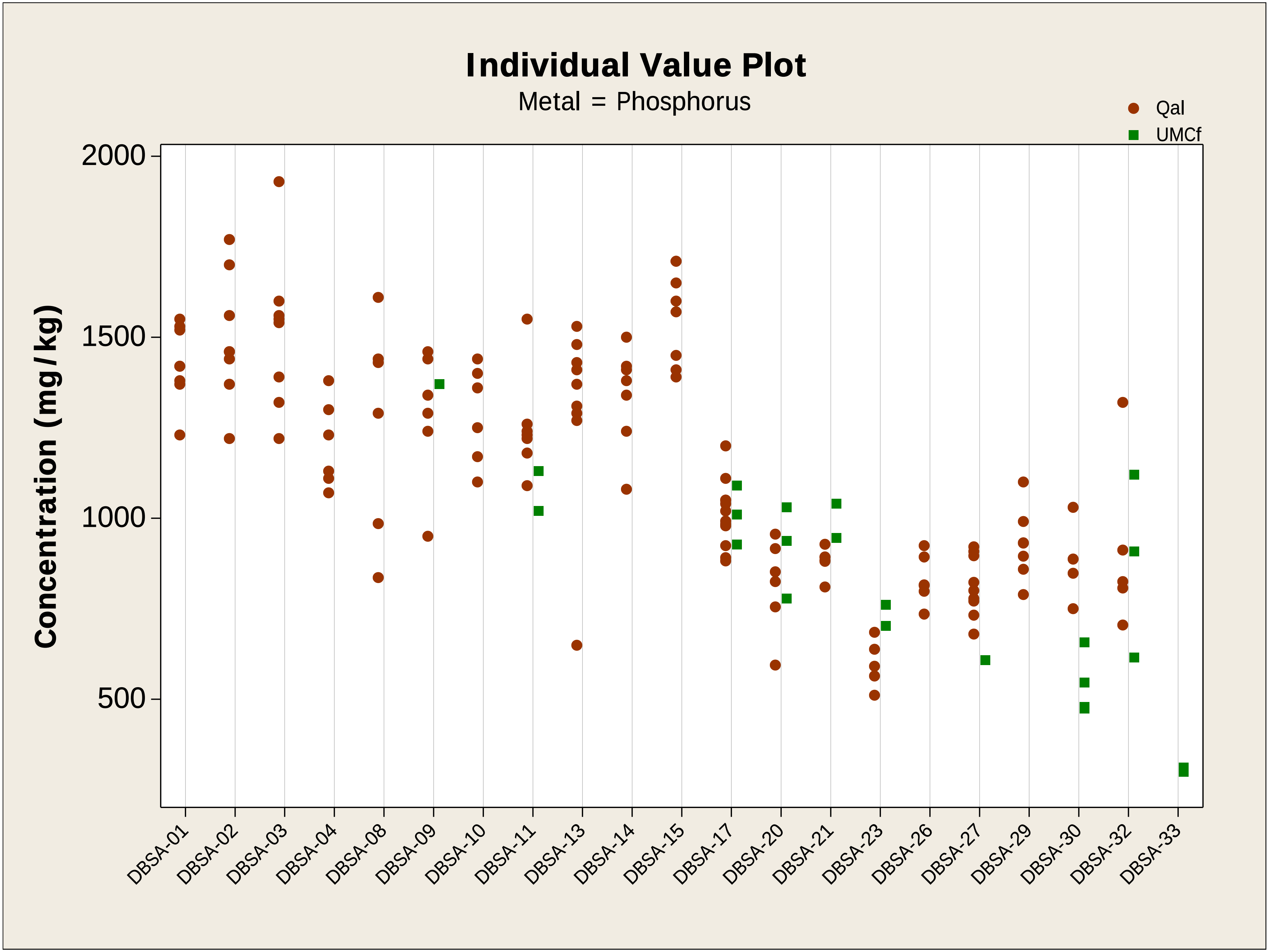


Individual Value Plot
Metal = Nickel
Qal
UMCf
Concentration (mg/kg)
30
25
20
15
10
5
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Niobium
Qal
UMCf
Concentration (mg / kg)
4.0
3.5
3.0
2.5
2.0
1.5
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33


Individual Value Plot
Metal = Palladium
Qal
UMCf
Concentration (mg / kg)
2.5
2.0
1.5
1.0
0.5
0.0
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33


Individual Value Plot
Metal = Phosphorus
Qal
UMCf
Concentration (mg/kg)
2000
1500
1000
500
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
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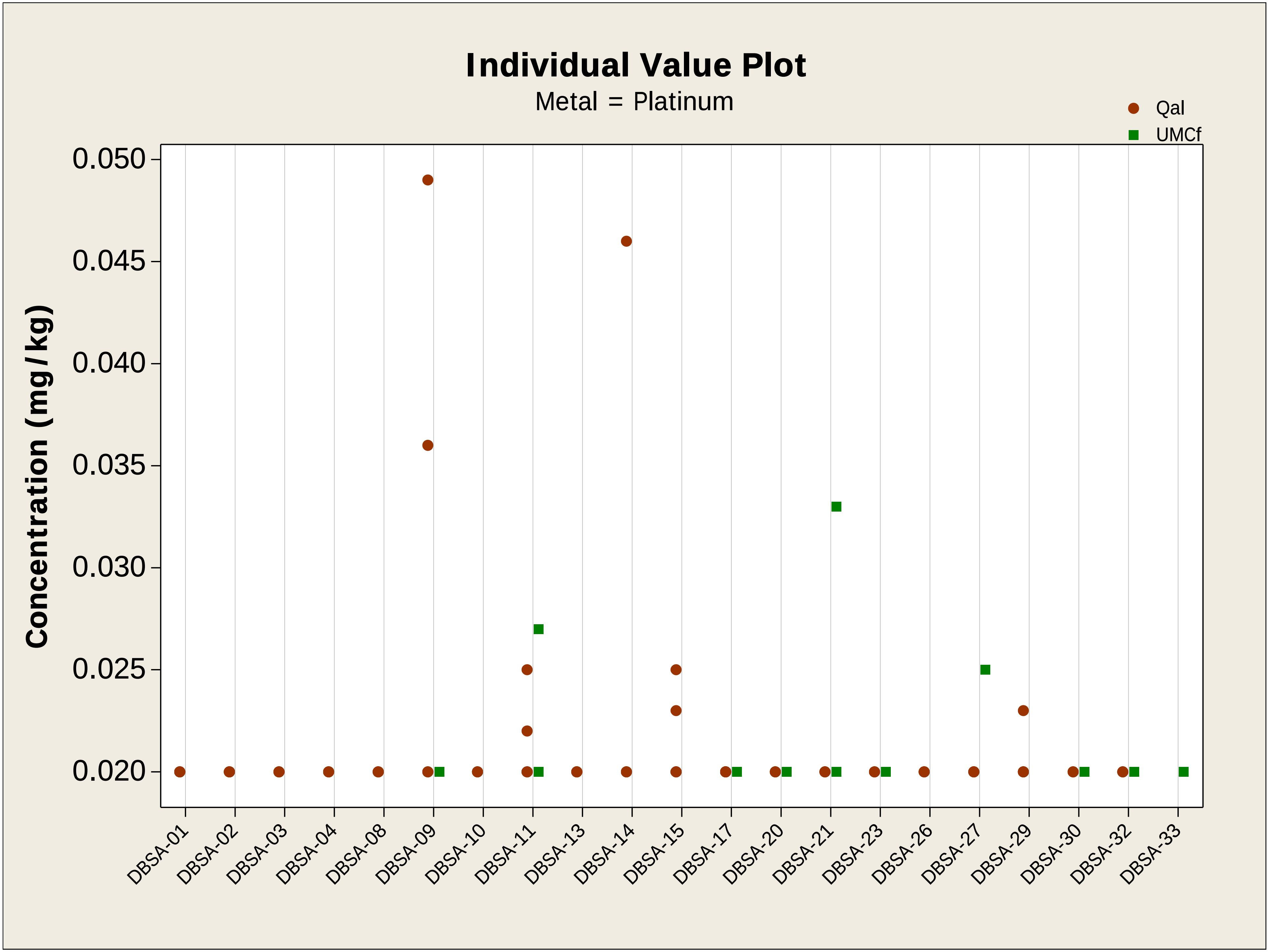
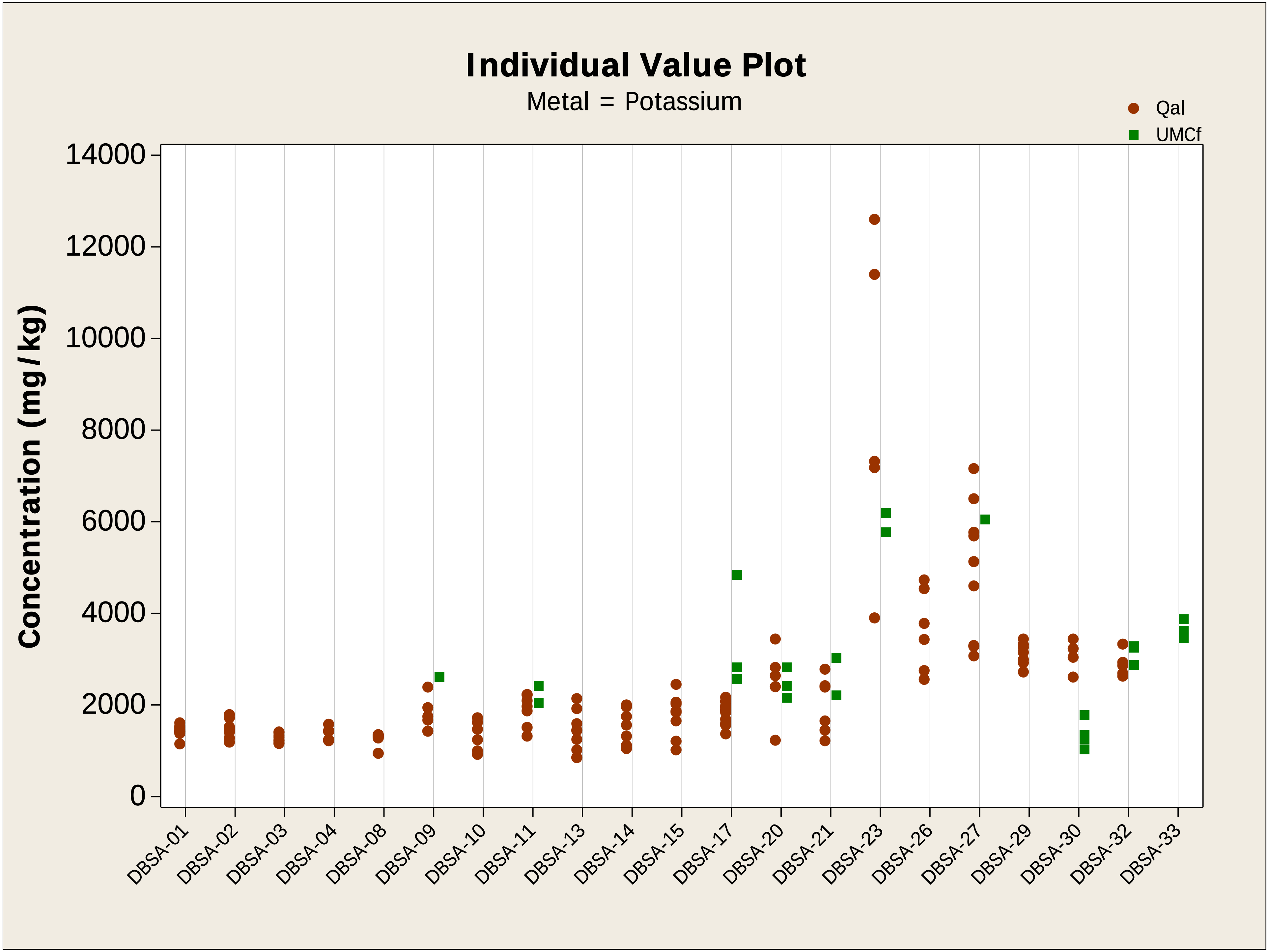
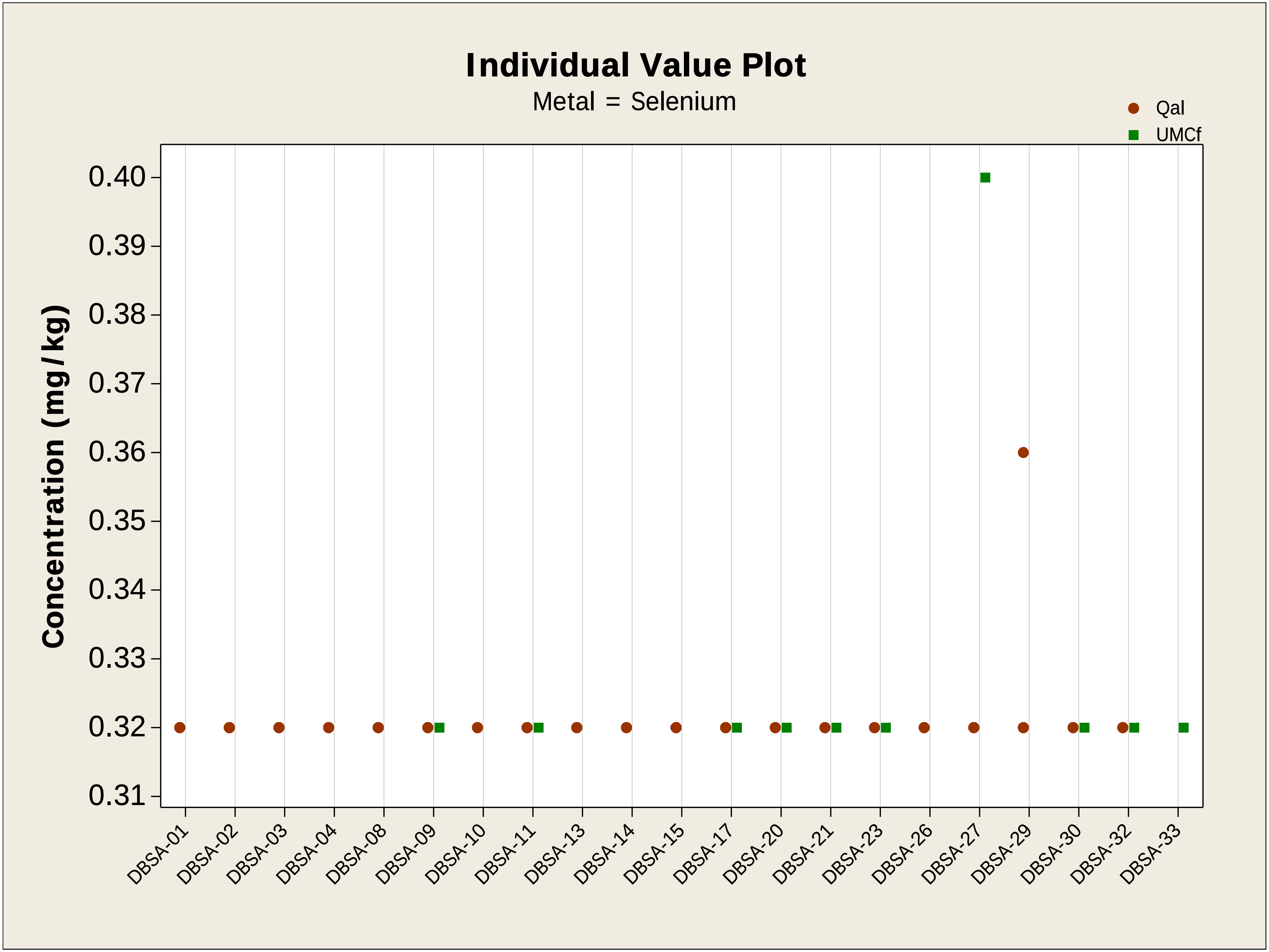
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Platinum
Qal
UMCf
Concentration (mg/kg)
0.050
0.045
0.040
0.035
0.030
0.025
0.020
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Potassium
Qal
UMCf
Concentration (mg/kg)
0
2000
4000
6000
8000
10000
12000
14000
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Selenium
Qal
UMCf
Concentration (mg/kg)
0.40
0.39
0.38
0.37
0.36
0.35
0.34
0.33
0.32
0.31
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
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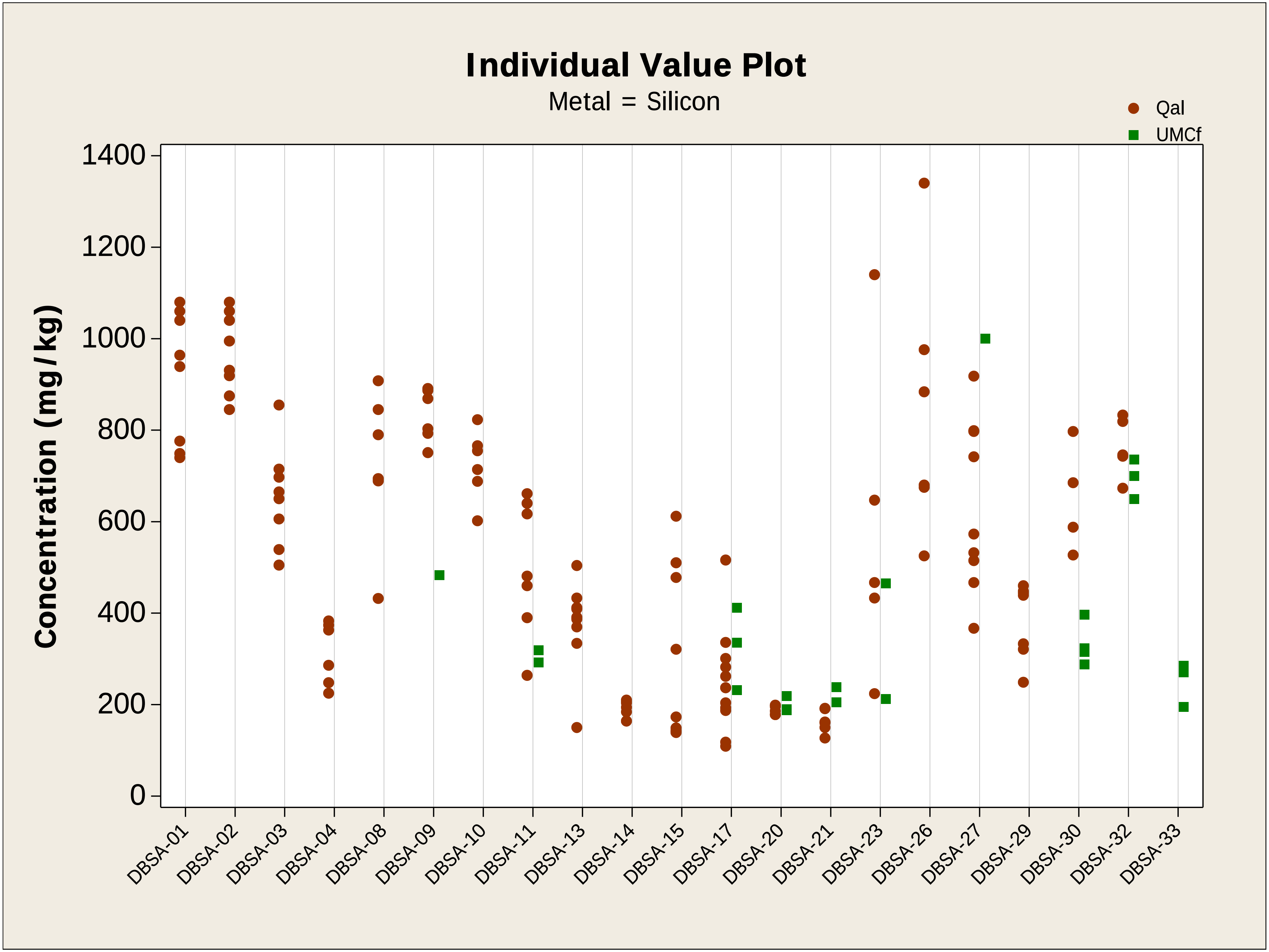
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Silicon
Qal
UMCf
Concentration (mg/kg)
0
200
400
600
800
1000
1200
1400
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
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DBSA-26
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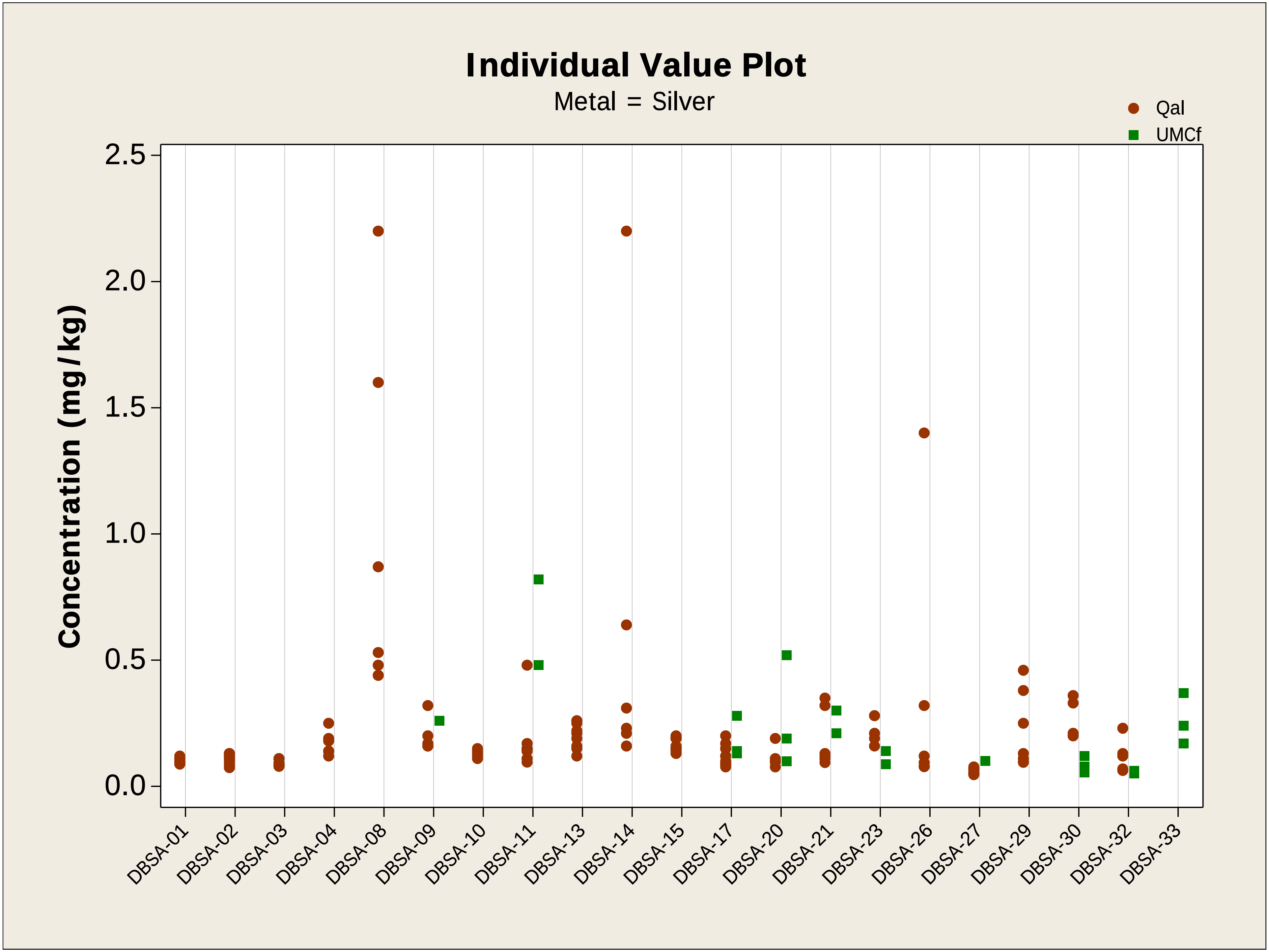
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Silver
Qal
UMCf
Concentration (mg/kg)
2.5
2.0
1.5
1.0
0.5
0.0
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
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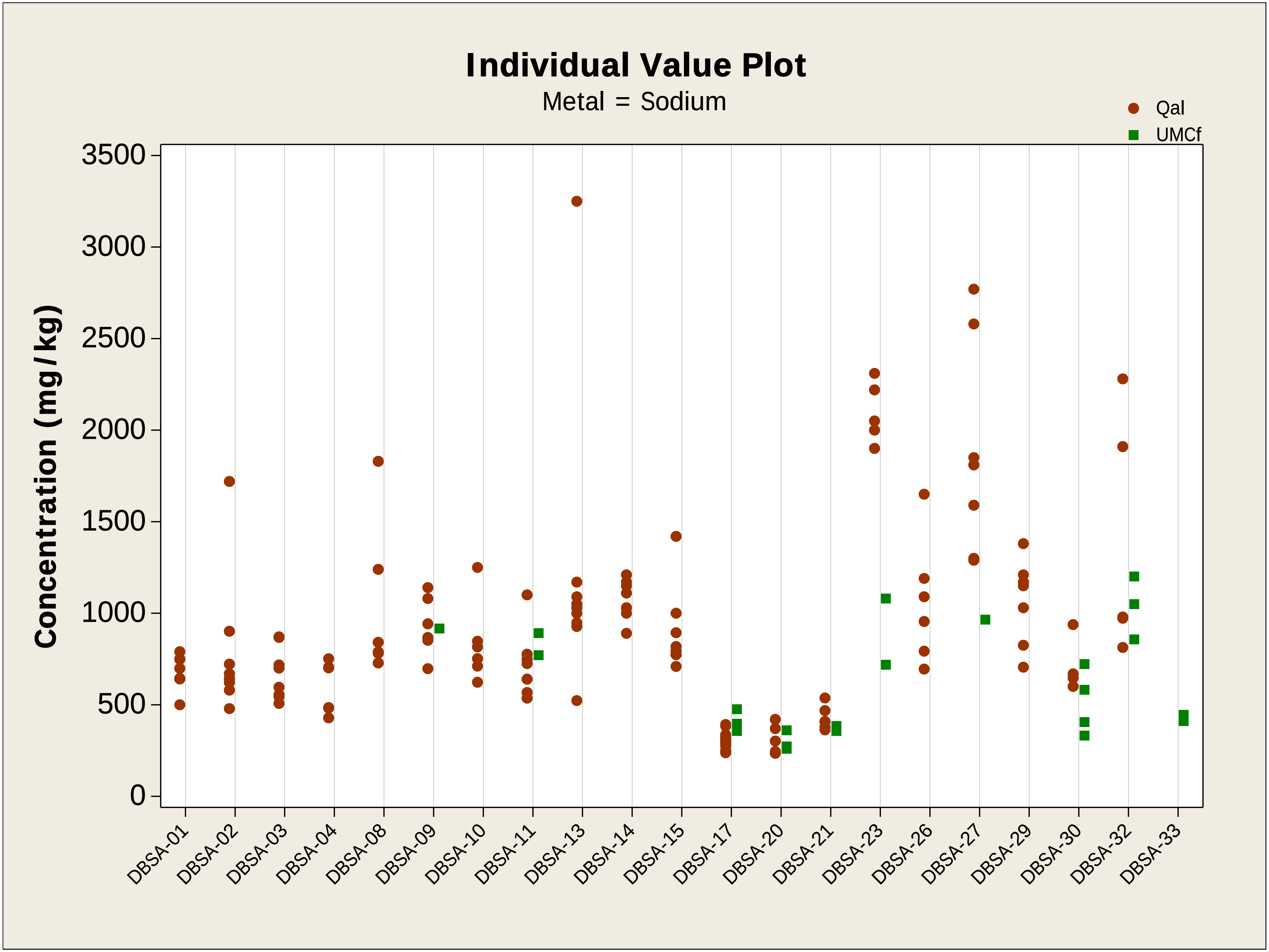
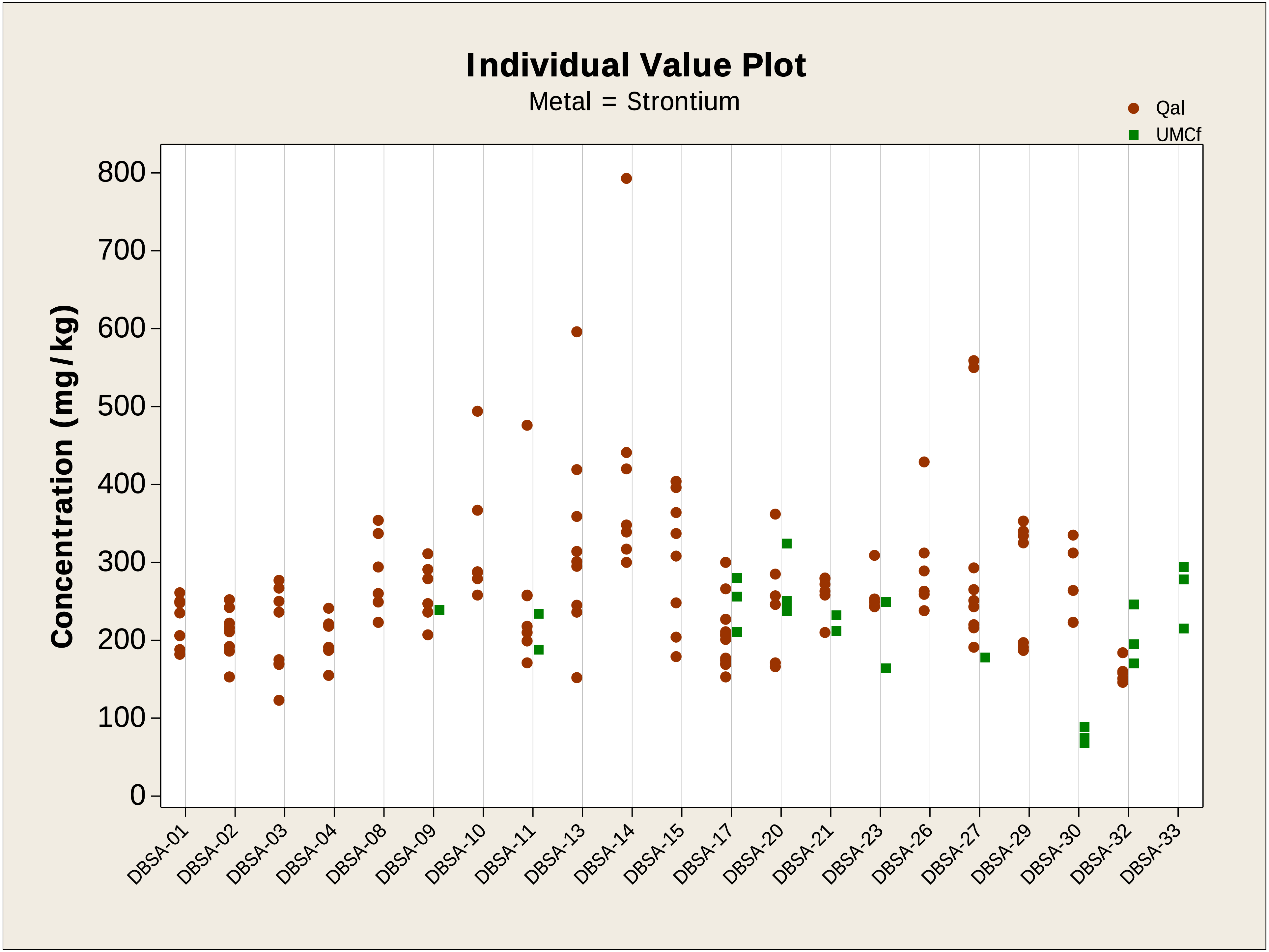
DBSA-32
DBSA-33



Individual Value Plot
Metal = Sodium
Qal
UMCf
Concentration (mg/kg)
0
500
1000
1500
2000
2500
3000
3500
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33


Individual Value Plot
Metal = Strontium
Qal
UMCf
Concentration (mg/kg)
0
100
200
300
400
500
600
700
800
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
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DBSA-26
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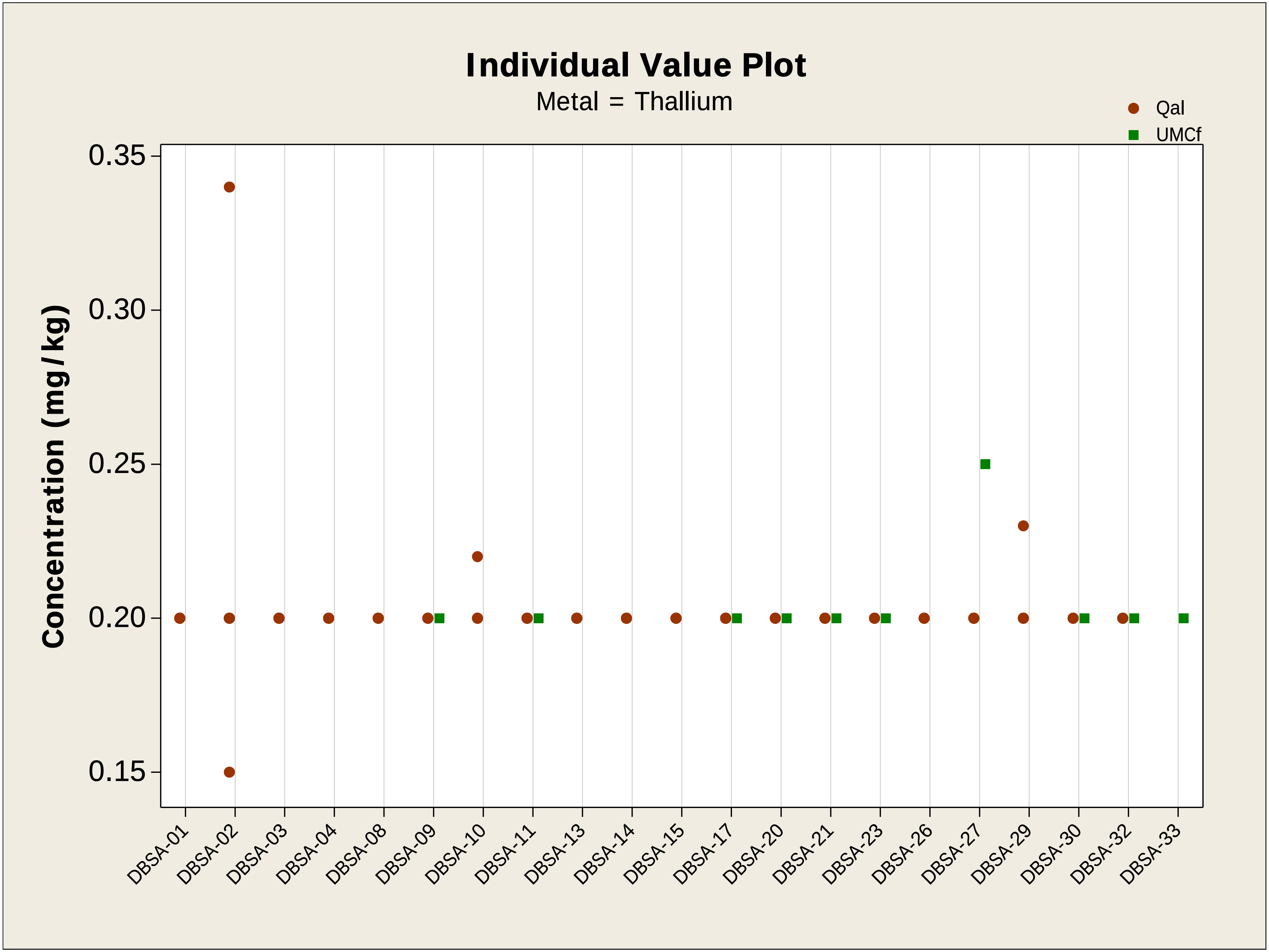
DBSA-32
DBSA-33



Individual Value Plot
Metal = Thallium
Qal
UMCf
Concentration (mg/kg)
0.35
0.30
0.25
0.20
0.15
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
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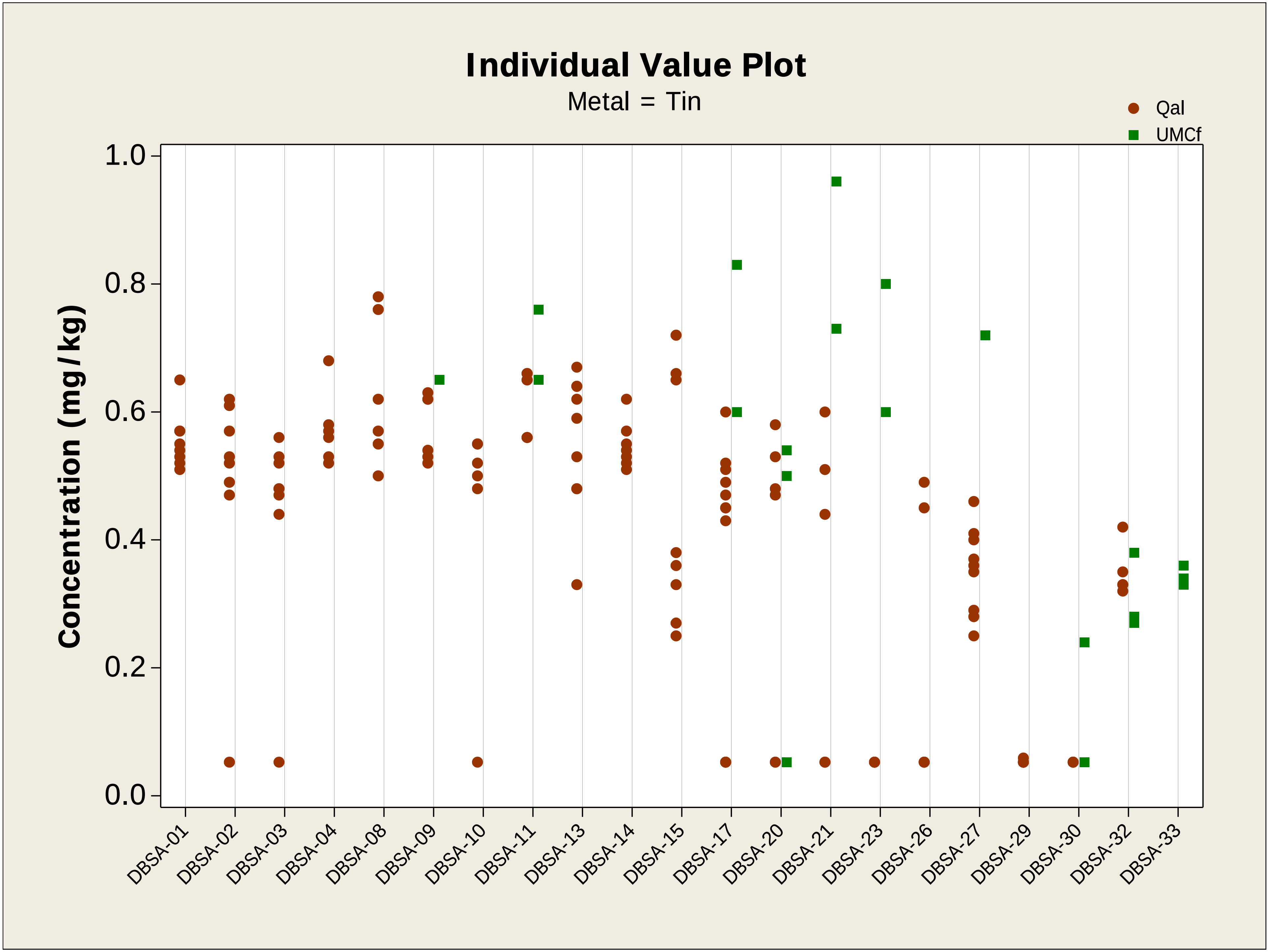
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Tin
Qal
UMCf
Concentration (mg/kg)
1.0
0.8
0.6
0.4
0.2
0.0
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
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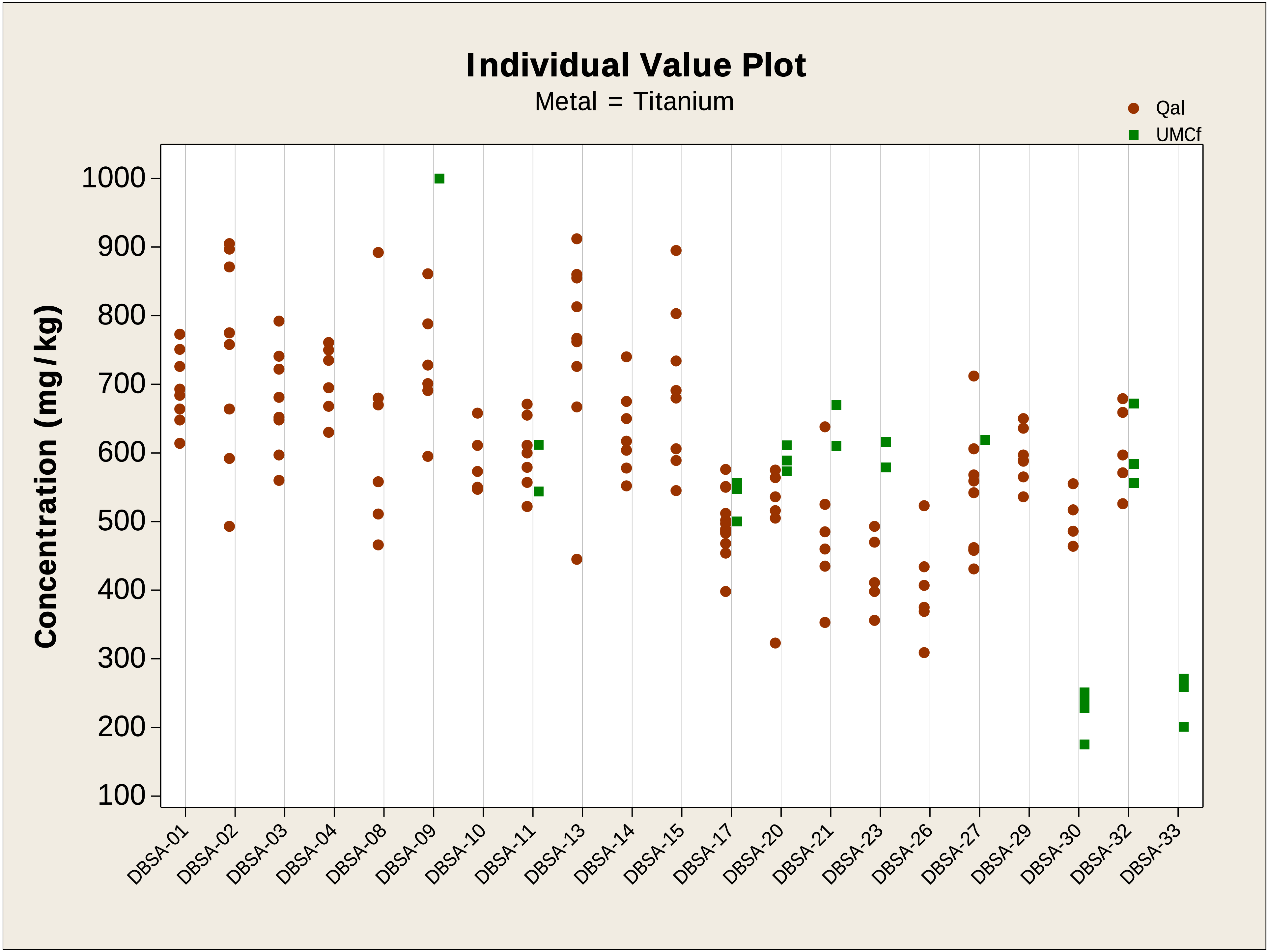
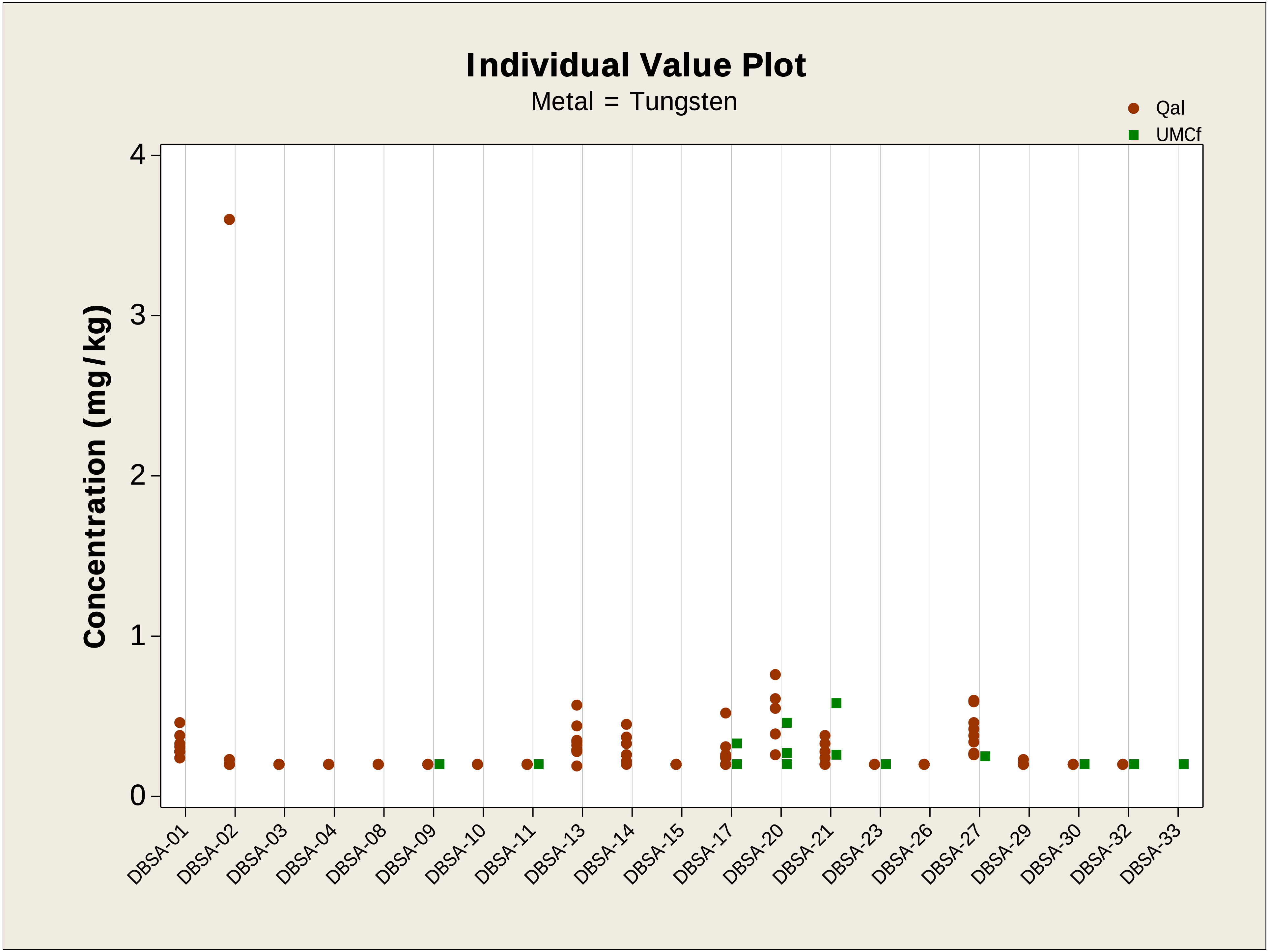
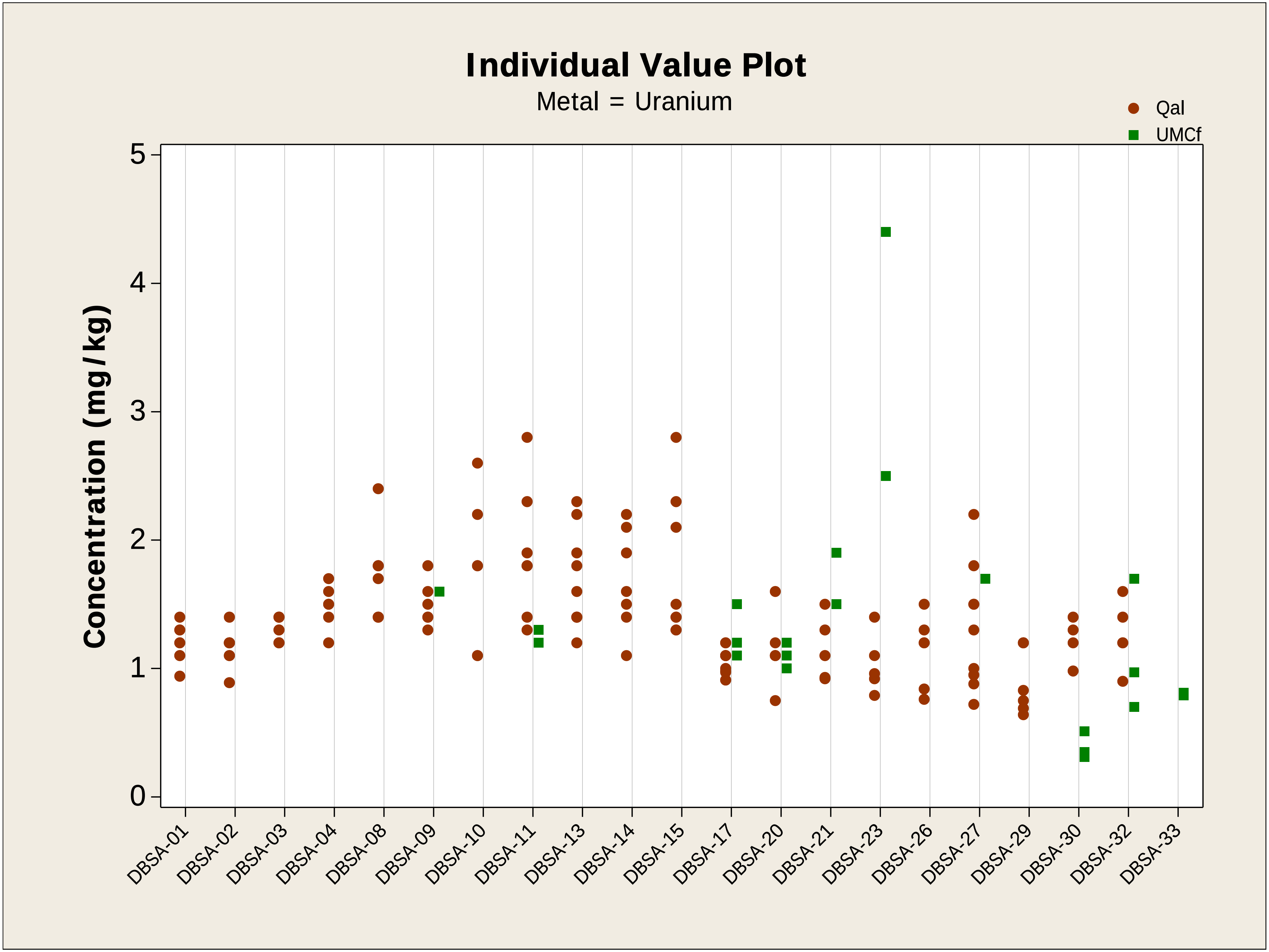
DBSA-32
DBSA-33



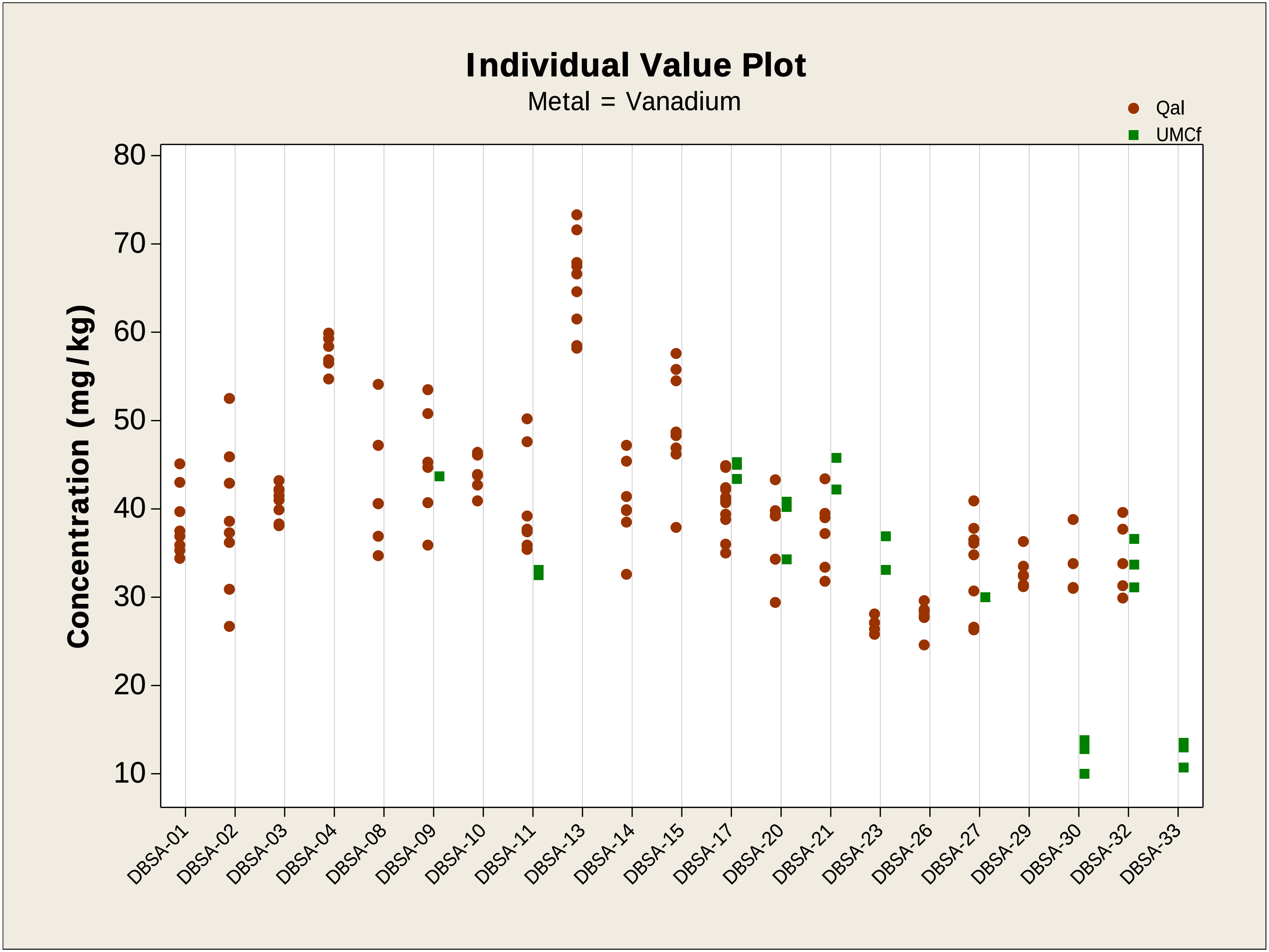
Individual Value Plot
Metal = Titanium
Qal
UMCf
Concentration (mg/kg)
1000
900
800
700
600
500
400
300
200
100
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33

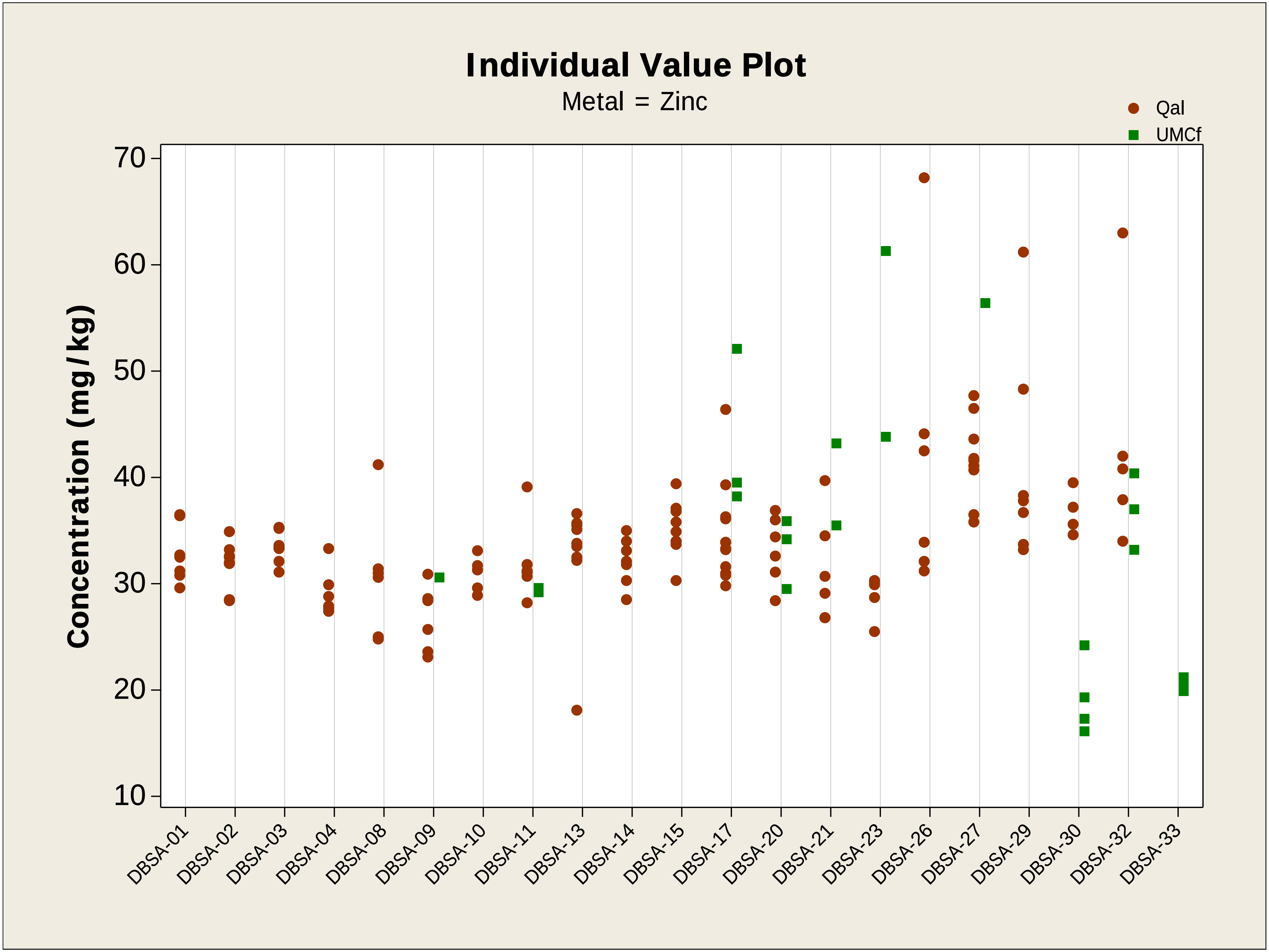


Individual Value Plot
Metal = Tungsten
Qal
UMCf
Concentration (mg/kg)
0
1
2
3
4
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Uranium
Qal
UMCf
Concentration (mg/kg)
0
1
2
3
4
5
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33


Individual Value Plot
Metal = Vanadium
Qal
UMCf
Concentration (mg/kg)
80
70
60
50
40
30
20
10
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33



Individual Value Plot
Metal = Zinc
Qal
UMCf
Concentration (mg/kg)
70
60
50
40
30
20
10
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
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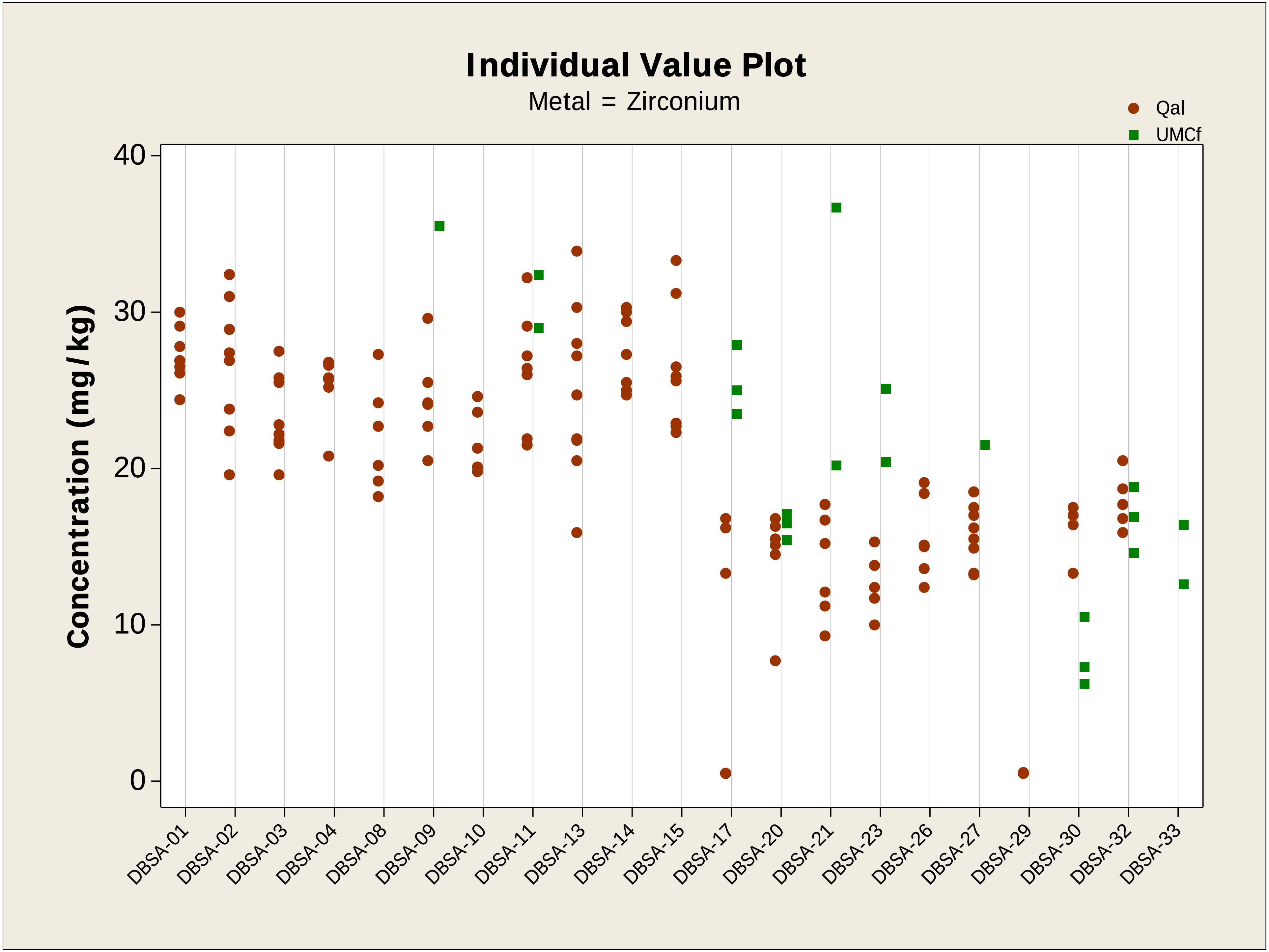
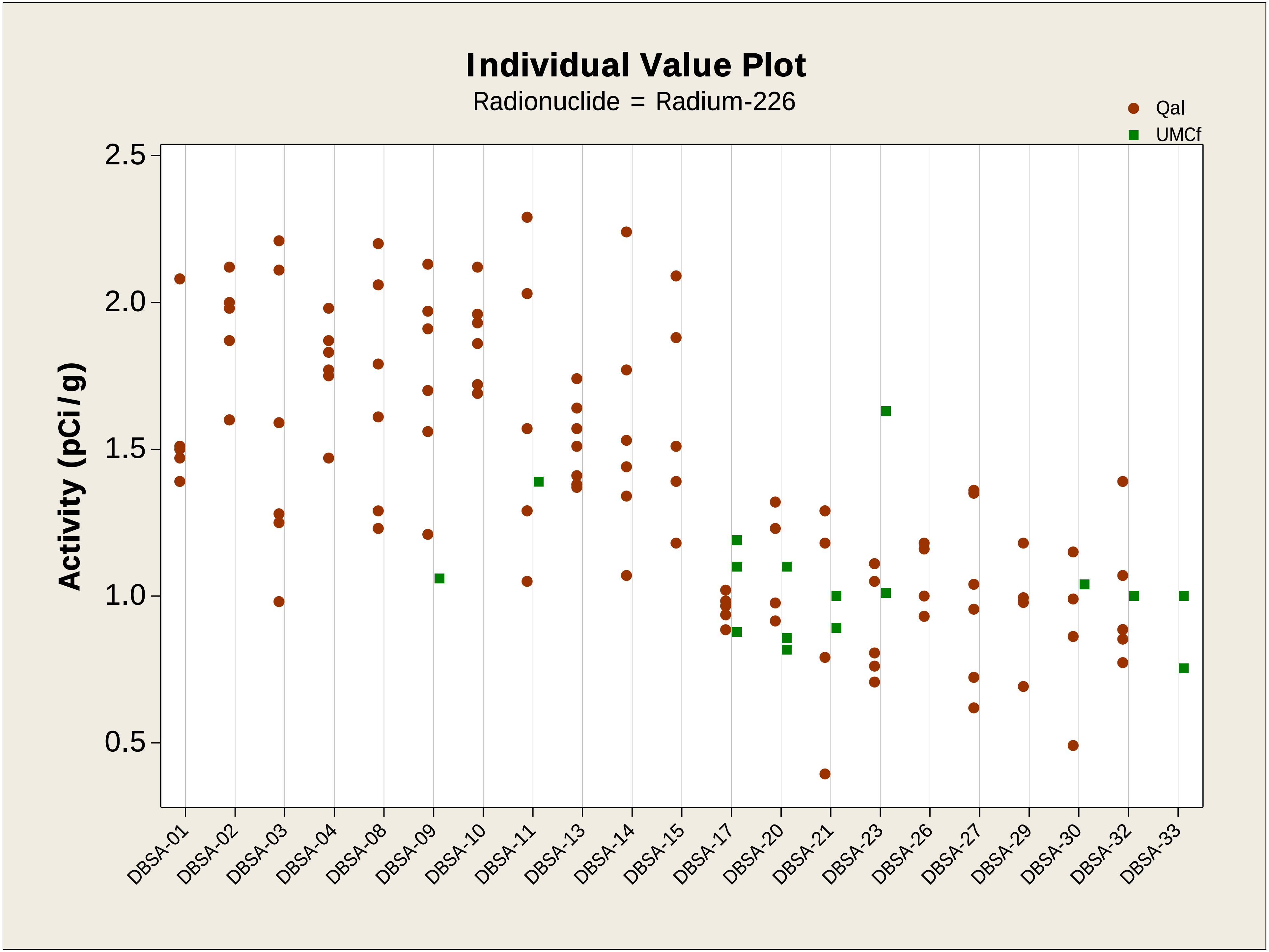
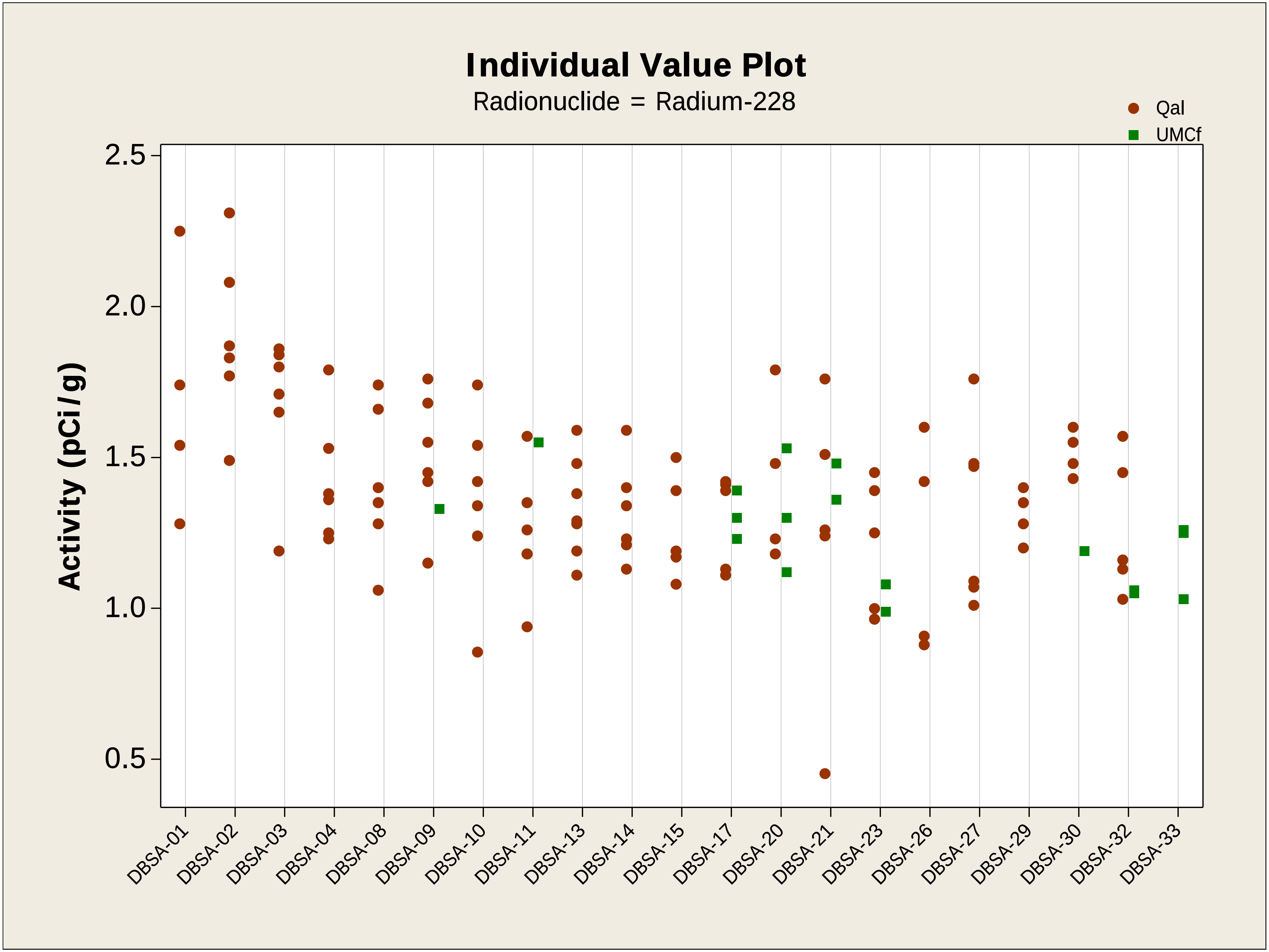
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33



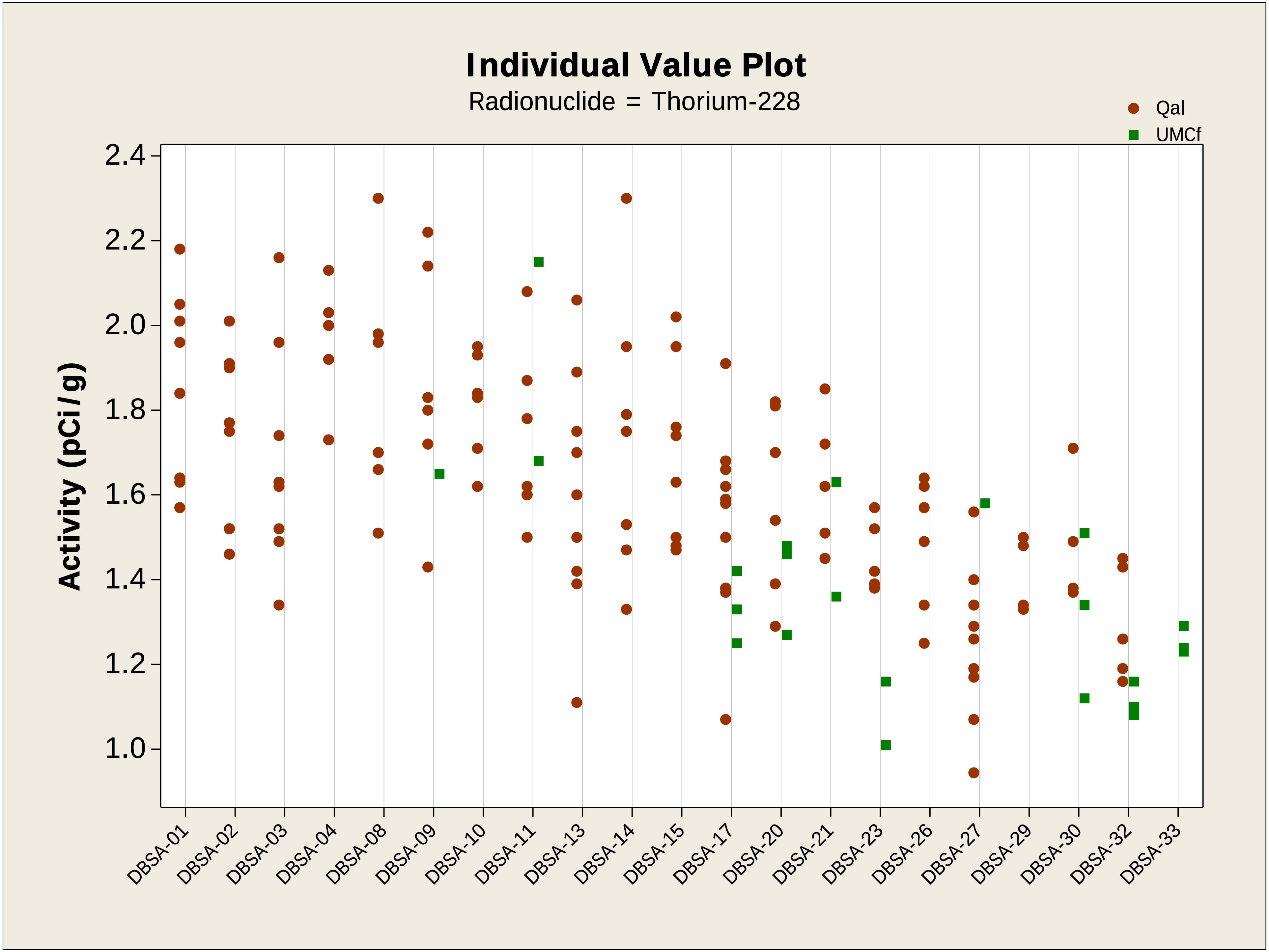
Individual Value Plot
Metal = Zirconium
Qal
UMCf
Concentration (mg/kg)
0
10
20
30
40
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33



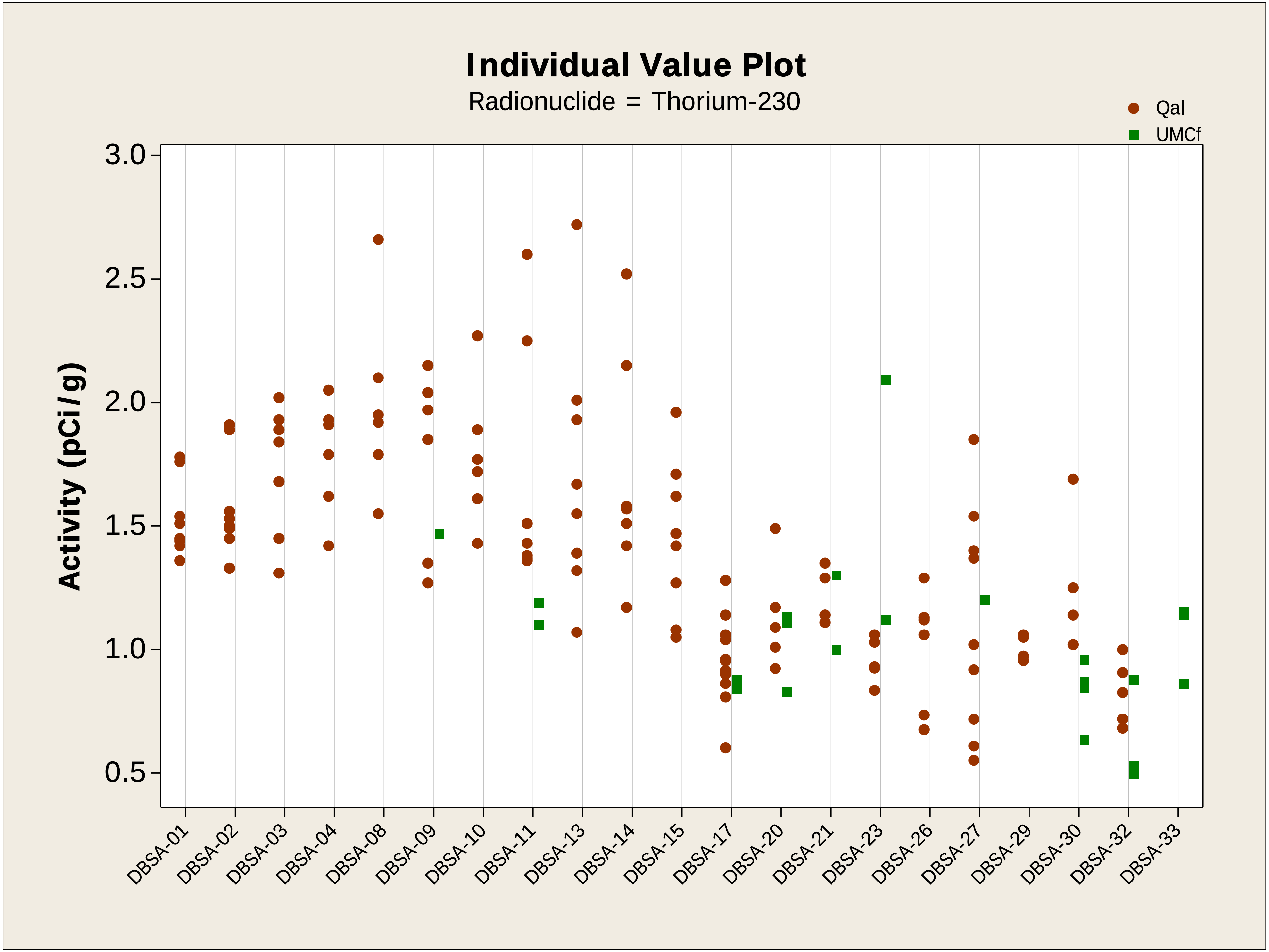
Individual Value Plot
Radionuclide = Radium-226
Qal
UMCf
Activity (pCi/g)
2.5
2.0
1.5
1.0
0.5
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33



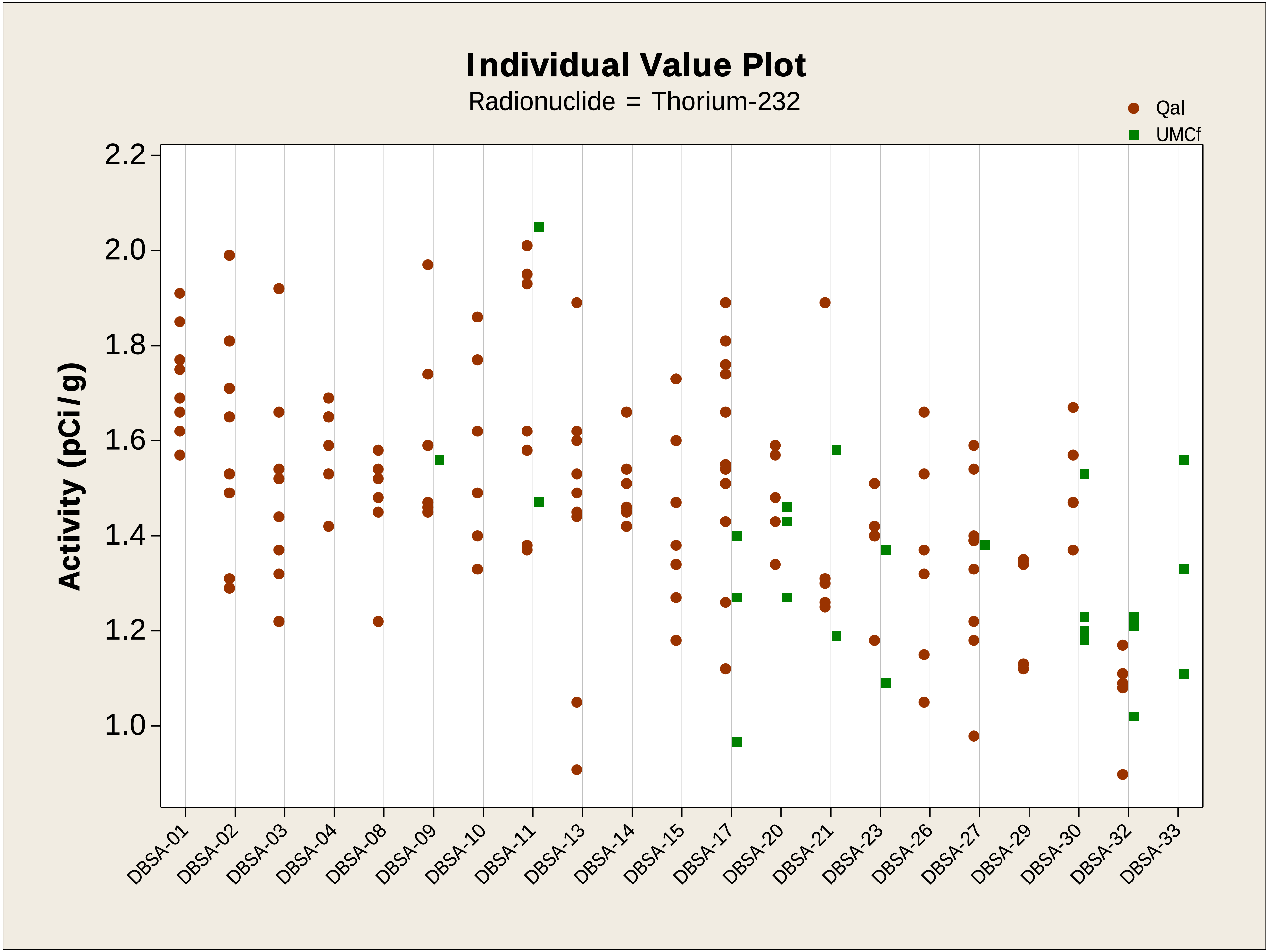
Individual Value Plot
Radionuclide = Radium-228
Qal
UMCf
Activity (pCi/g)
2.5
2.0
1.5
1.0
0.5
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33



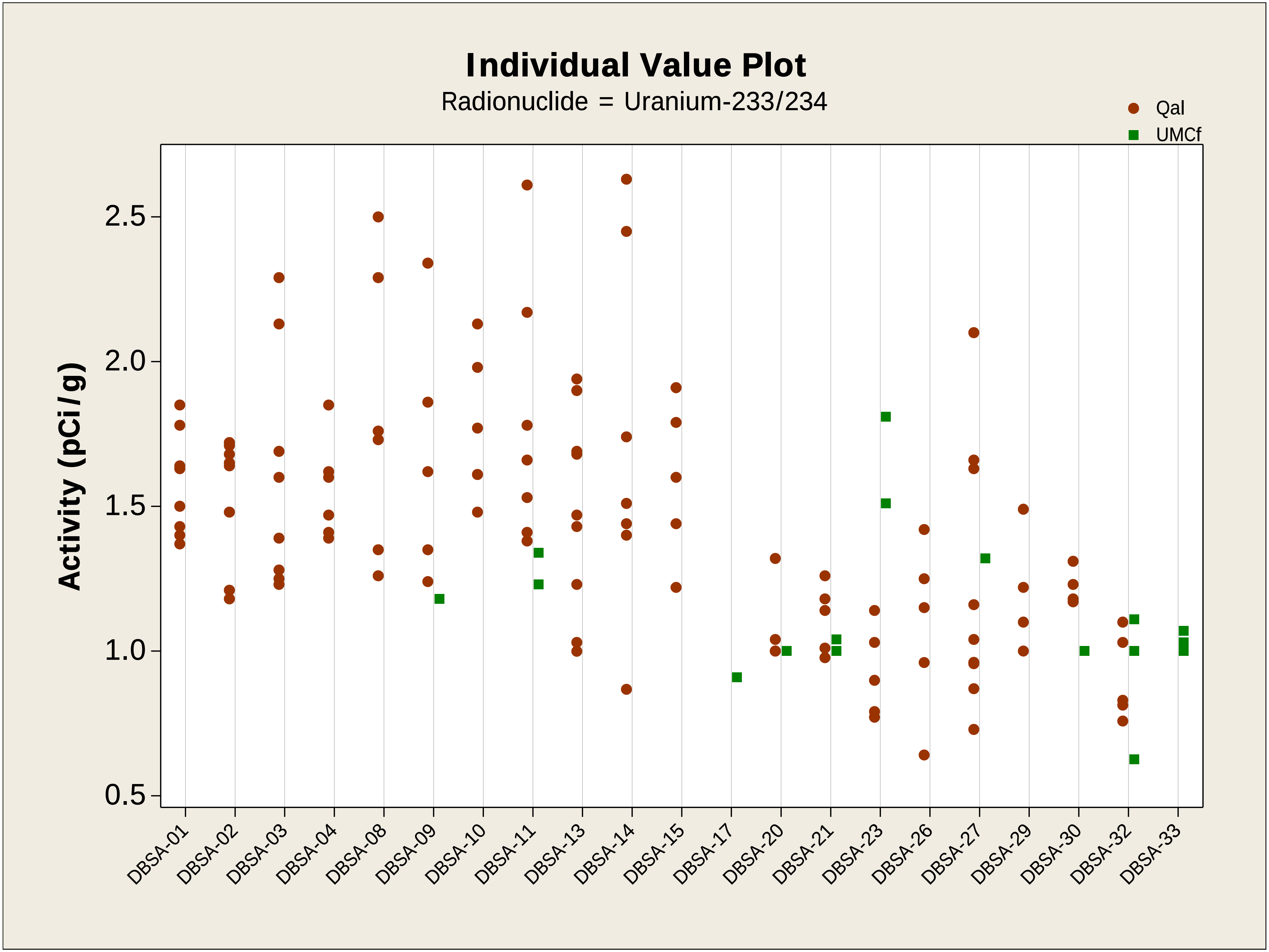
Individual Value Plot
Radionuclide = Thorium-228
Qal
UMCf
Activity (pCi/g)
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33

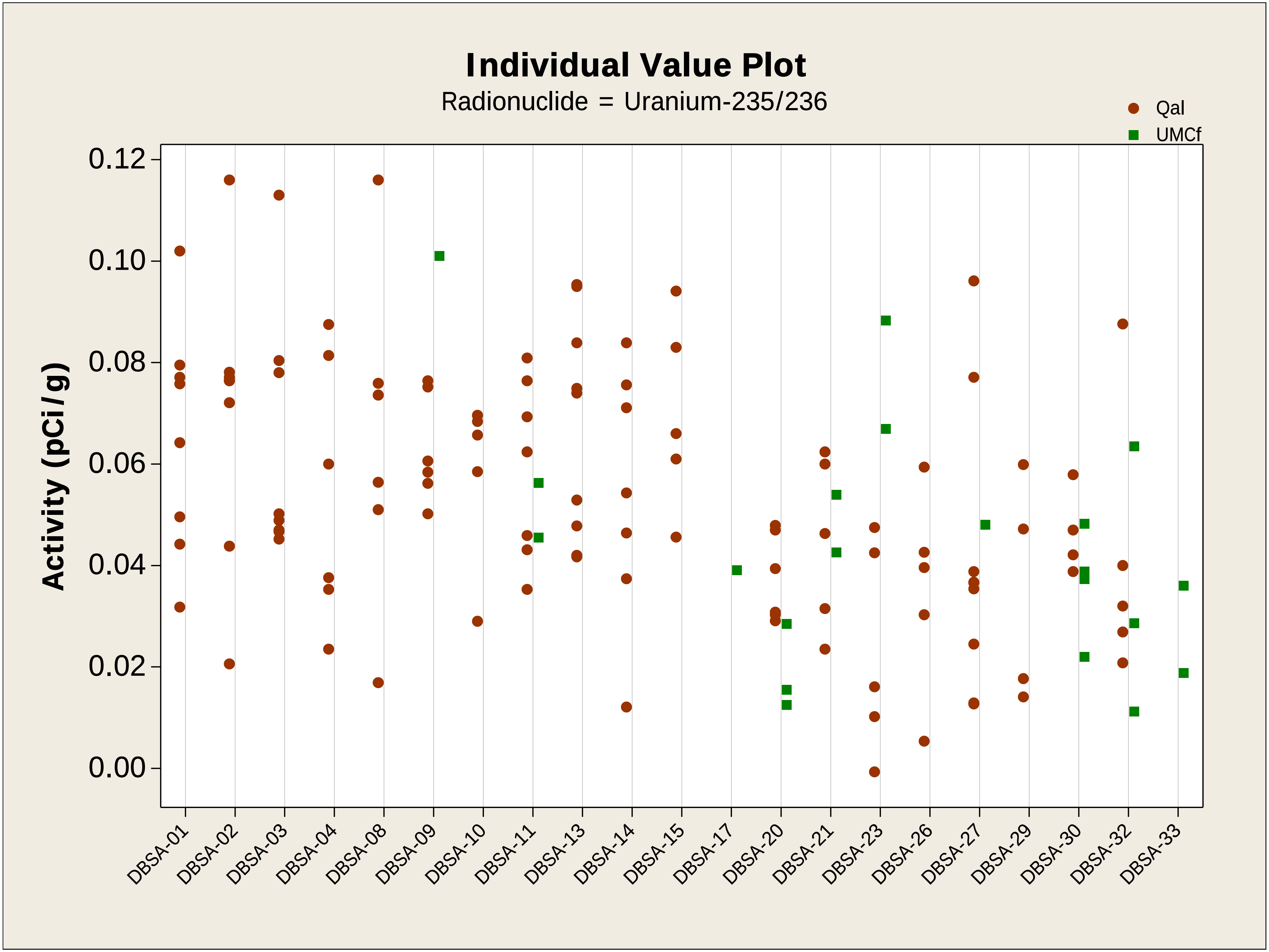


Individual Value Plot
Radionuclide = Thorium-230
Qal
UMCf
Activity (pCi/g)
3.0
2.5
2.0
1.5
1.0
0.5
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33

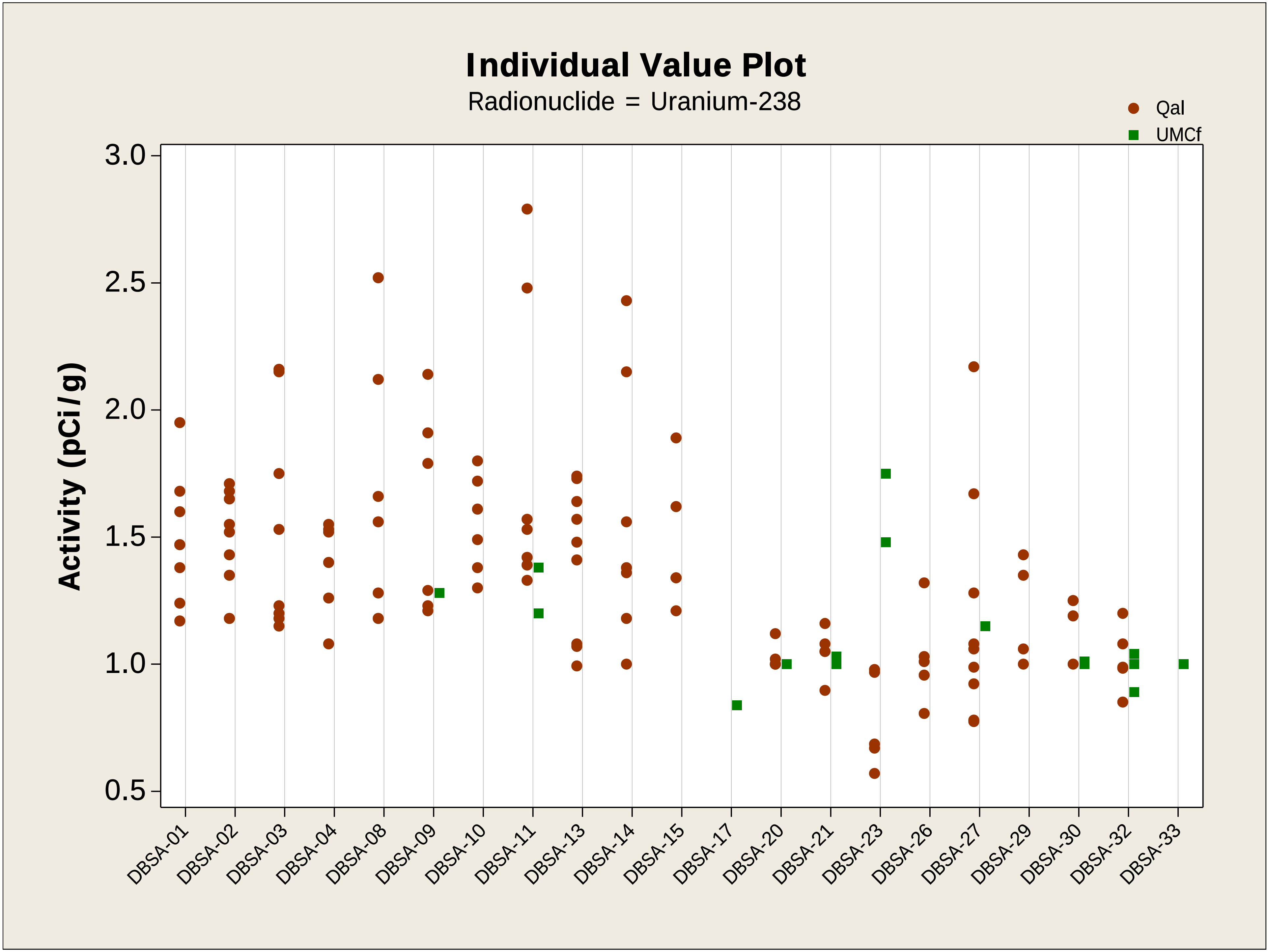


Individual Value Plot
Radionuclide = Thorium-232
Qal
UMCf
Activity (pCi/g)
2.2
2.0
1.8
1.6
1.4
1.2
1.0
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33


Individual Value Plot
Radionuclide = Uranium-233/234
Qal
UMCf
Activity (pCi/g)
2.5
2.0
1.5
1.0
0.5
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33

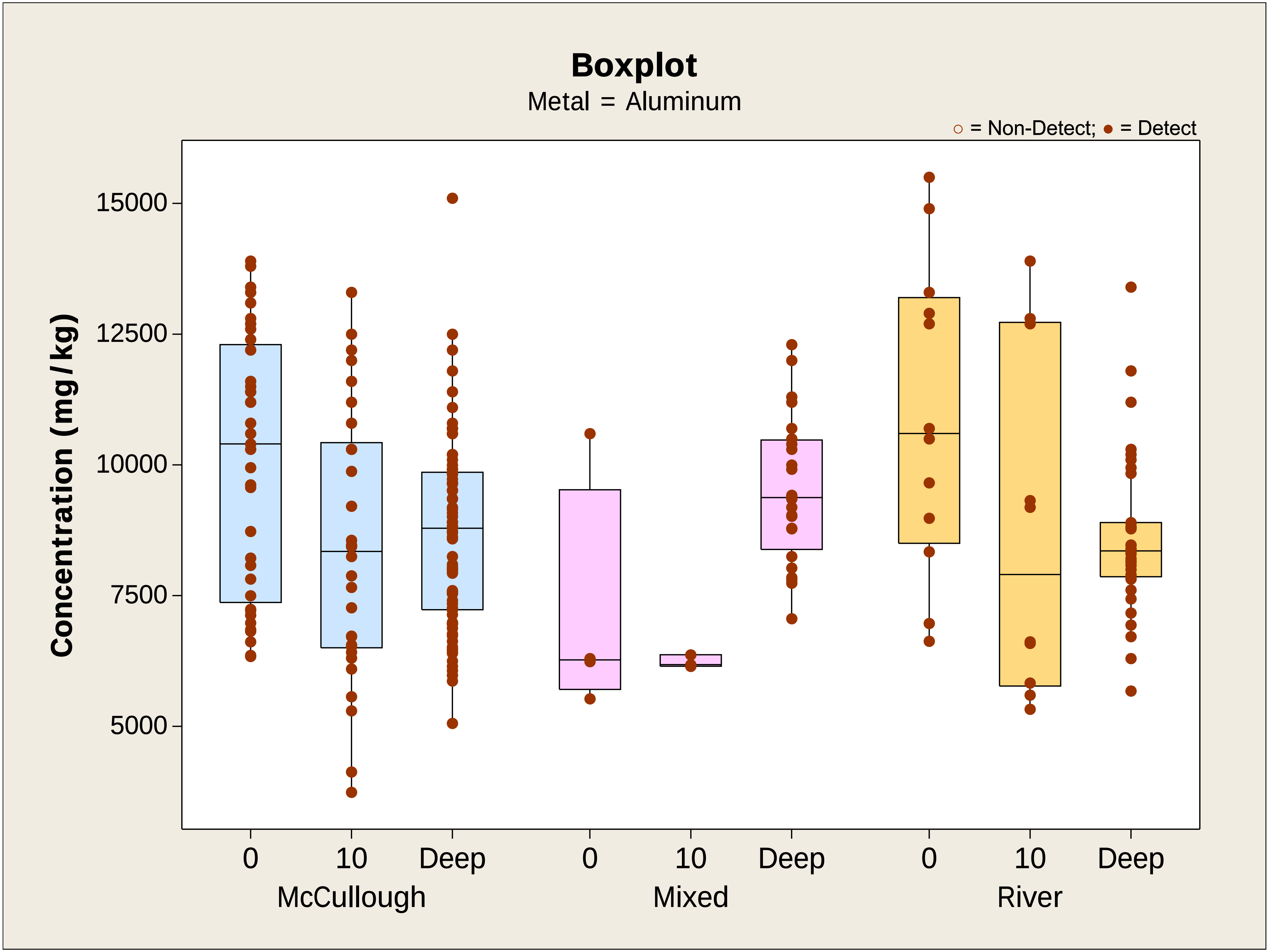


Individual Value Plot
Radionuclide = Uranium-235/236
Qal
UMCf
Activity (pCi/g)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33

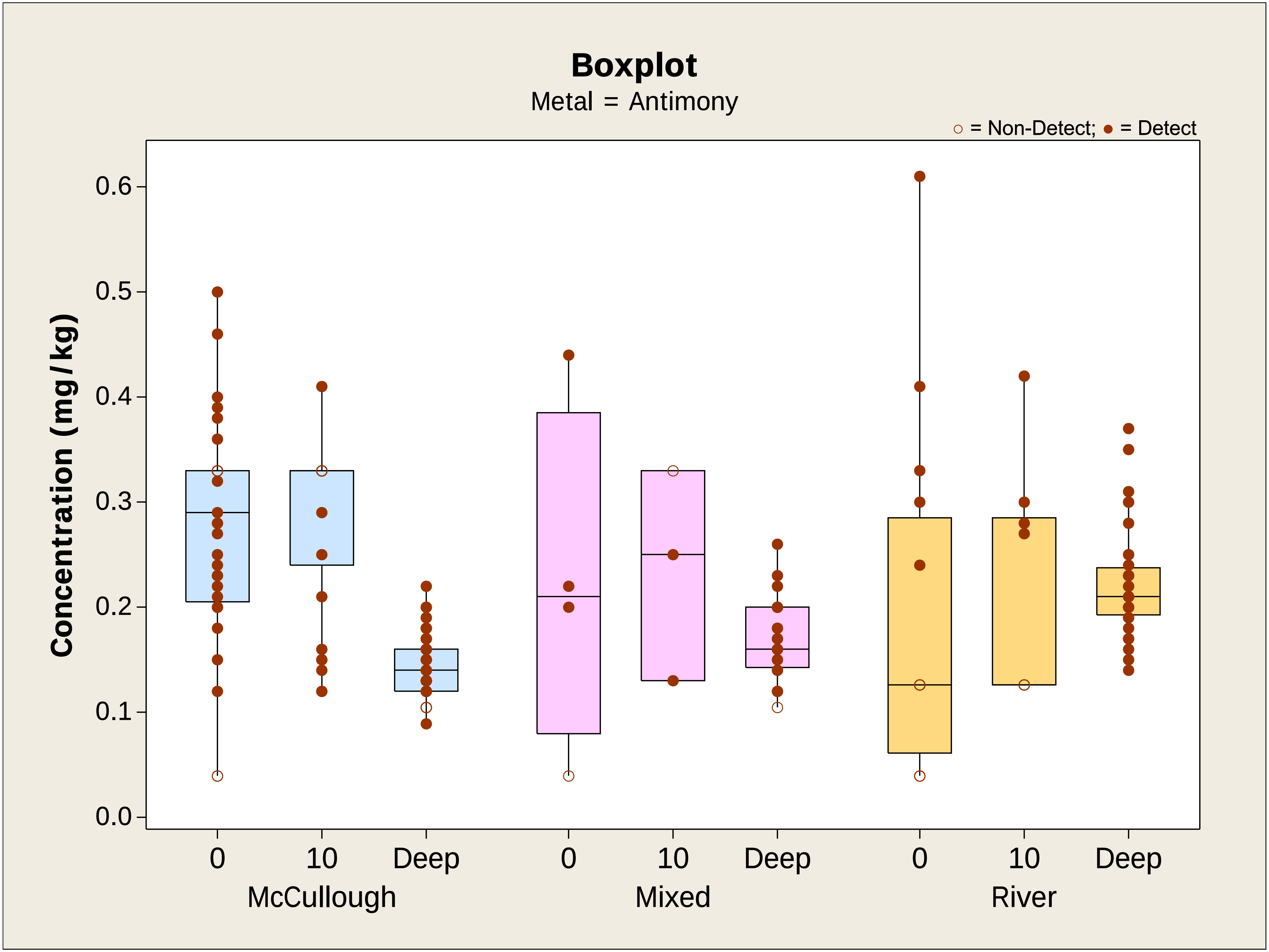


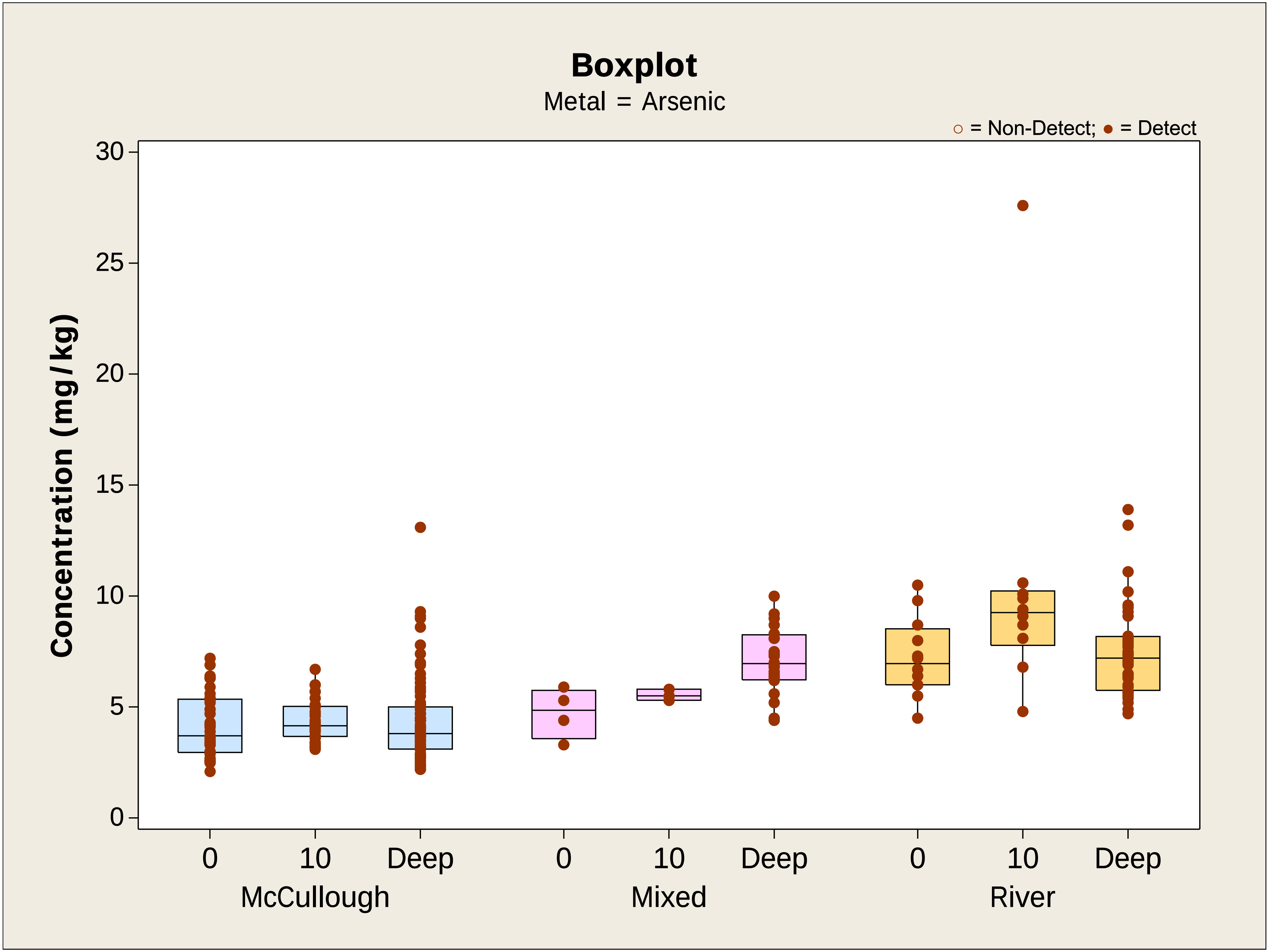
Individual Value Plot
Radionuclide = Uranium-238
Qal
UMCf
Activity (pCi/g)
3.0
2.5
2.0
1.5
1.0
0.5
DBSA-01
DBSA-02
DBSA-03
DBSA-04
DBSA-08
DBSA-09
DBSA-10
DBSA-11
DBSA-13
DBSA-14
DBSA-15
DBSA-17
DBSA-20
DBSA-21
DBSA-23
DBSA-26
DBSA-27
DBSA-29
DBSA-30
DBSA-32
DBSA-33

BOXPLOTS (LITHOLOGIES/DEPTHS)

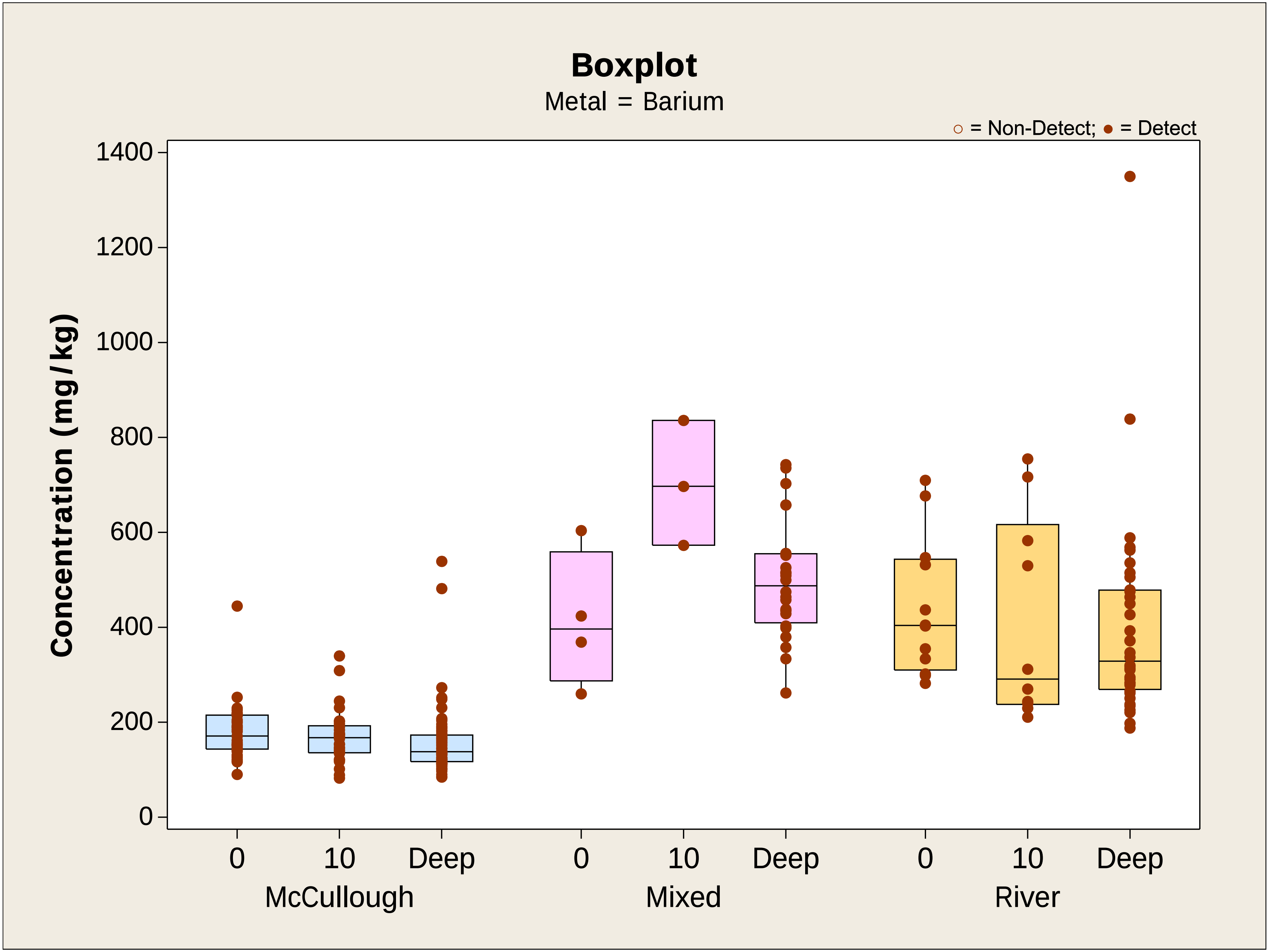


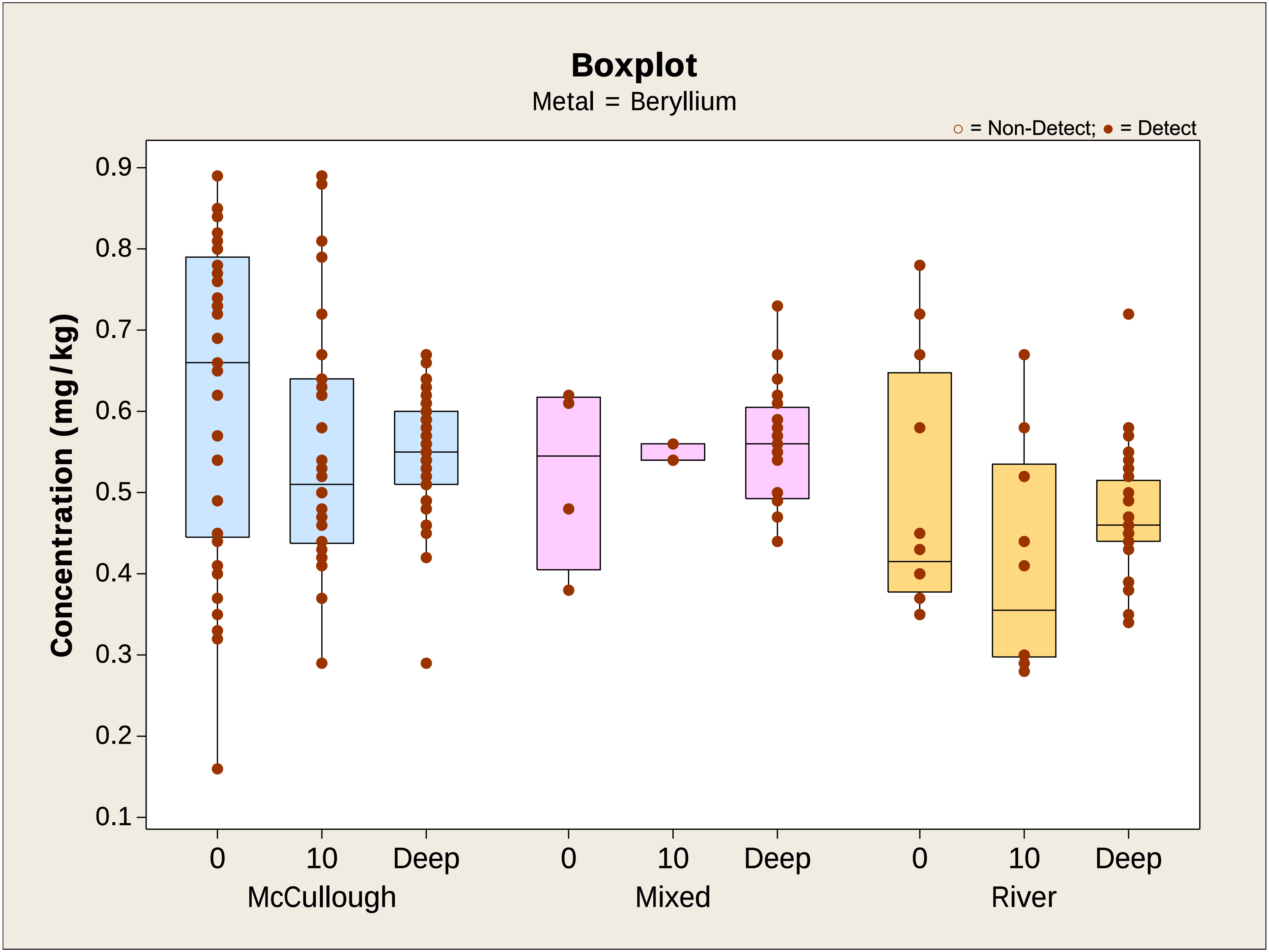
Boxplot
Metal = Aluminum
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
15000
12500
10000
7500
5000
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River

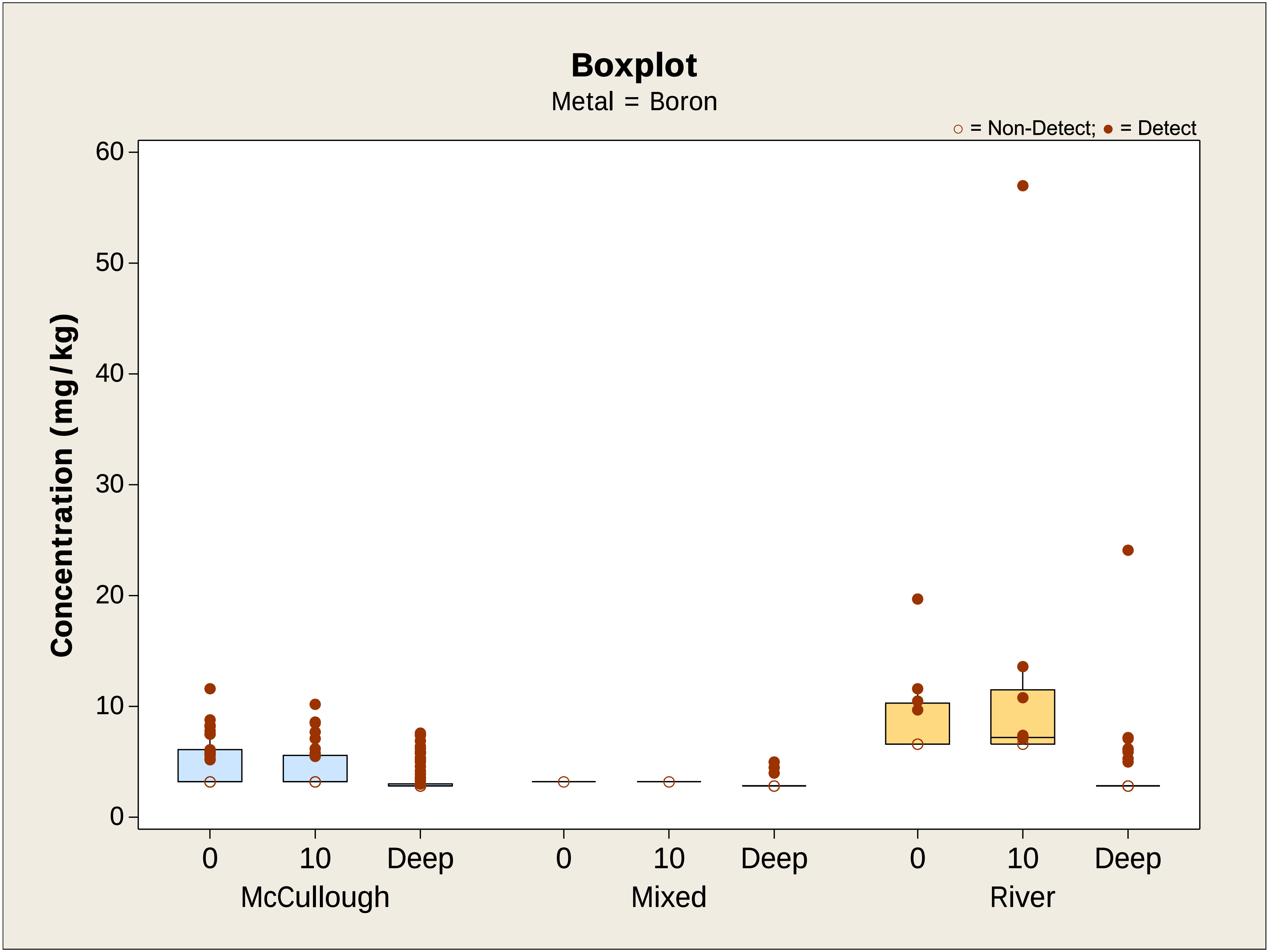

Boxplot
Metal = Antimony
○ = Non-Detect; ● = Detect
Concentration (mg / kg)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River



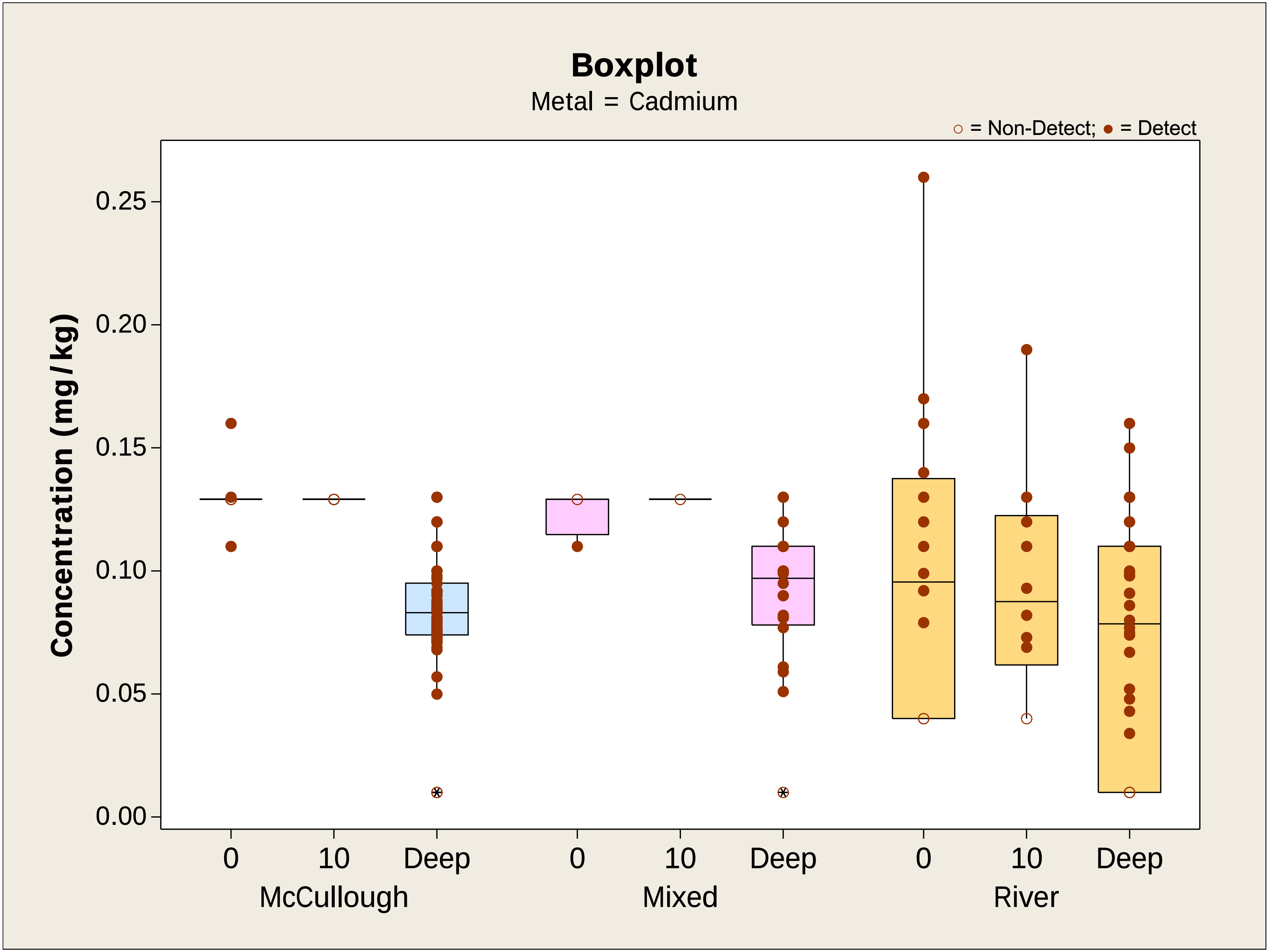
Boxplot
Metal = Arsenic
○ = Non-Detect; ● = Detect
Concentration (mg / kg)
0
5
10
15
20
25
30
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River

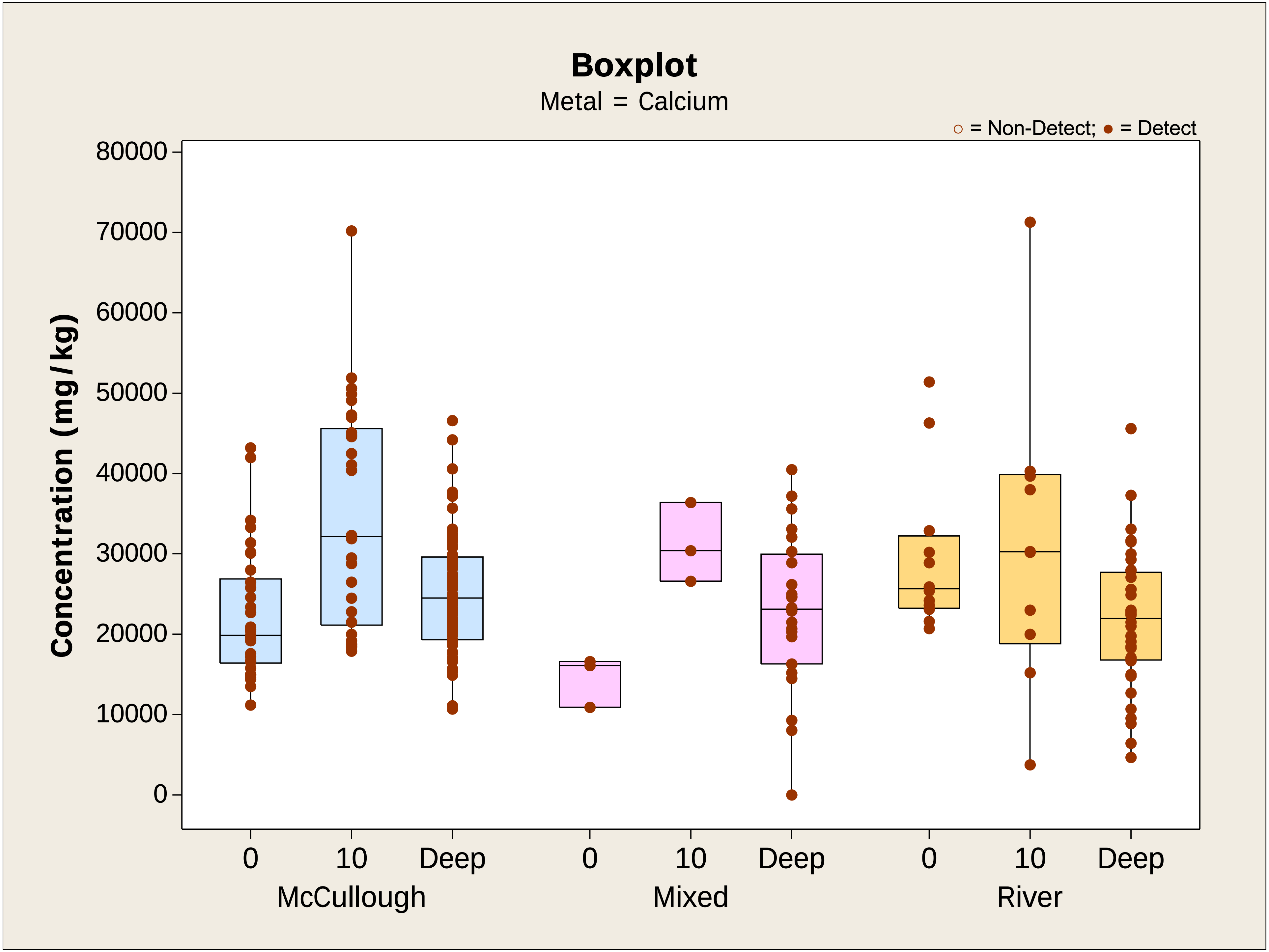

Boxplot
Metal = Barium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
1400
1200
1000
800
600
400
200
0
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River

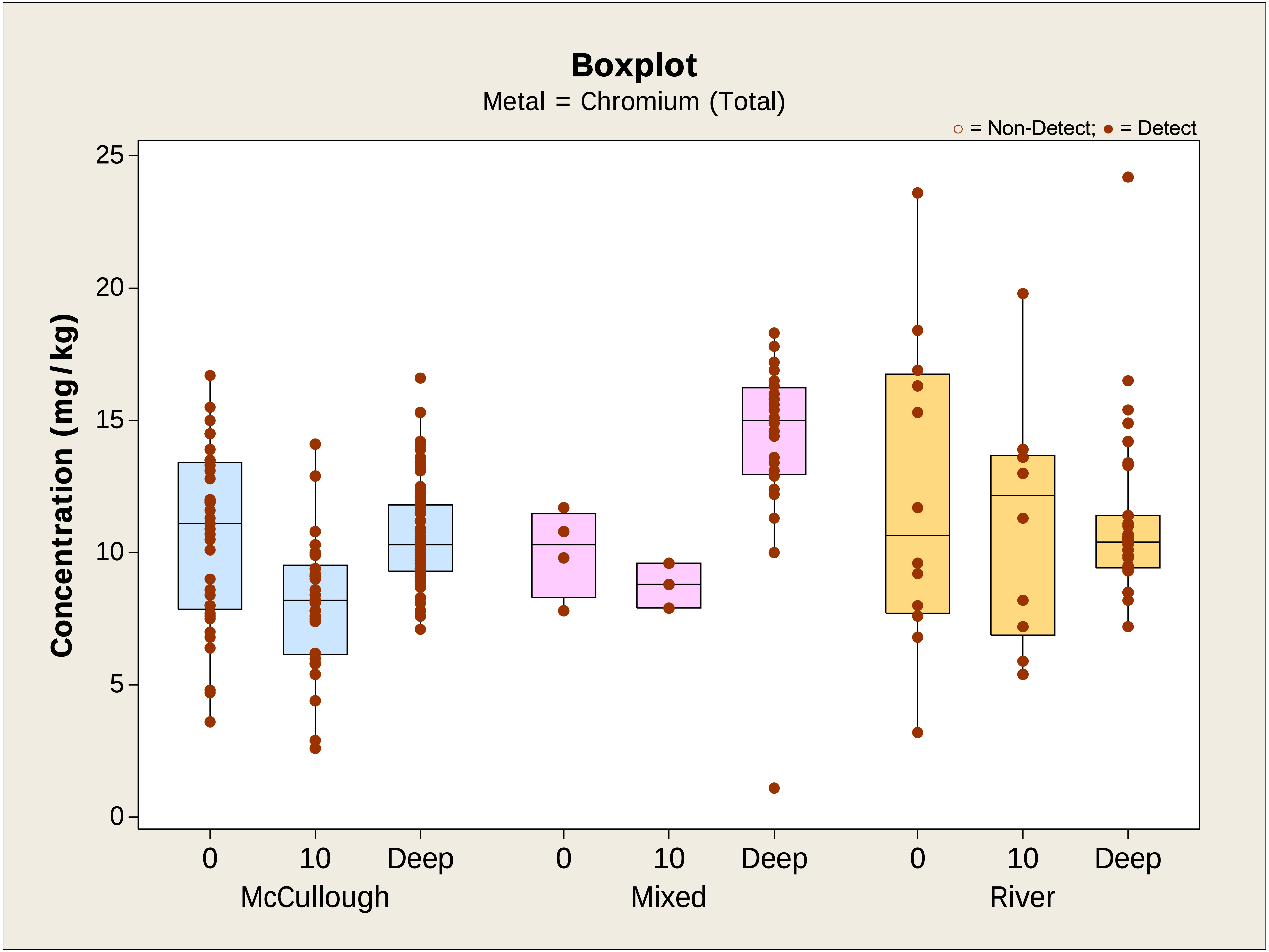

Boxplot
Metal = Beryllium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River



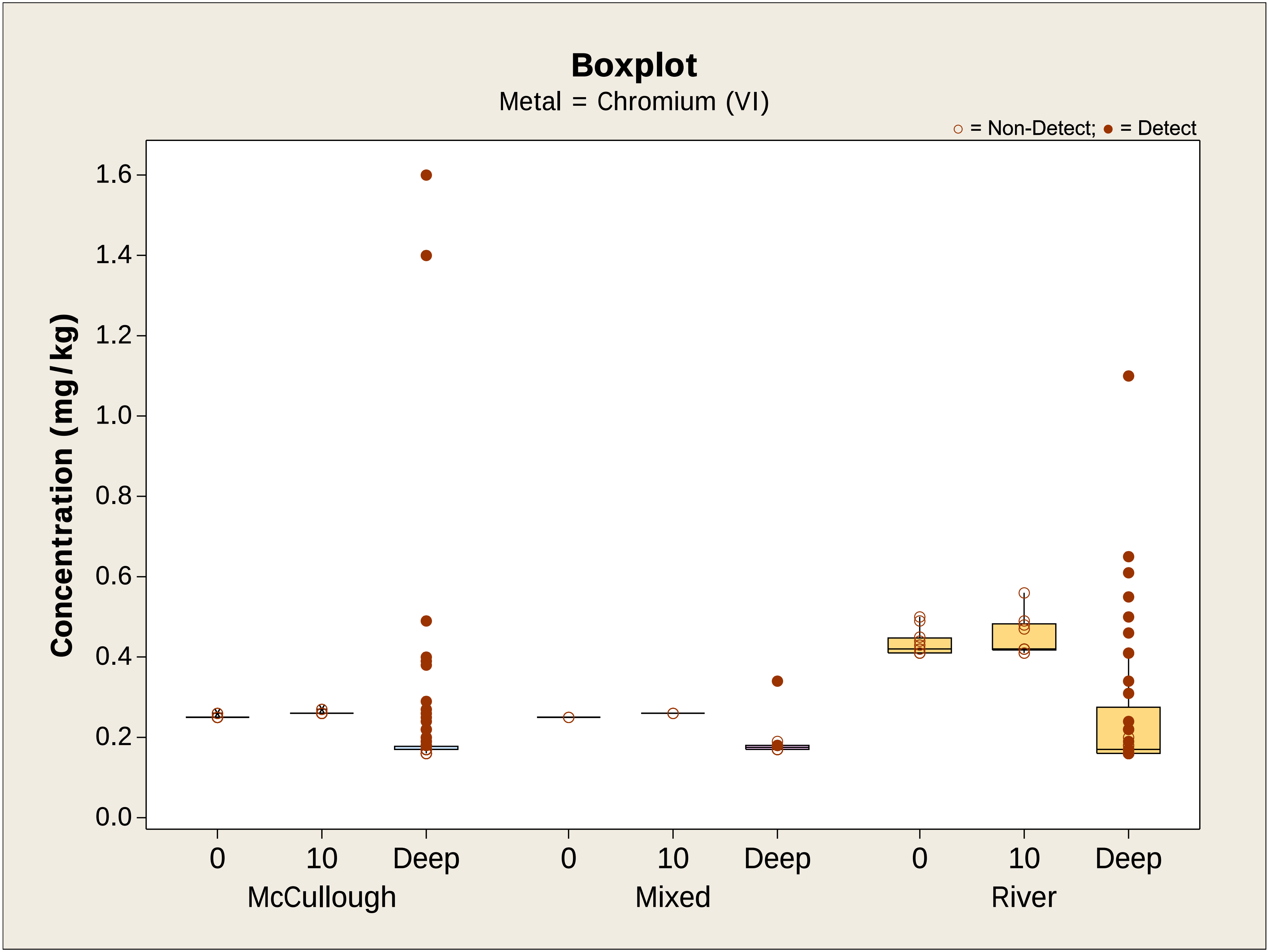
Boxplot
Metal = Boron
○ = Non-Detect; ● = Detect
Concentration (mg / kg)
60
50
40
30
20
10
0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River


Boxplot
Metal = Cadmium
○ = Non-Detect; ● = Detect
Concentration (mg / kg)
0.25
0.20
0.15
0.10
0.05
0.00
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

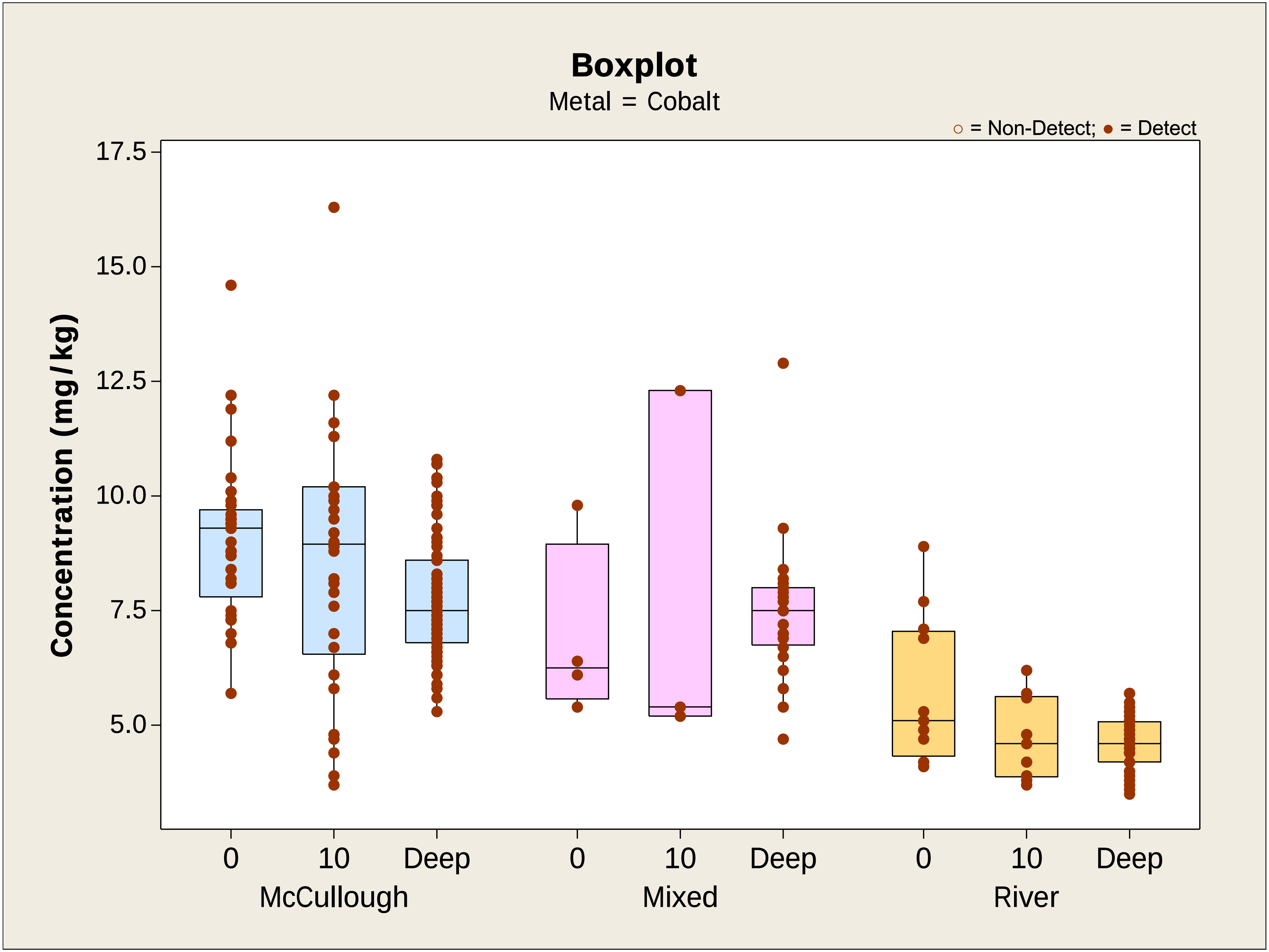

Boxplot
Metal = Calcium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
80000
70000
60000
50000
40000
30000
20000
10000
0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

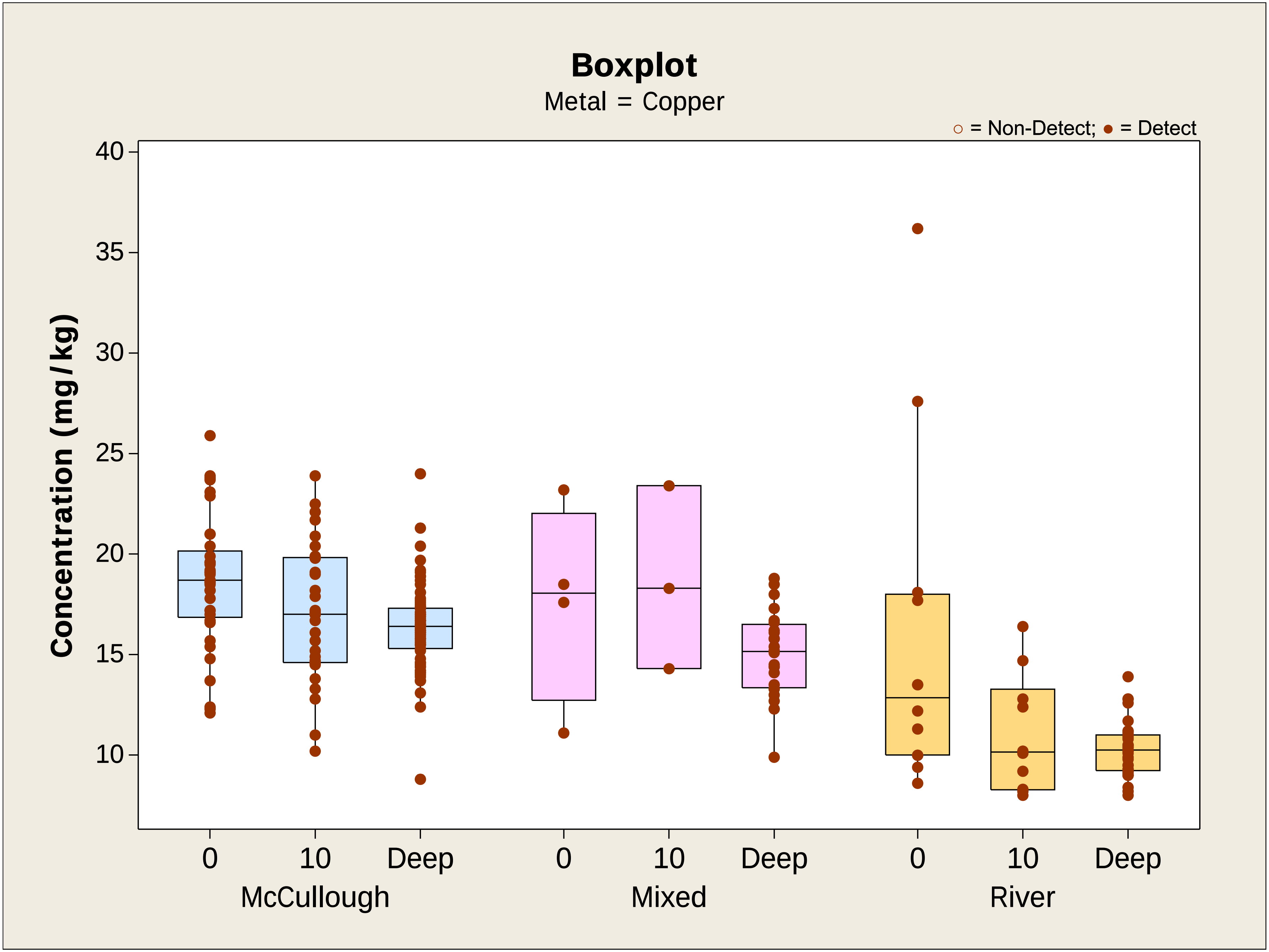


Boxplot
Metal = Chromium (Total)
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
25
20
15
10
5
0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

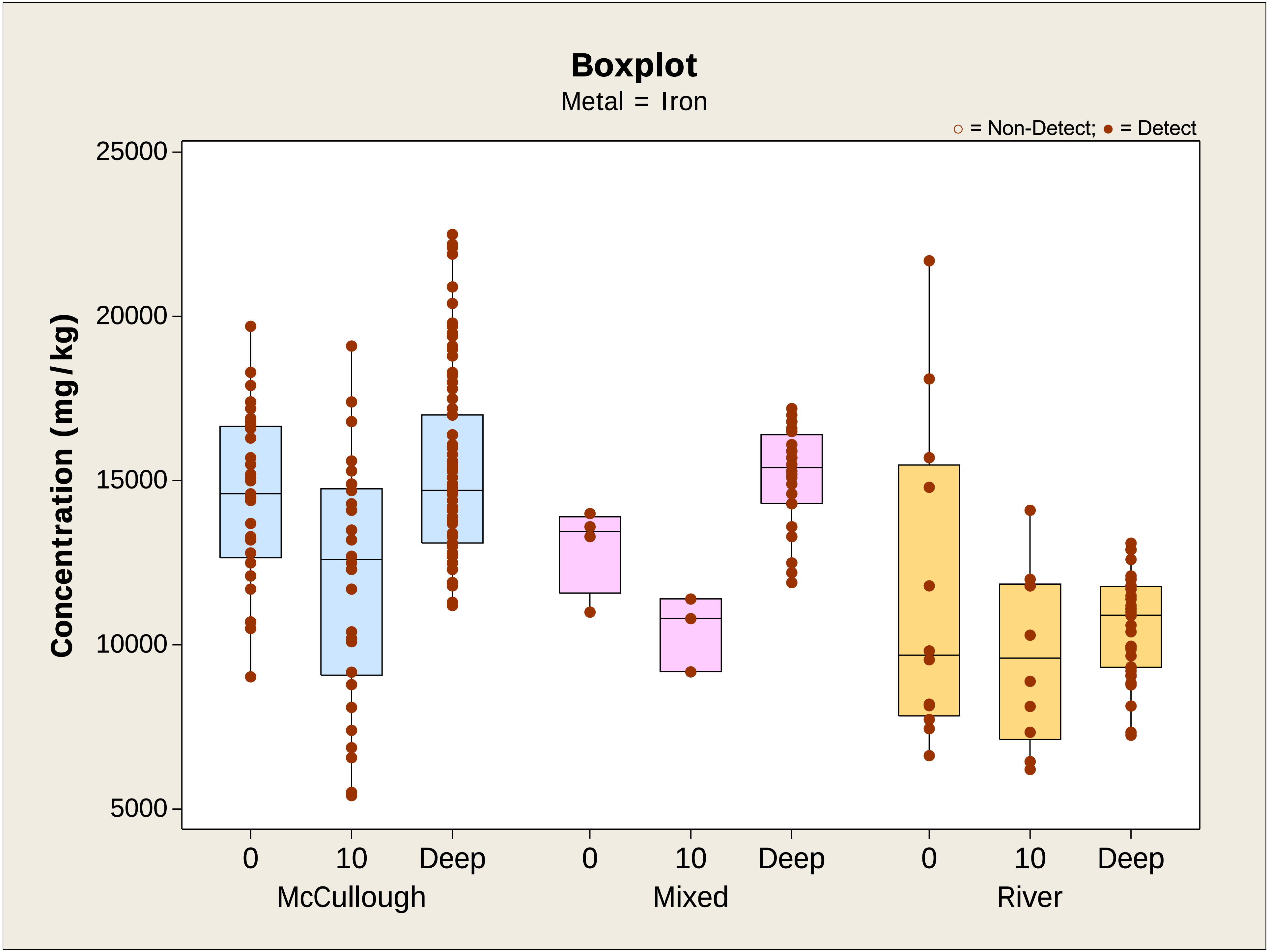


Boxplot
Metal = Chromium (VI)
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River

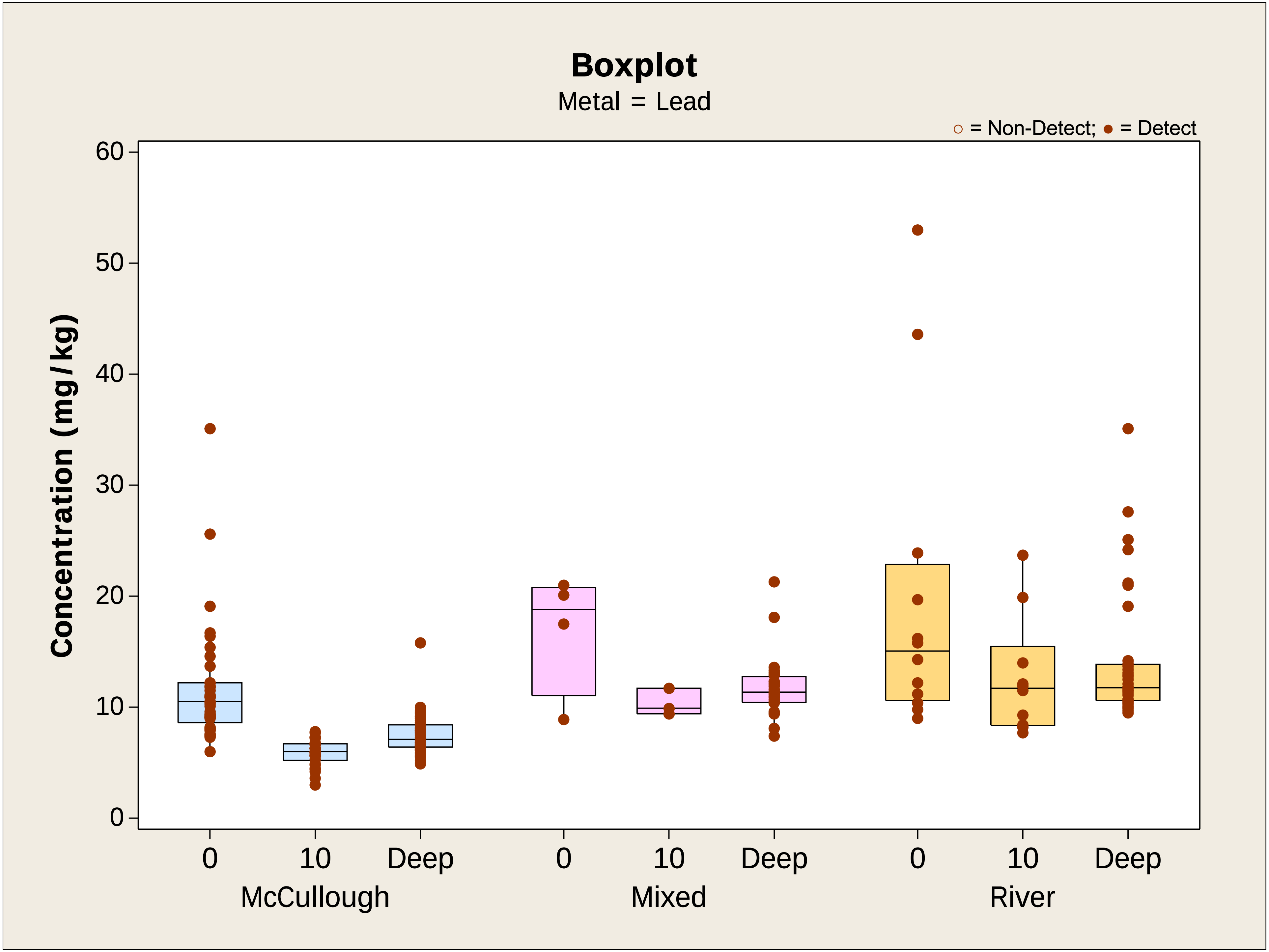

Boxplot
Metal = Cobalt
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
17.5
15.0
12.5
10.0
7.5
5.0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

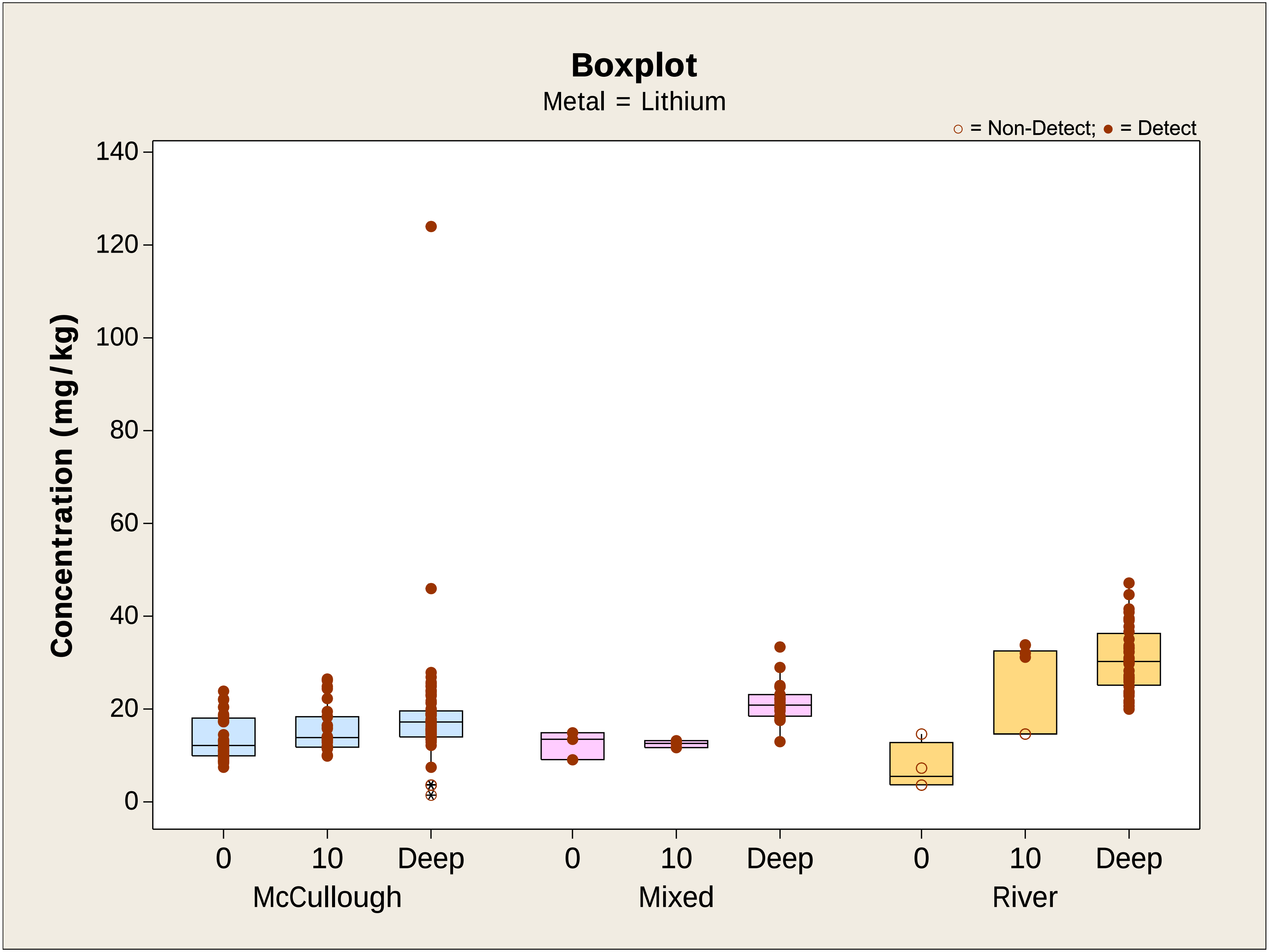


Boxplot
Metal = Copper
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
40
35
30
25
20
15
10
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

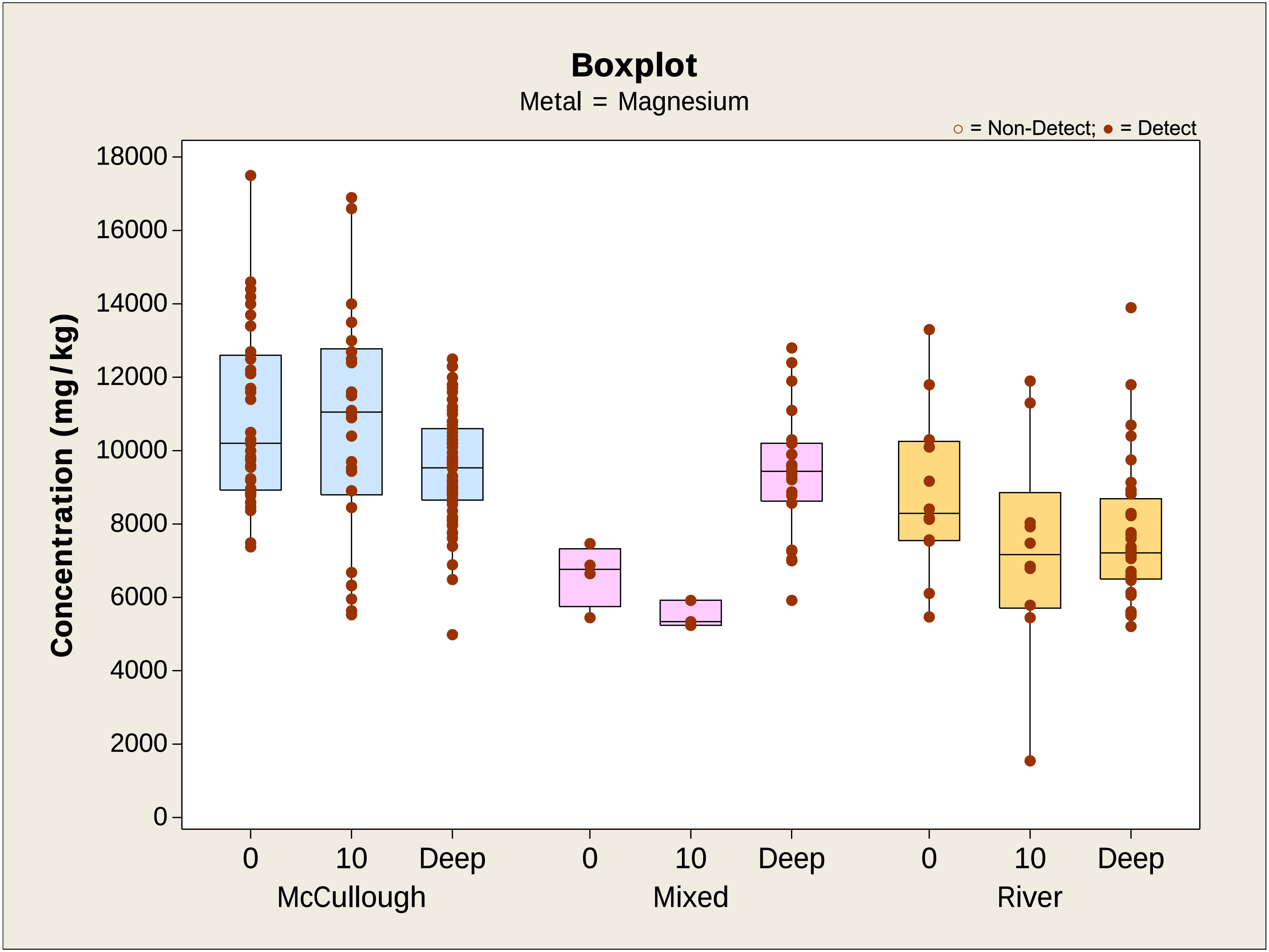


Boxplot
Metal = Iron
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
25000
20000
15000
10000
5000
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

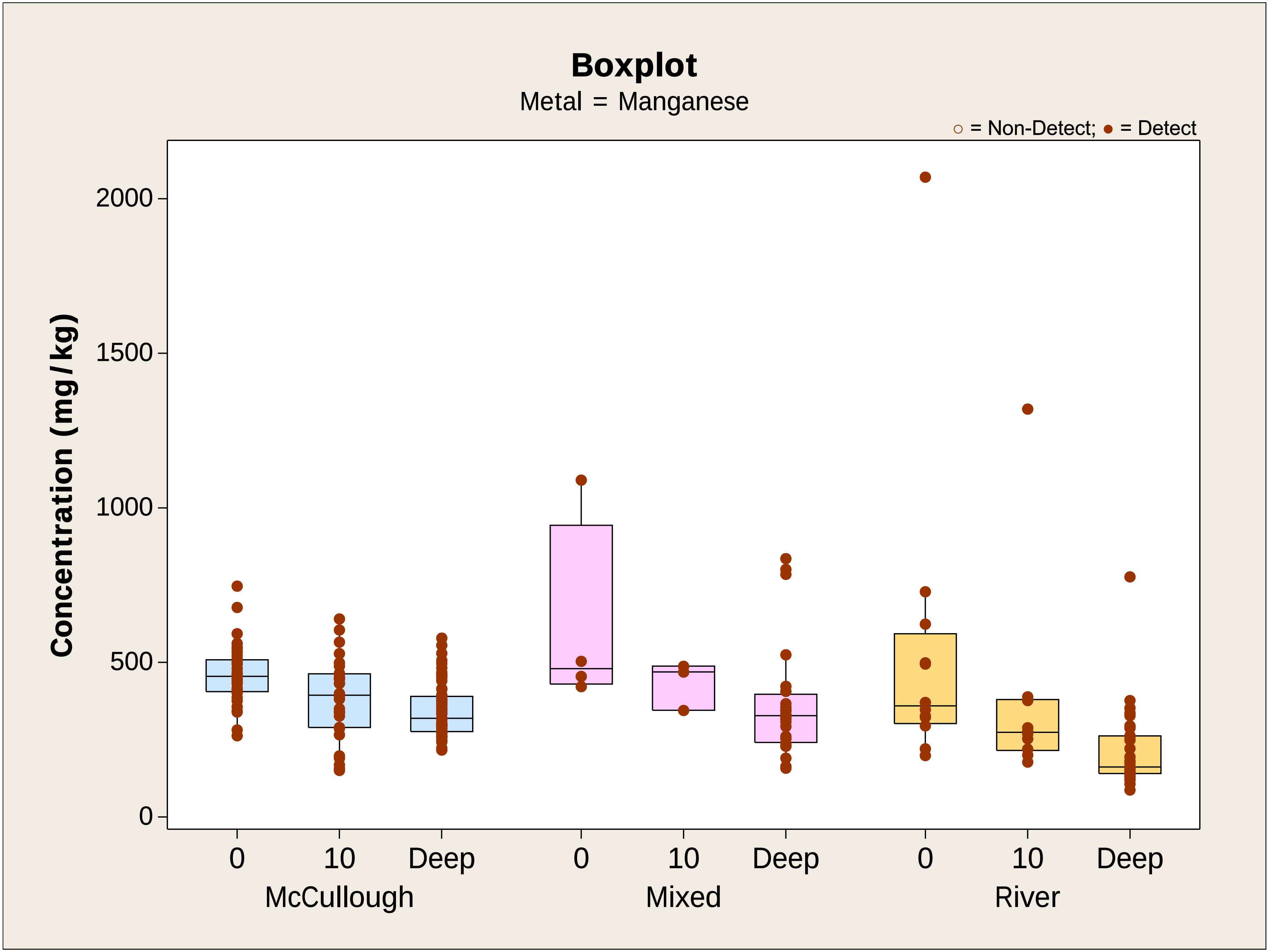

Boxplot
Metal = Lead
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
60
50
40
30
20
10
0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

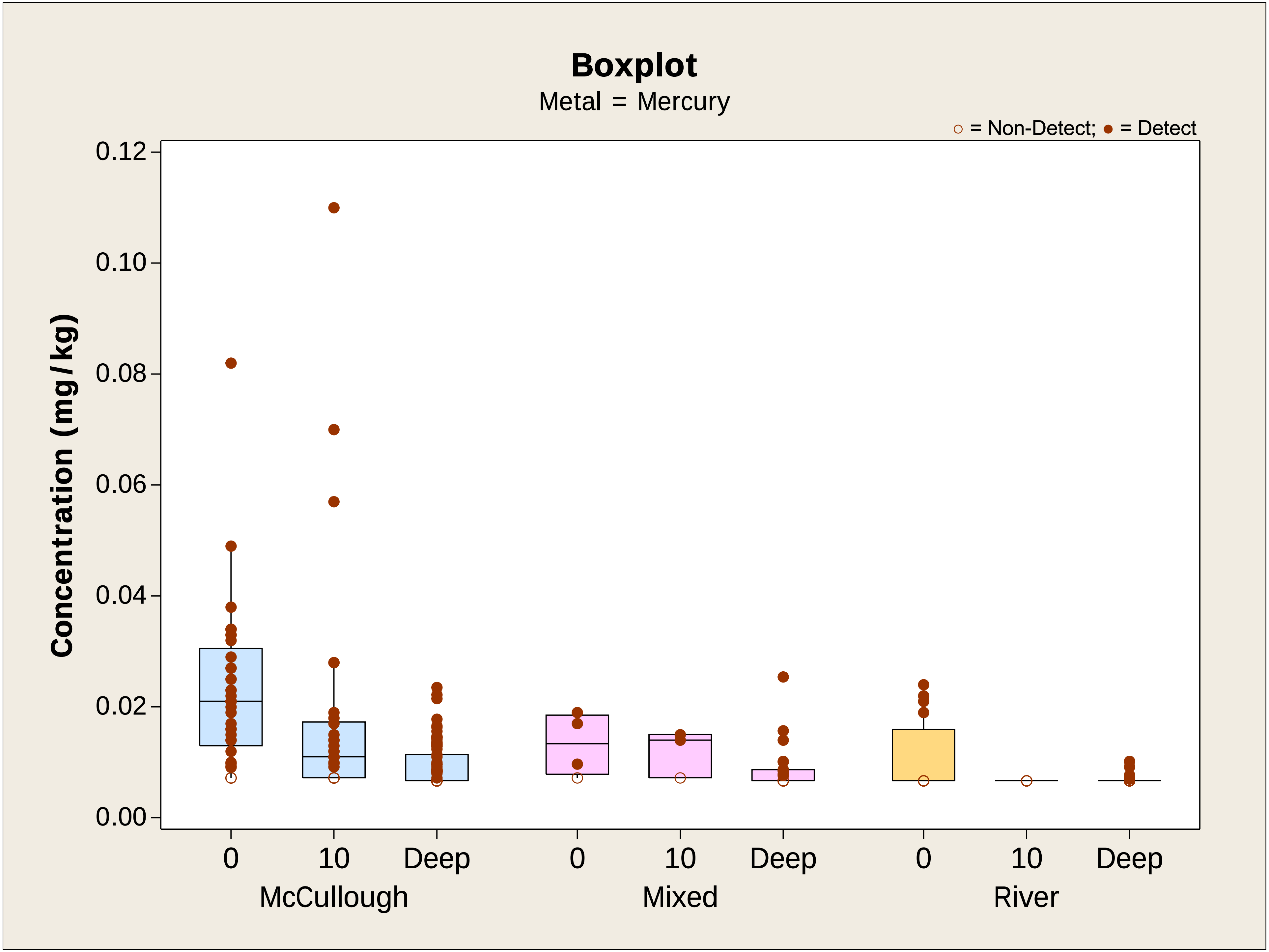


Boxplot
Metal = Lithium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
140
120
100
80
60
40
20
0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

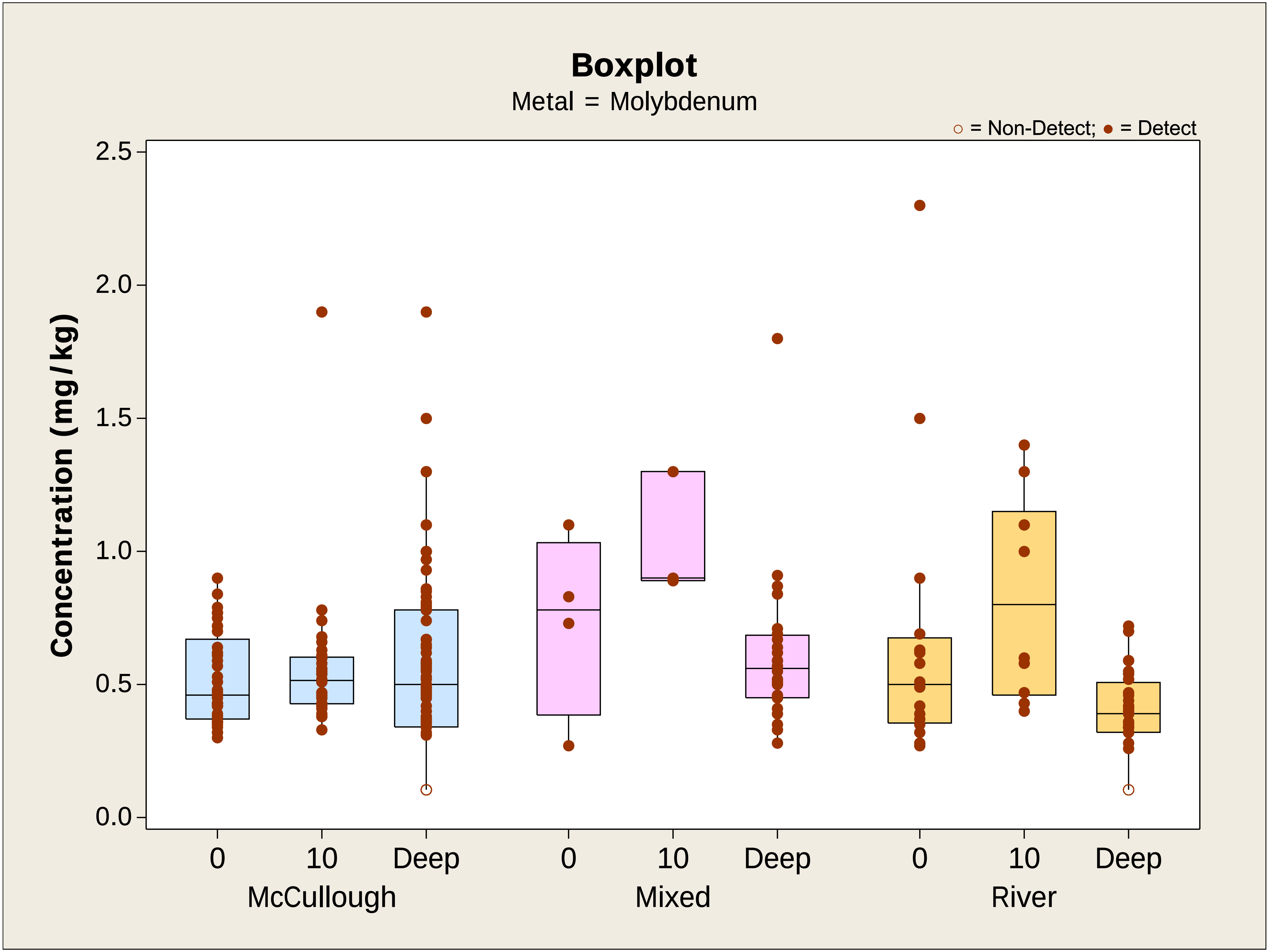


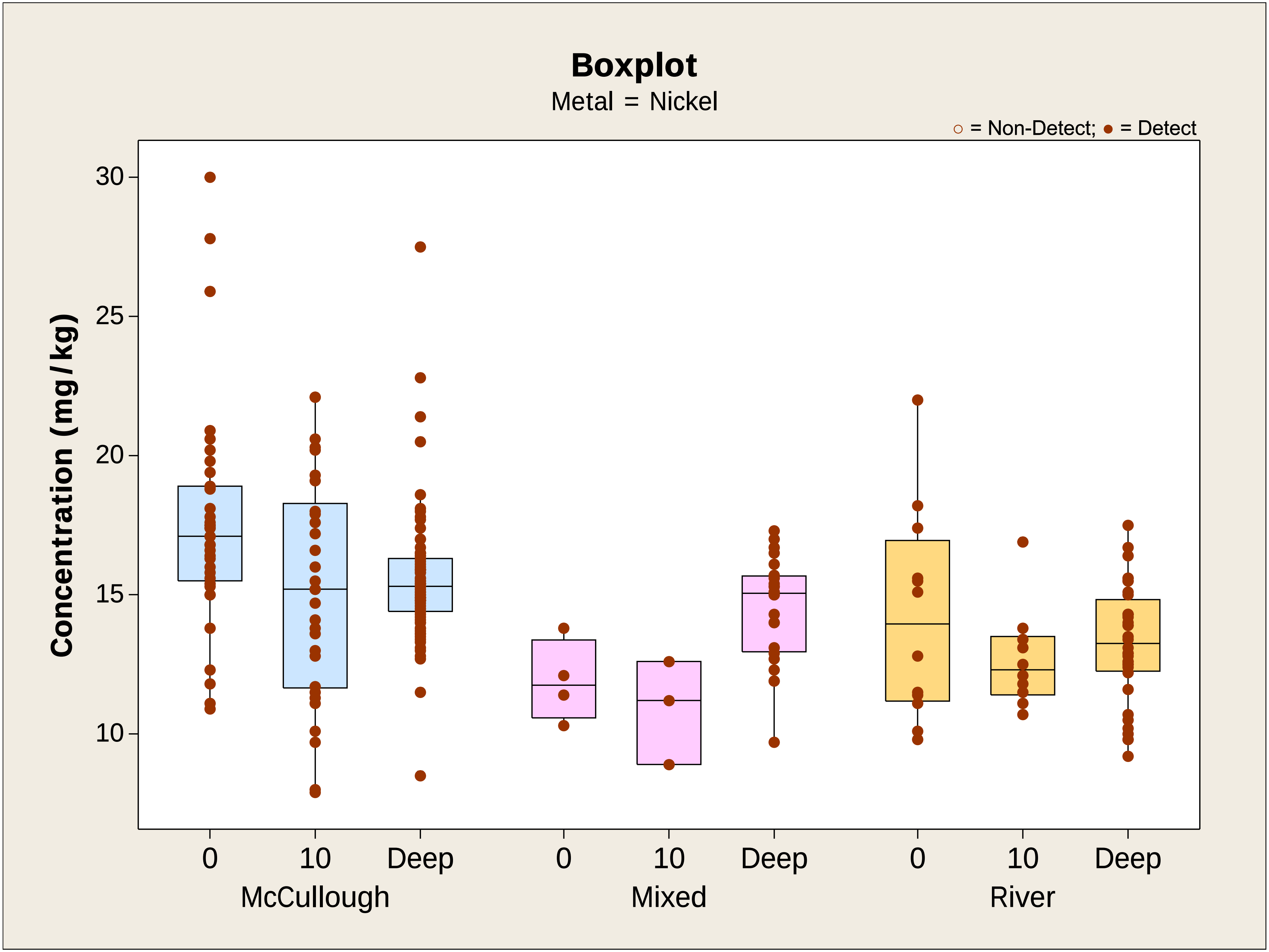
Boxplot
Metal = Magnesium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River


Boxplot
Metal = Manganese
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
2000
1500
1000
500
0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

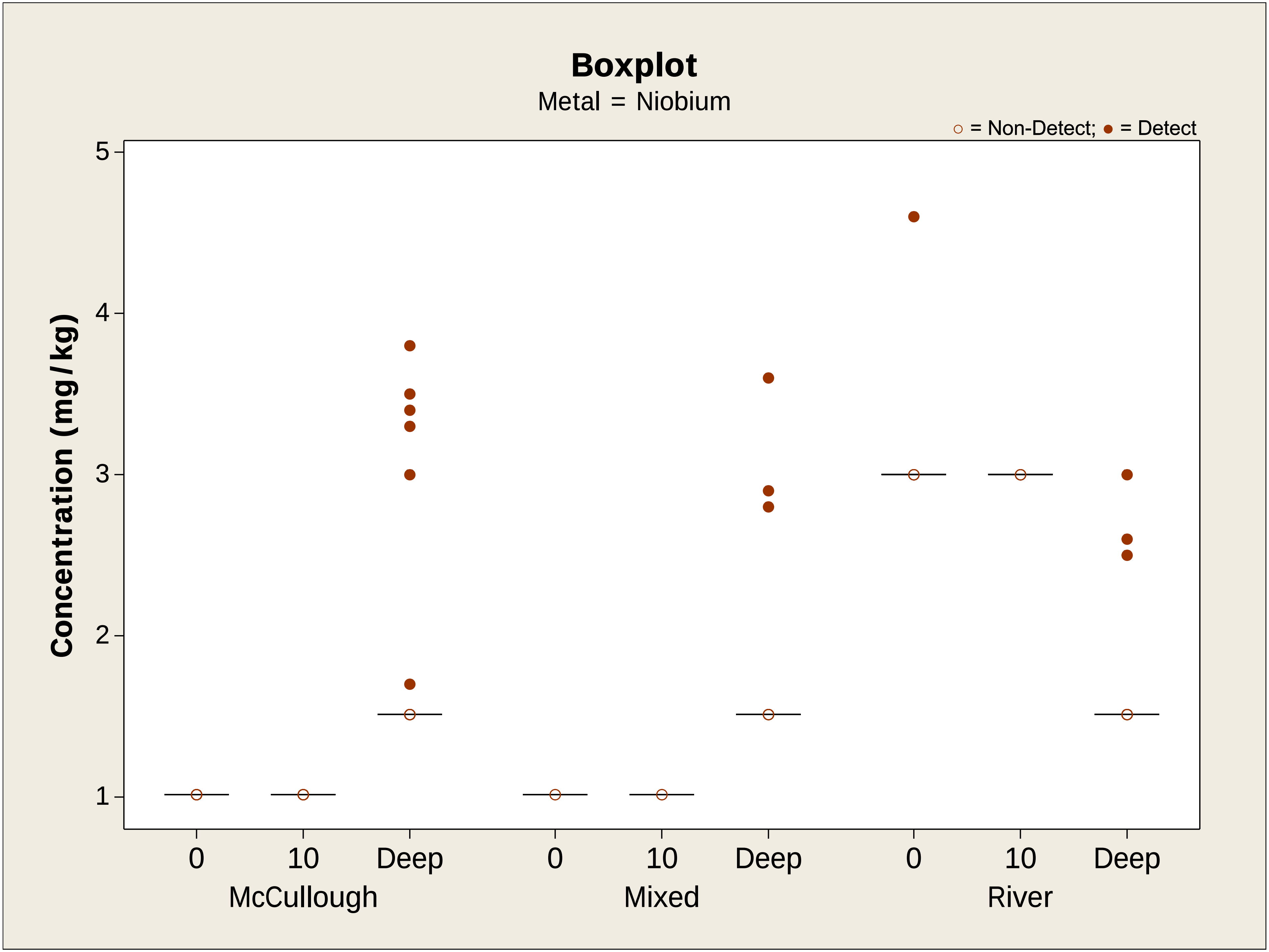


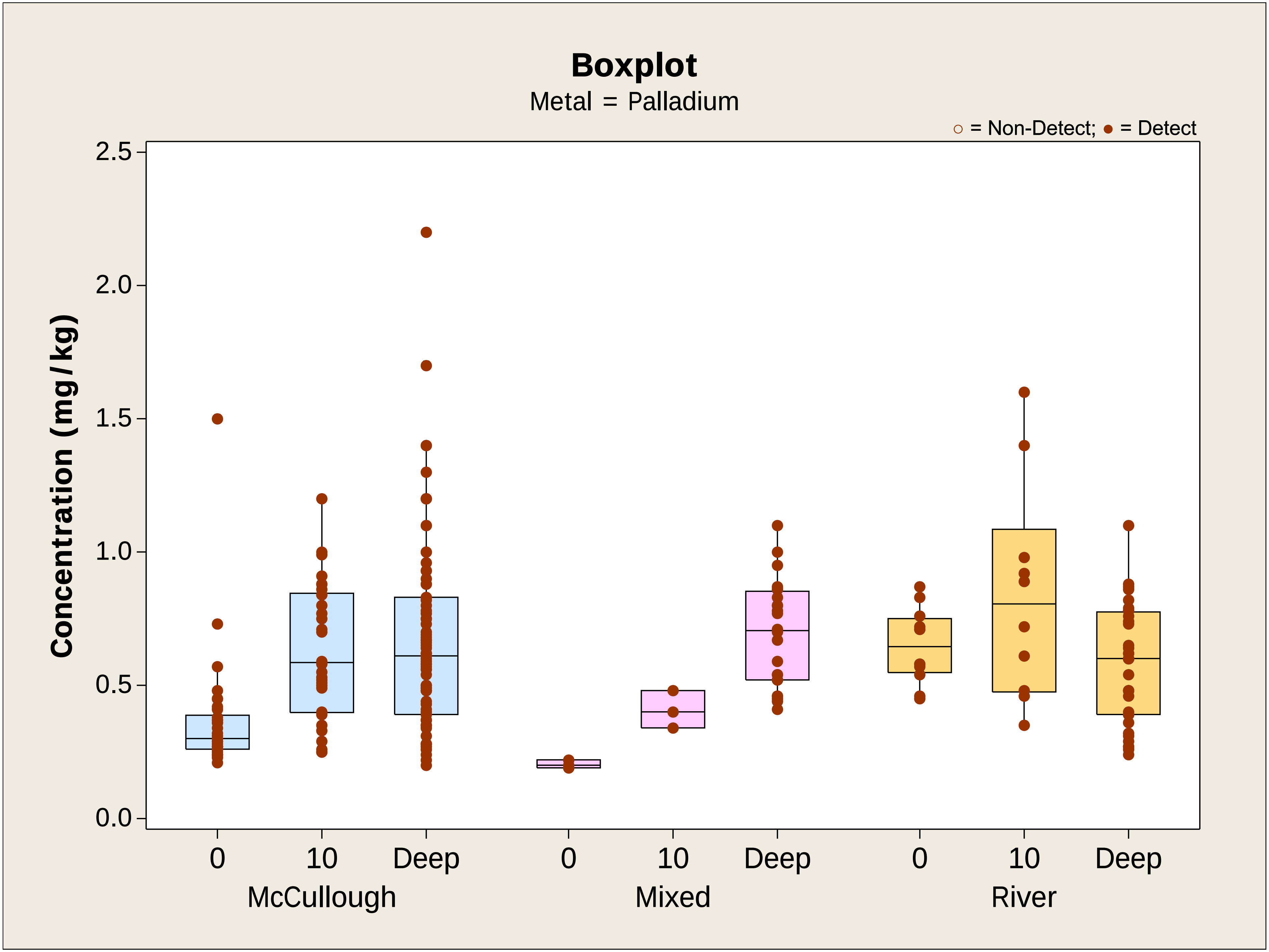
Boxplot
Metal = Mercury
○ = Non-Detect; ● = Detect
Concentration (mg / kg)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River

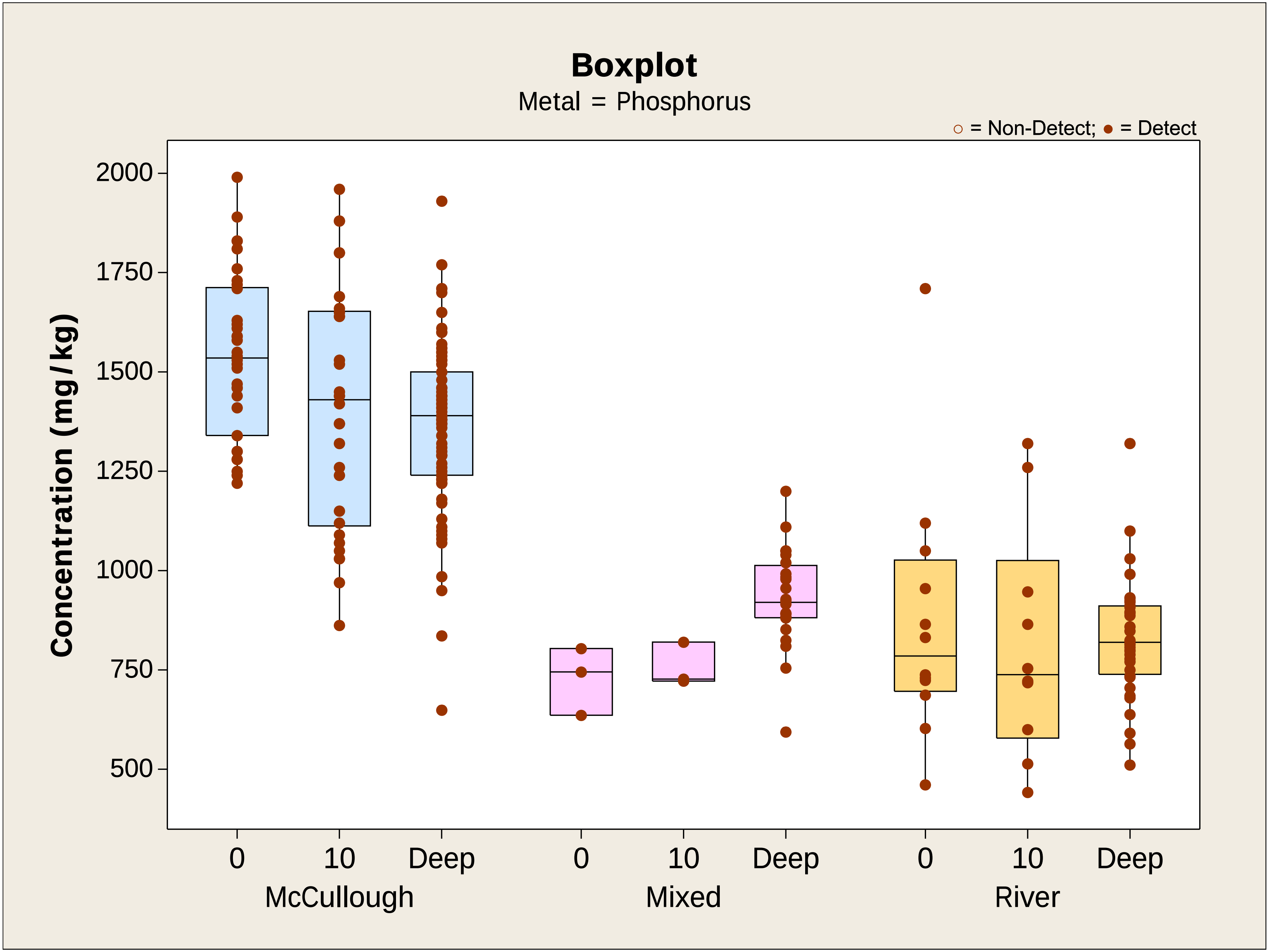

Boxplot
Metal = Molybdenum
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
2.5
2.0
1.5
1.0
0.5
0.0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

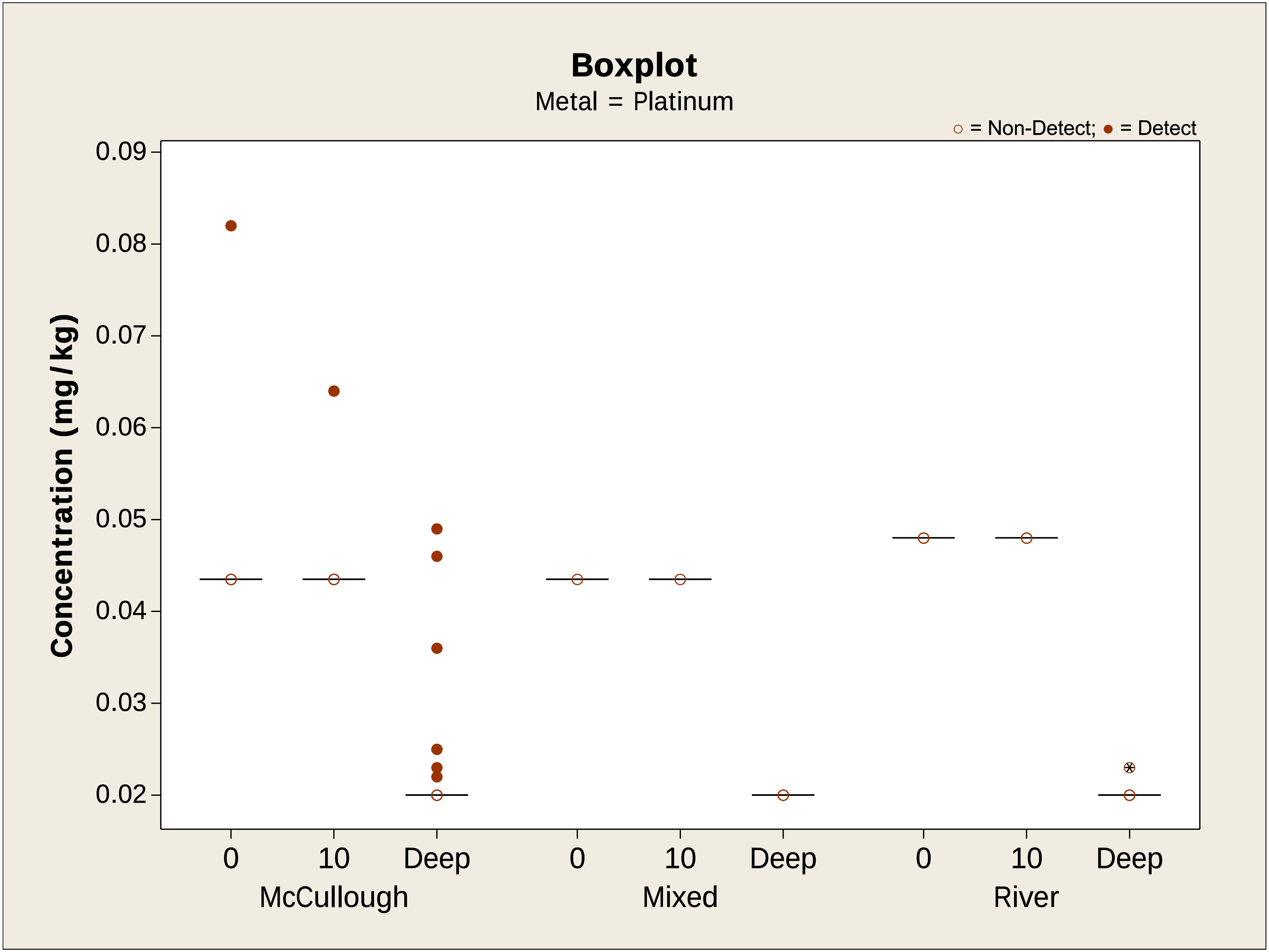


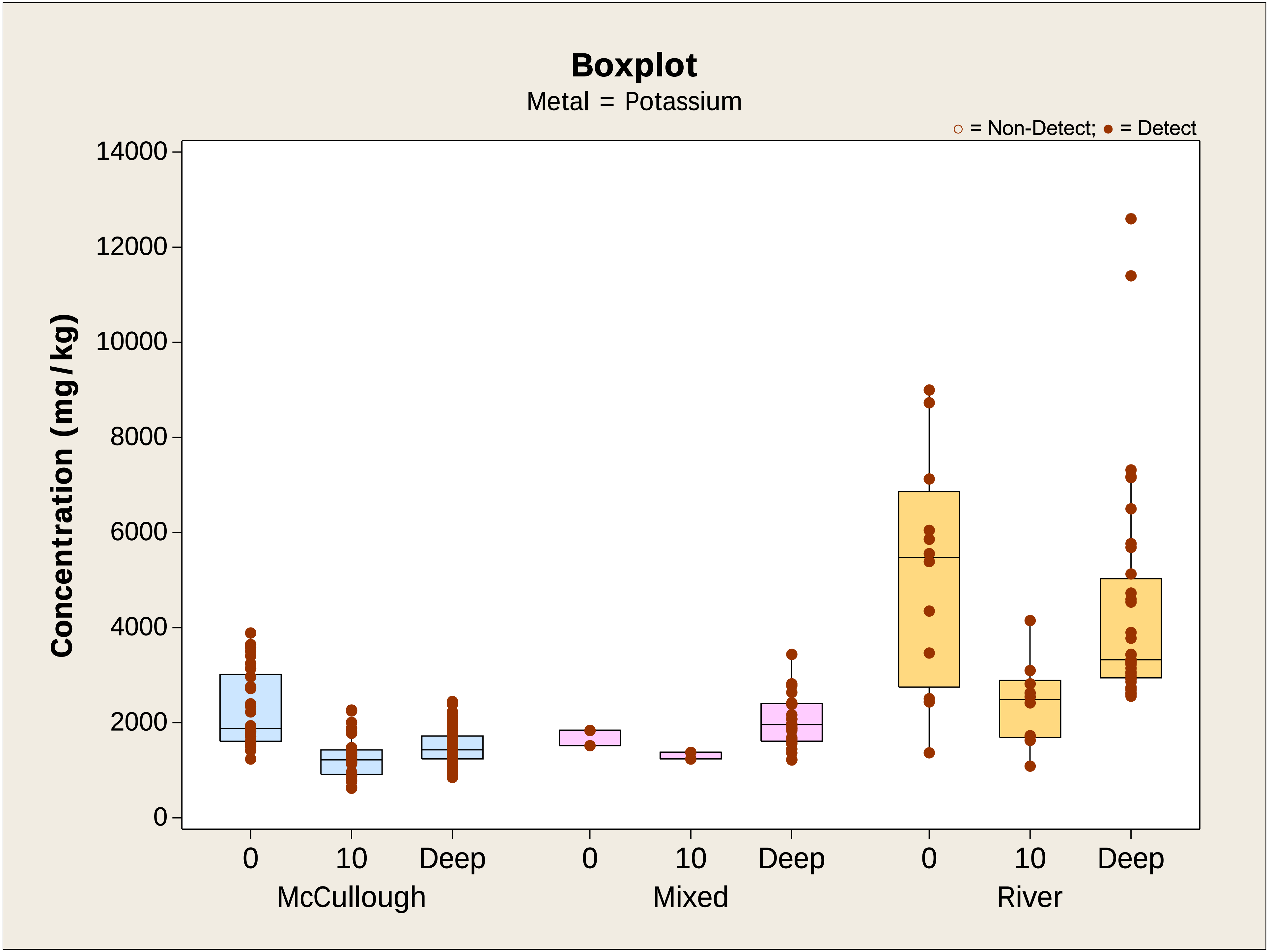
Boxplot
Metal = Nickel
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
30
25
20
15
10
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River


Boxplot
Metal = Niobium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
1
2
3
4
5
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River

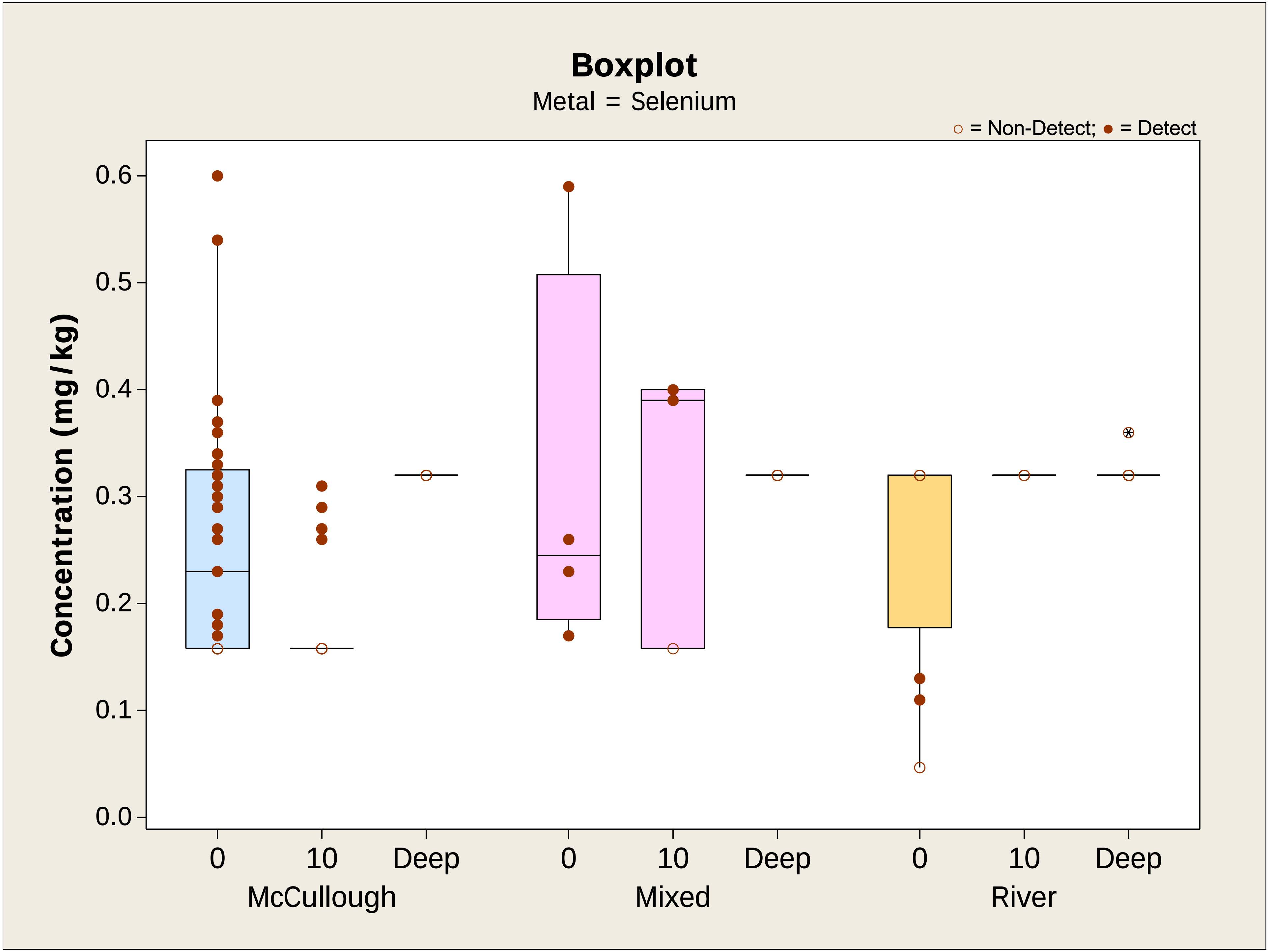

Boxplot
Metal = Palladium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
2.5
2.0
1.5
1.0
0.5
0.0
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River


Boxplot
Metal = Phosphorus
○ = Non-Detect; ● = Detect
Concentration (mg / kg)
2000
1750
1500
1250
1000
750
500
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River

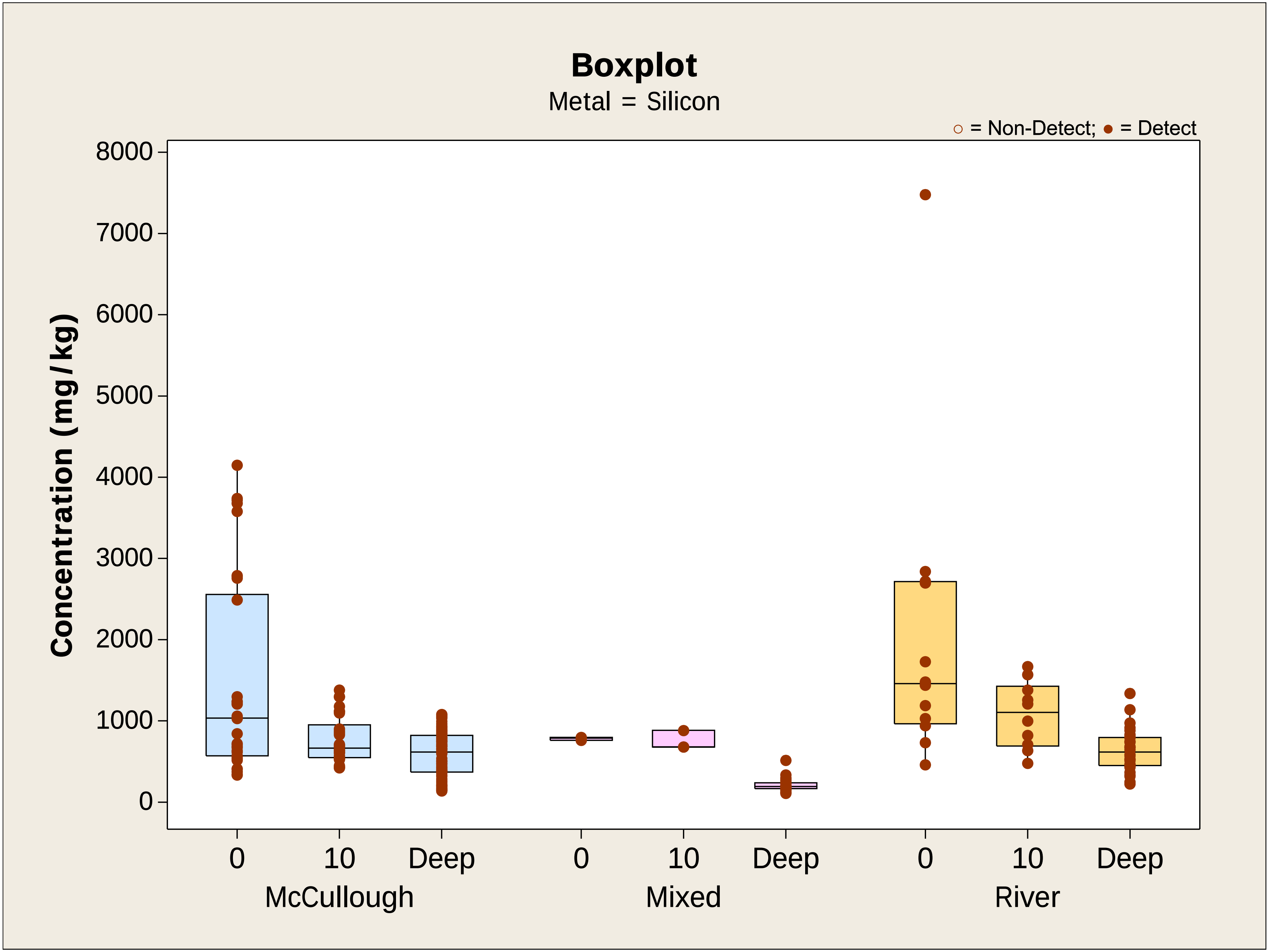

Boxplot
Metal = Platinum
○ = Non-Detect; ● = Detect
Concentration (mg / kg)
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River



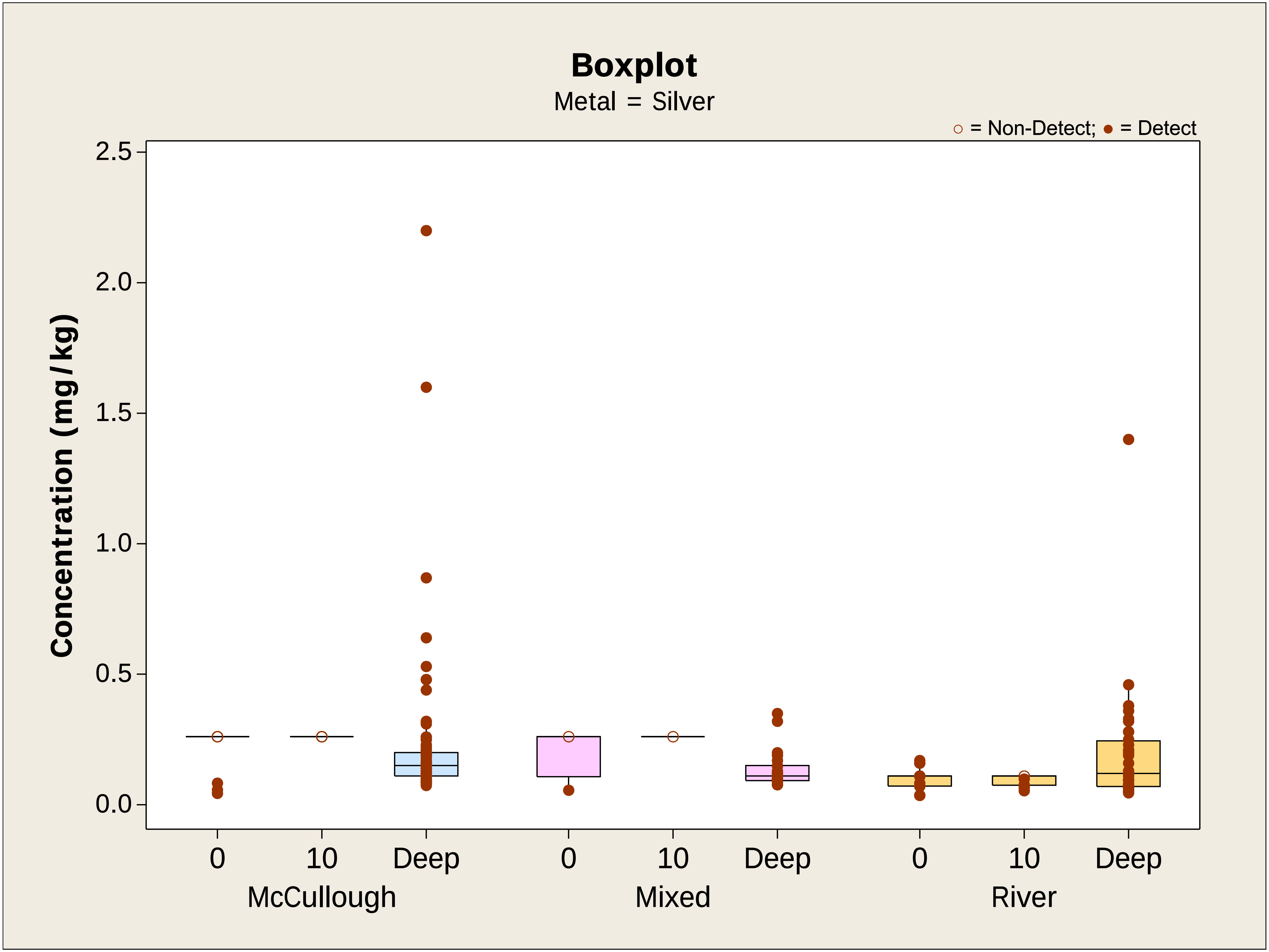
Boxplot
Metal = Potassium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0
2000
4000
6000
8000
10000
12000
14000
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River



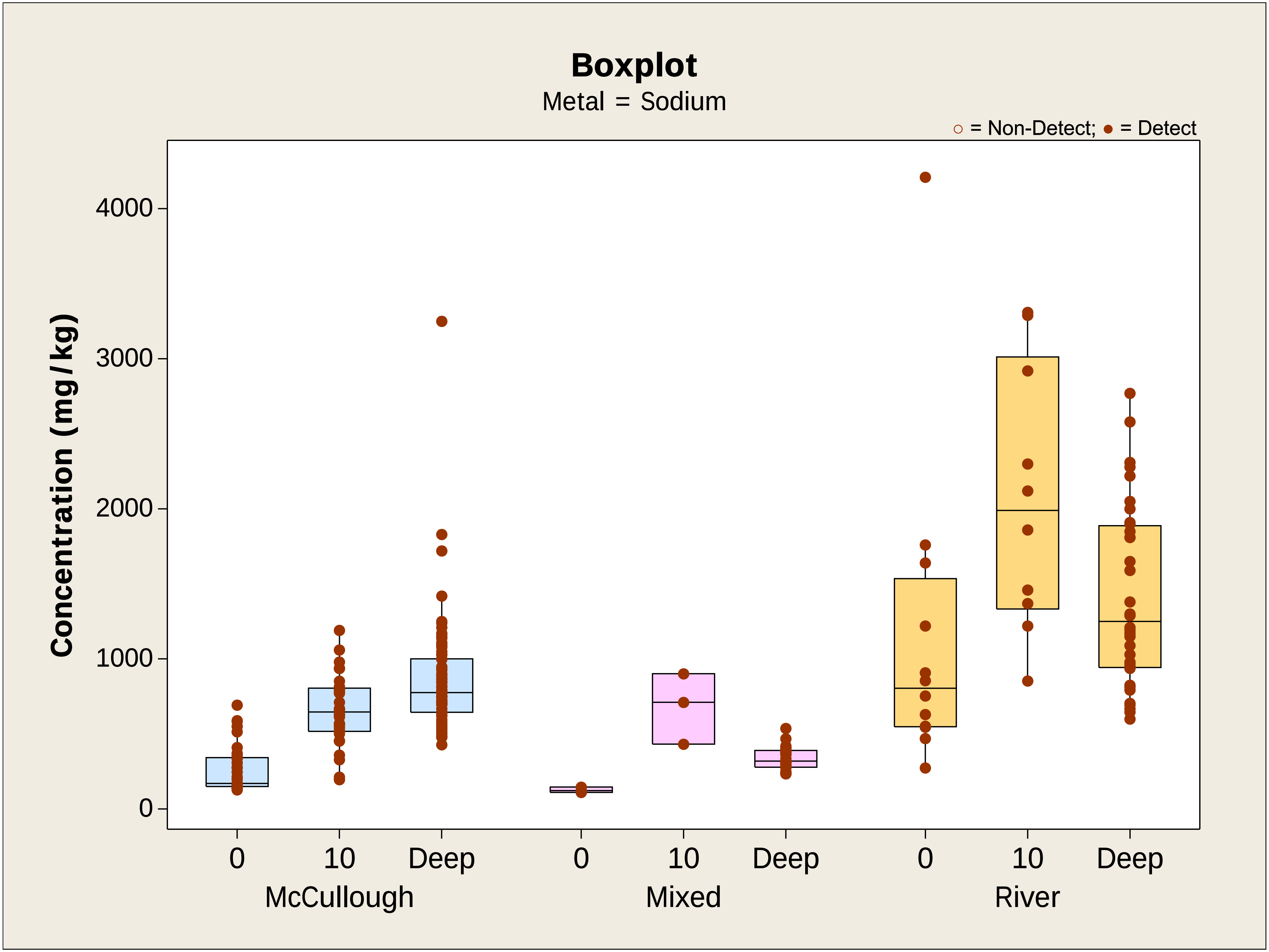
Boxplot
Metal = Selenium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River

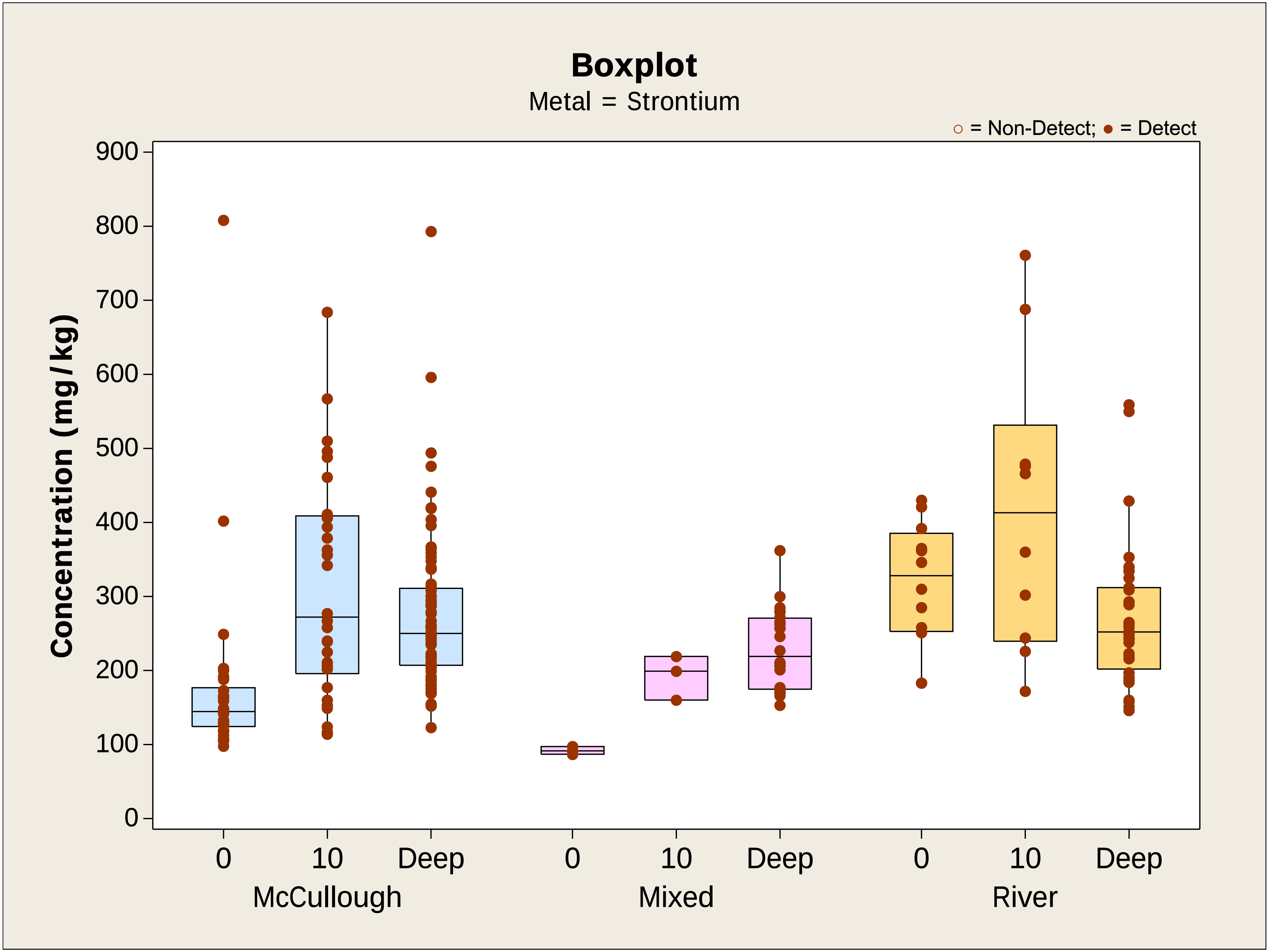


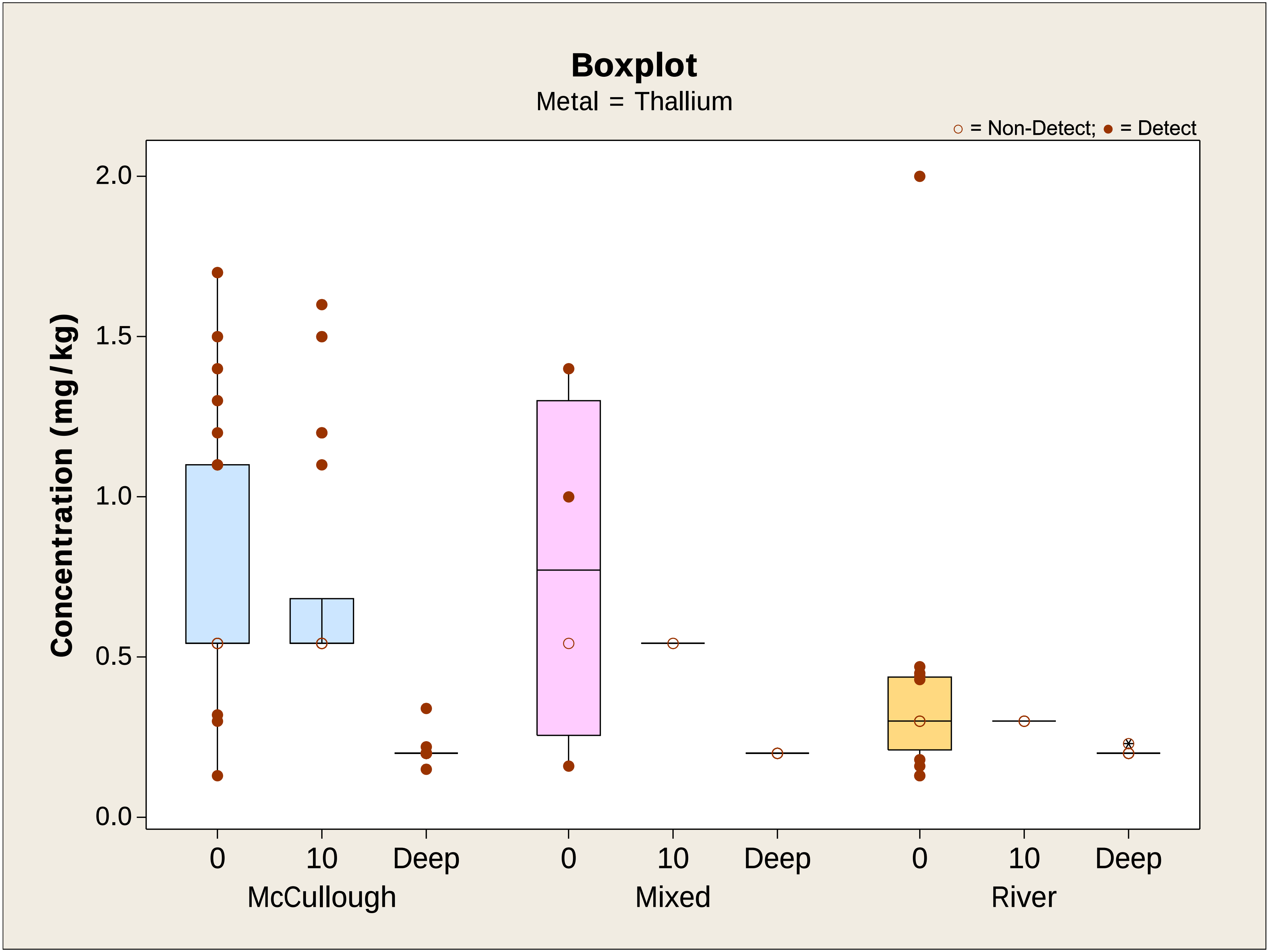
Boxplot
Metal = Silicon
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
8000
7000
6000
5000
4000
3000
2000
1000
0
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River



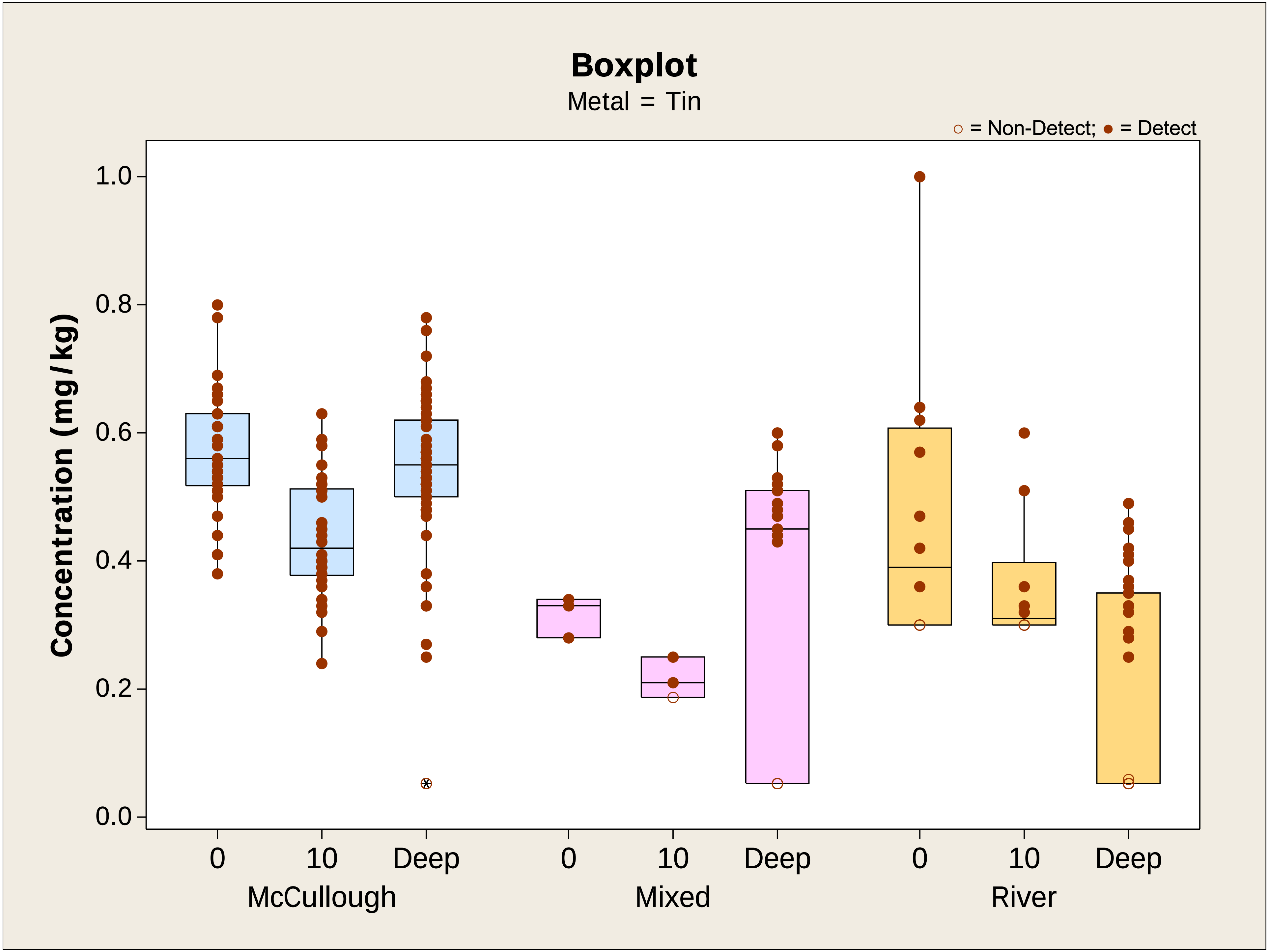
Boxplot
Metal = Silver
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
2.5
2.0
1.5
1.0
0.5
0.0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

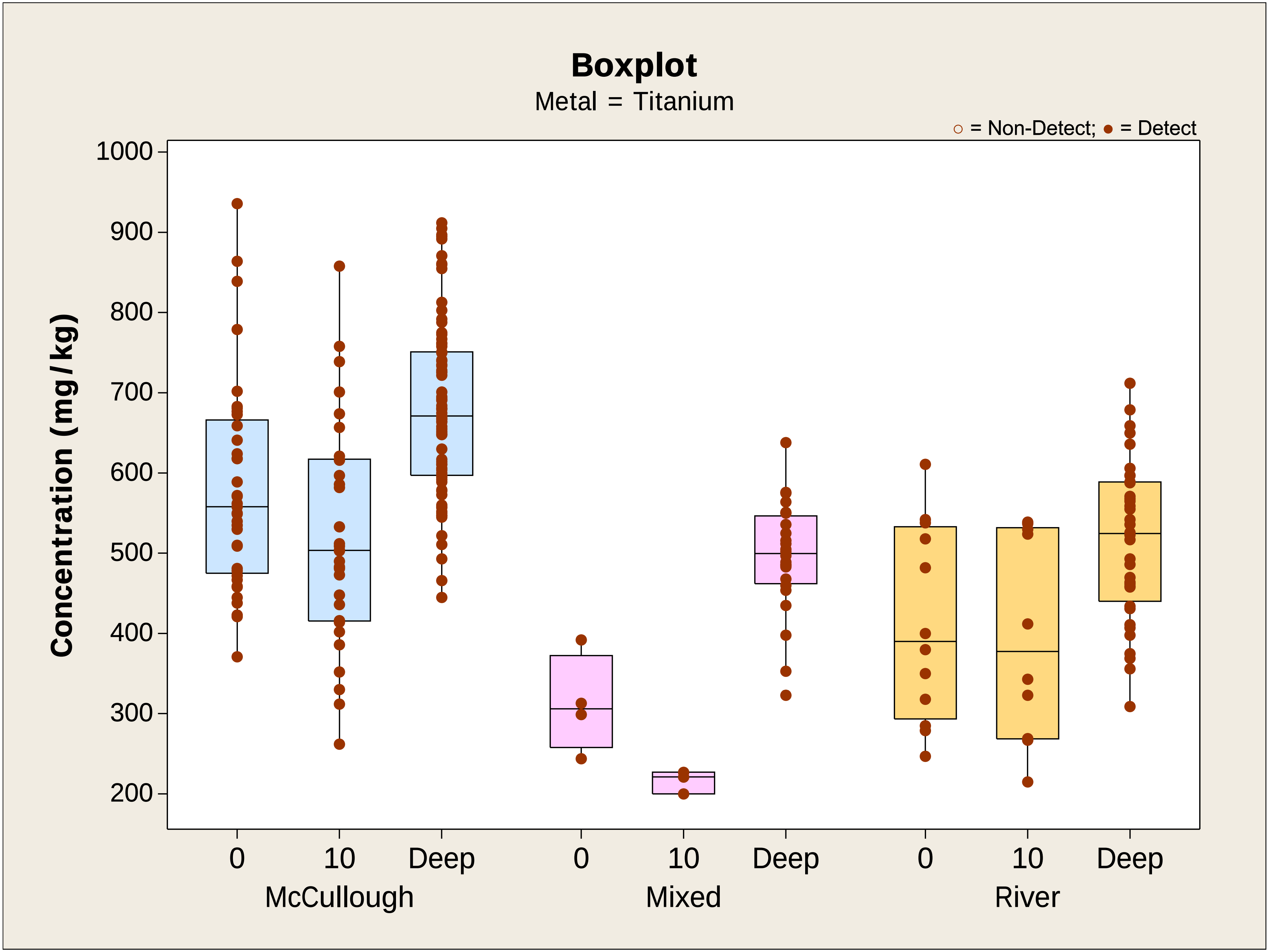

Boxplot
Metal = Sodium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
4000
3000
2000
1000
0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River


Boxplot
Metal = Strontium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
900
800
700
600
500
400
300
200
100
0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

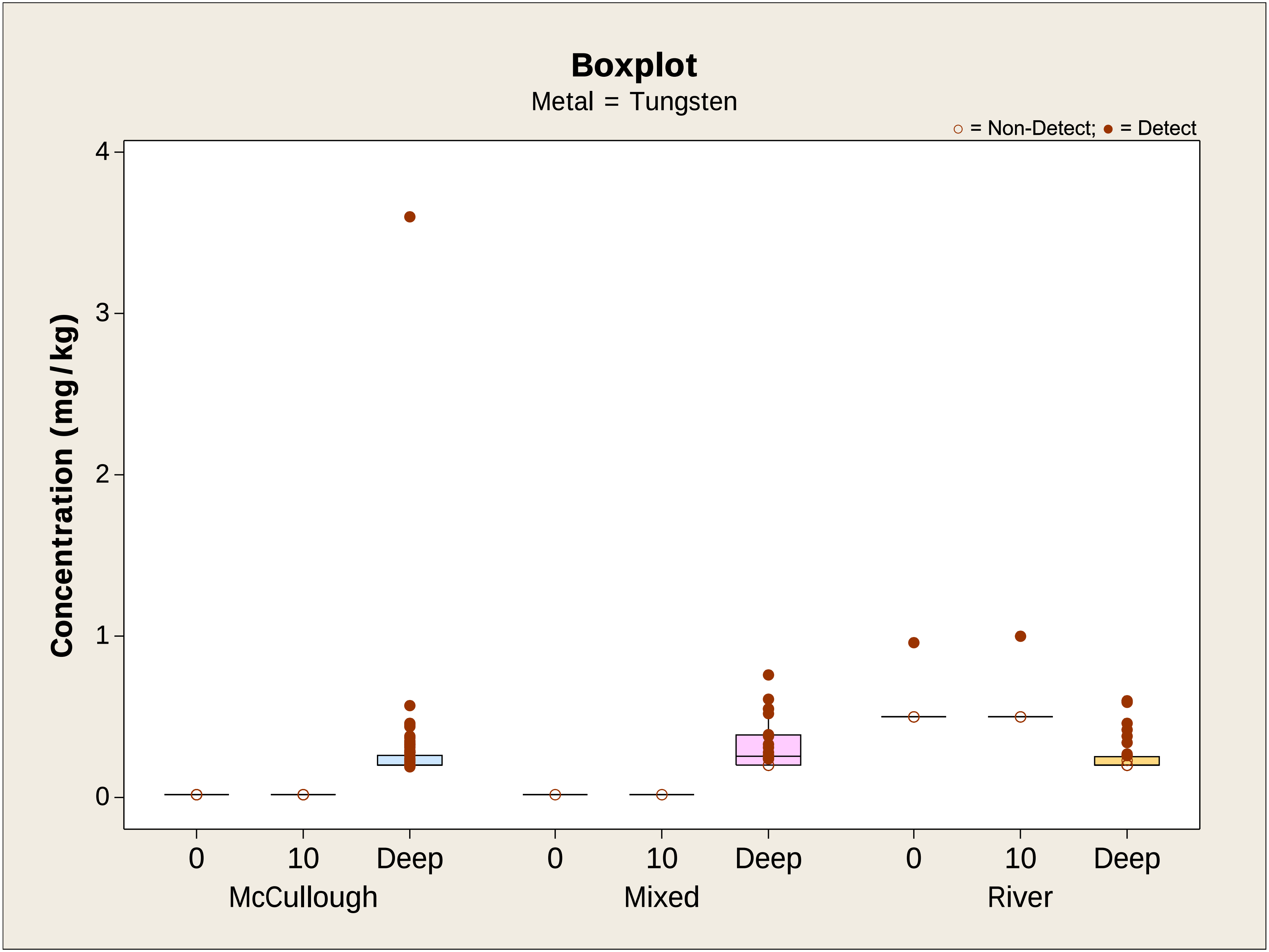


Boxplot
Metal = Thallium
○ = Non-Detect; ● = Detect
Concentration (mg / kg)
2.0
1.5
1.0
0.5
0.0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

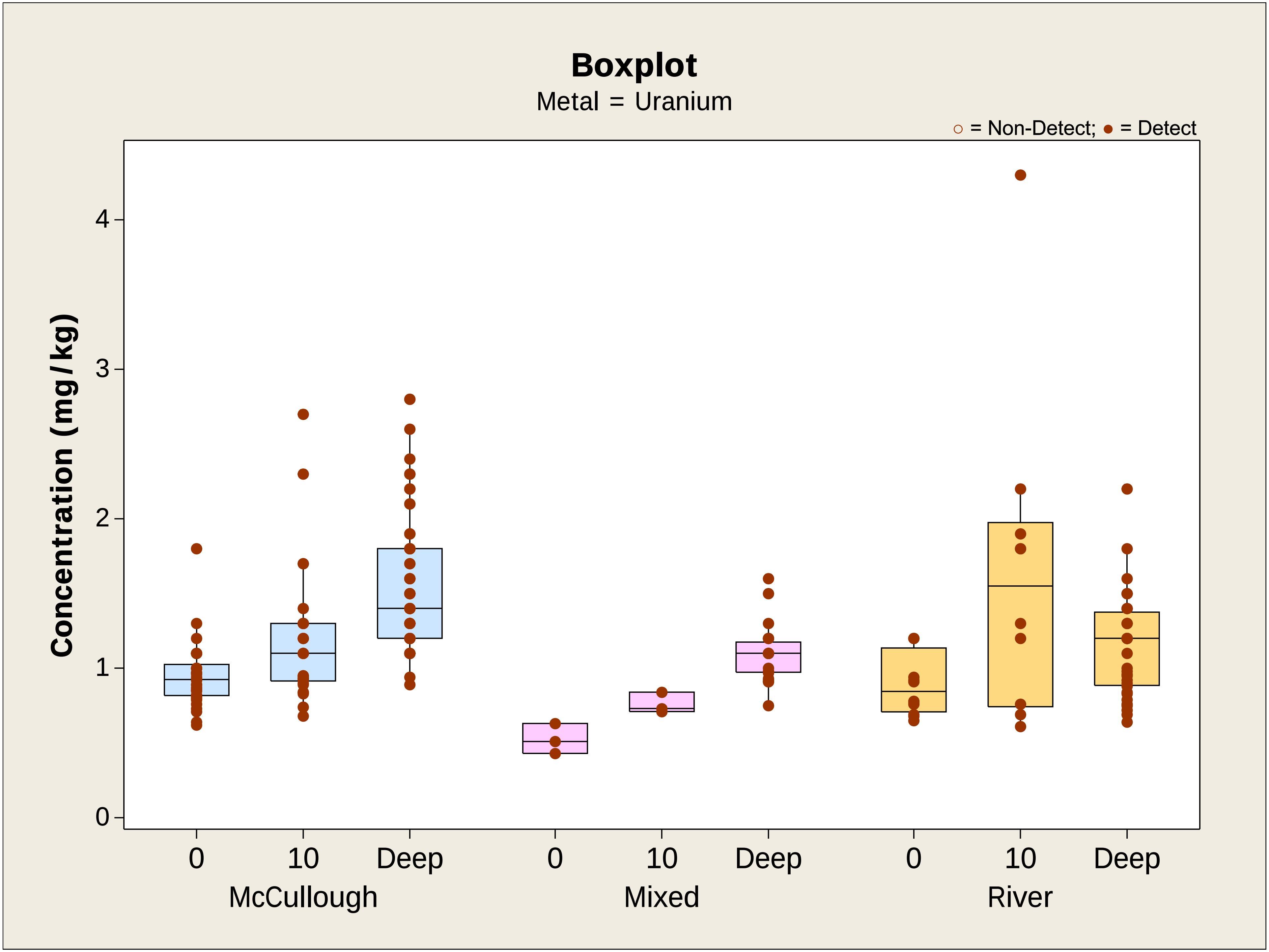

Boxplot
Metal = Tin
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
1.0
0.8
0.6
0.4
0.2
0.0
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River

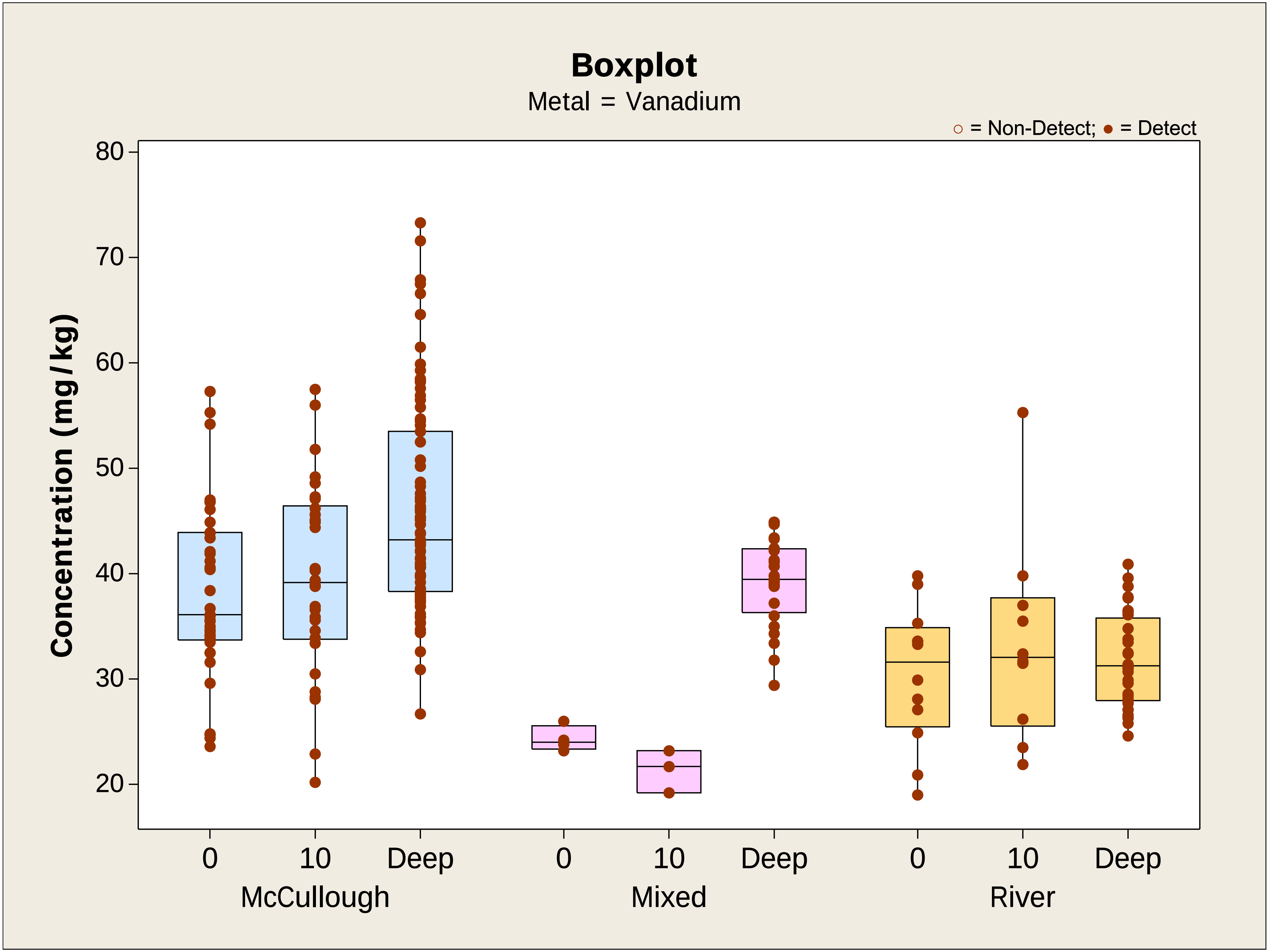


Boxplot
Metal = Titanium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
1000
900
800
700
600
500
400
300
200
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River

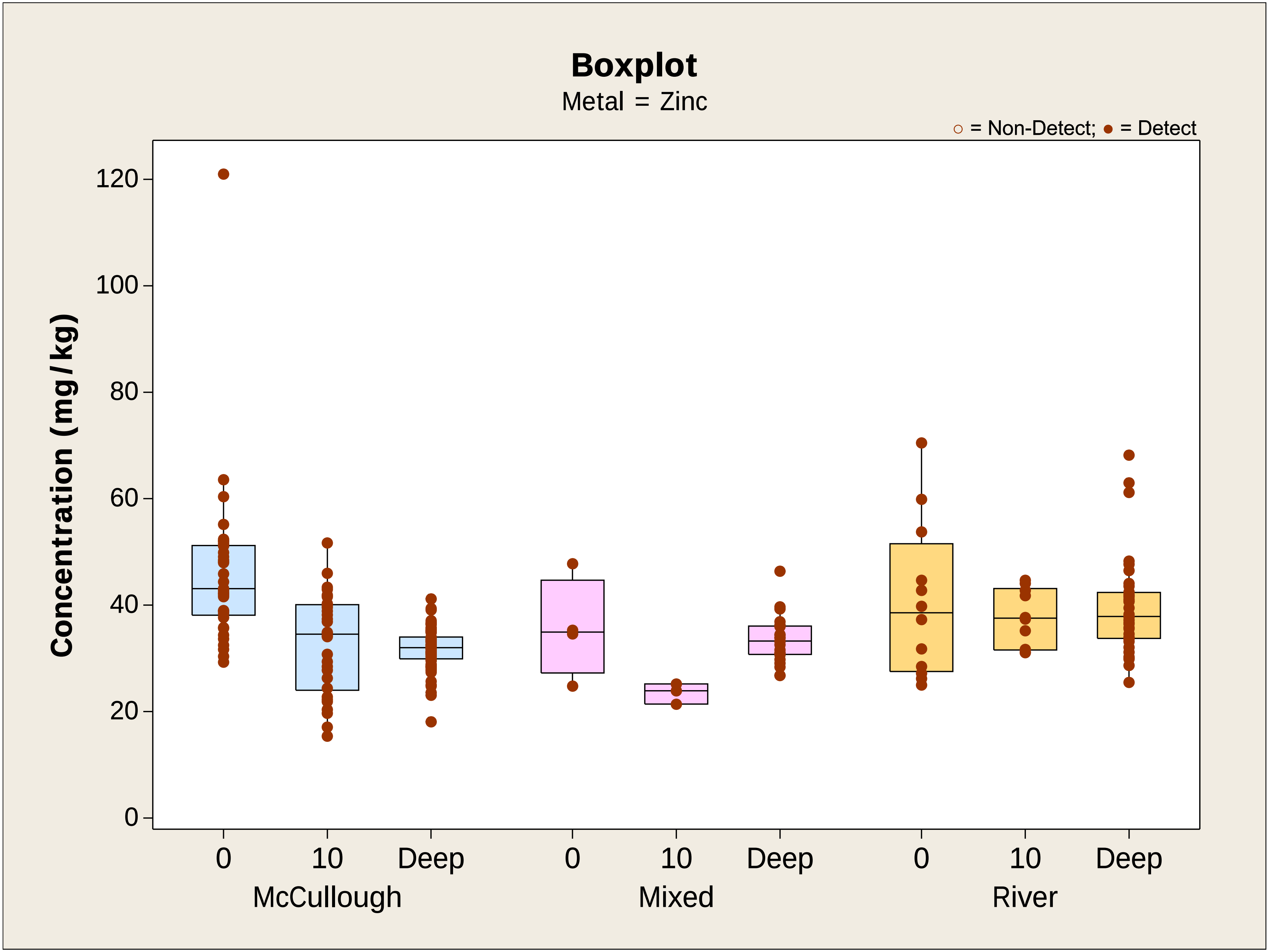


Boxplot
Metal = Tungsten
○ = Non-Detect; ● = Detect
Concentration (mg / kg)
4
3
2
1
0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

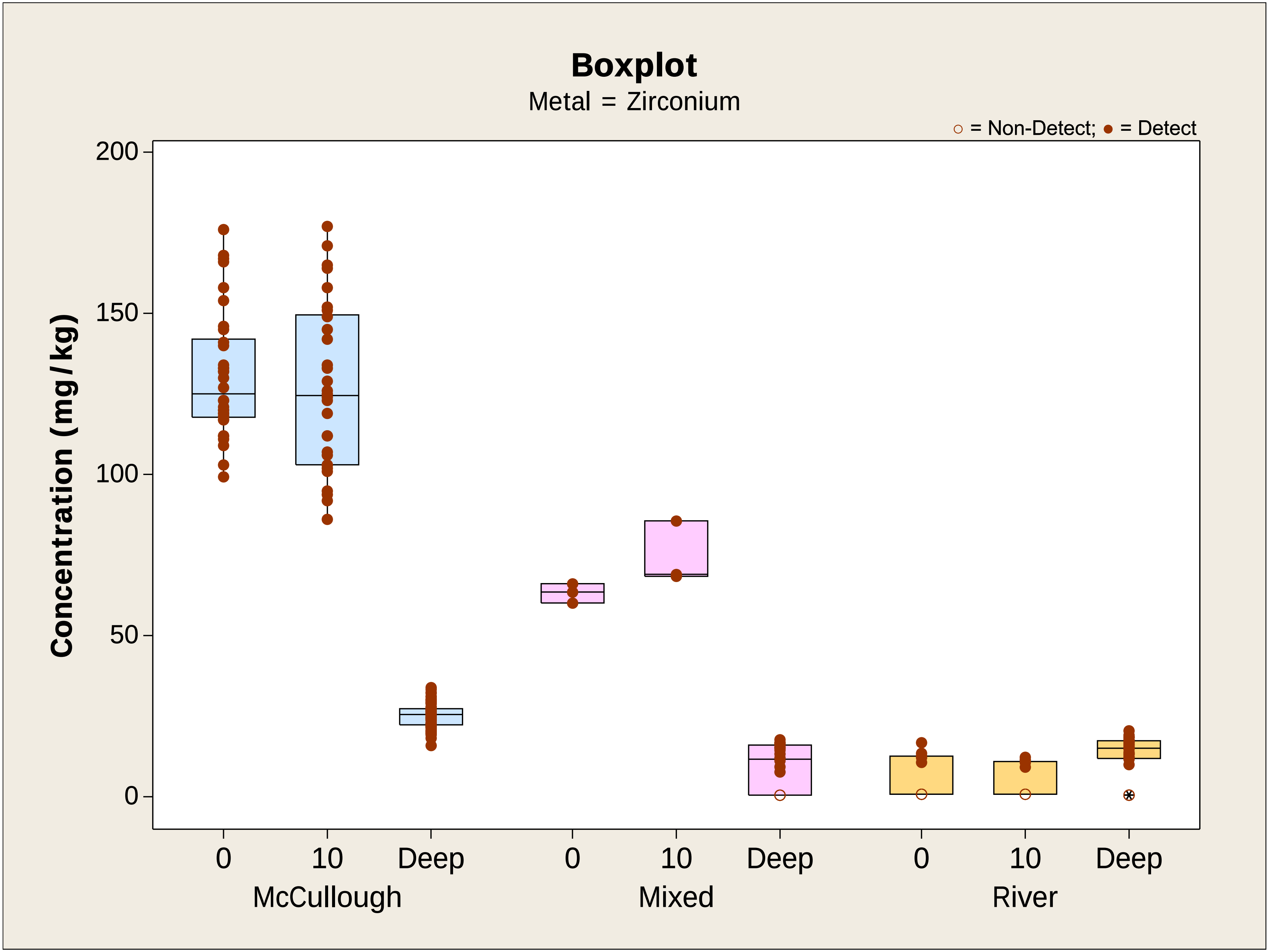

Boxplot
Metal = Uranium
○ = Non-Detect; ● = Detect
Concentration (mg / kg)
0
1
2
3
4
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

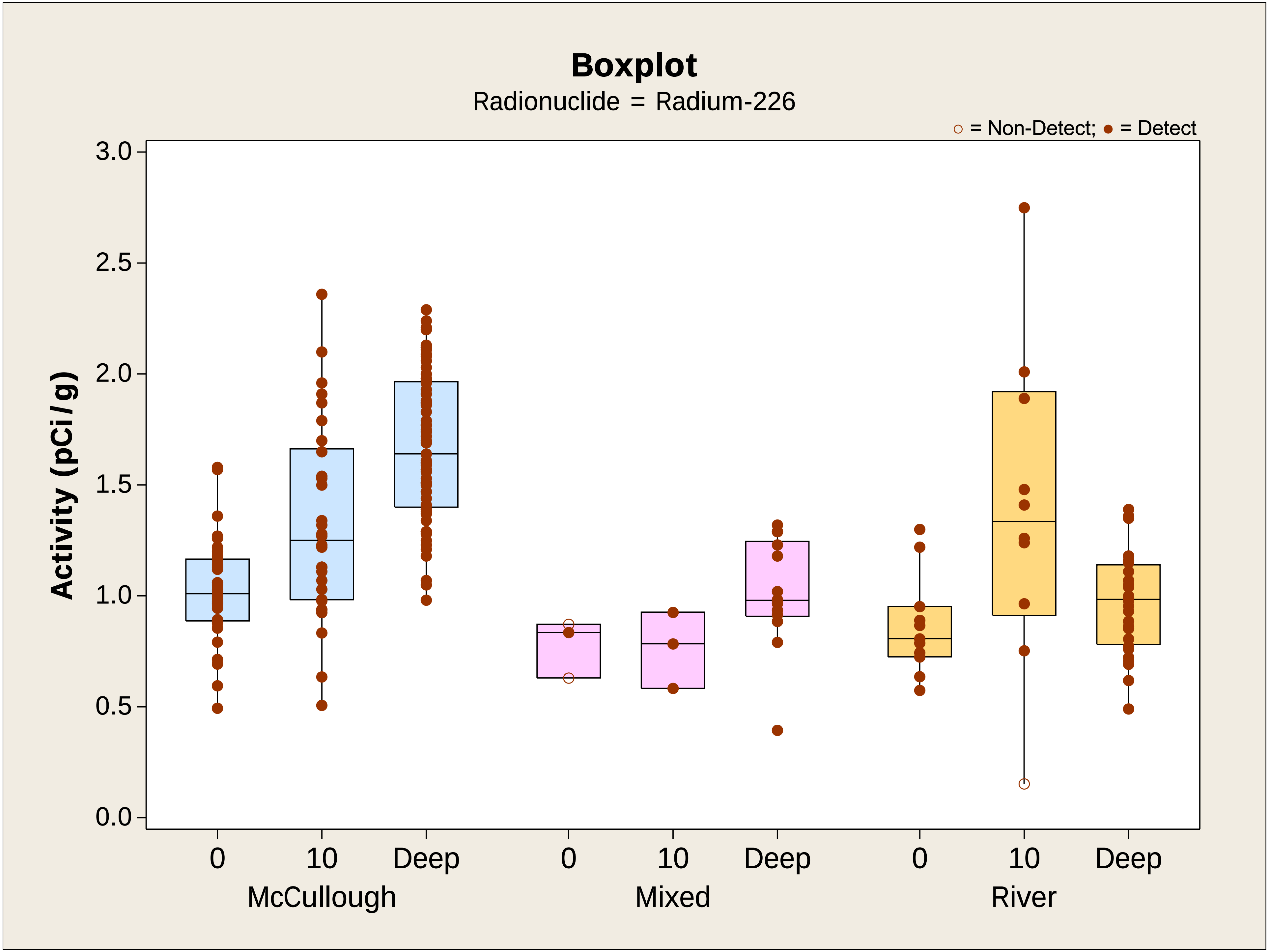


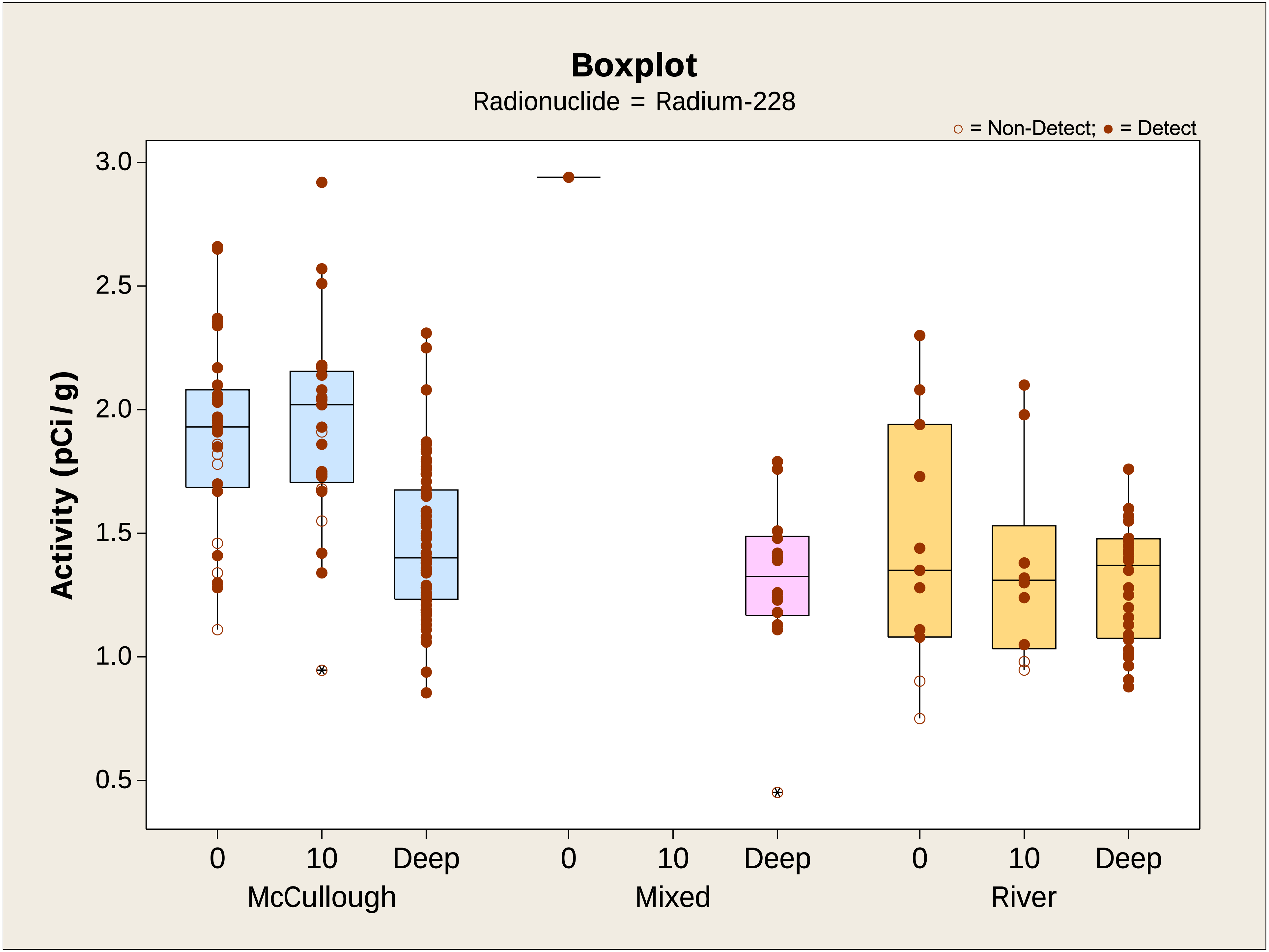
Boxplot
Metal = Vanadium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
80
70
60
50
40
30
20
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

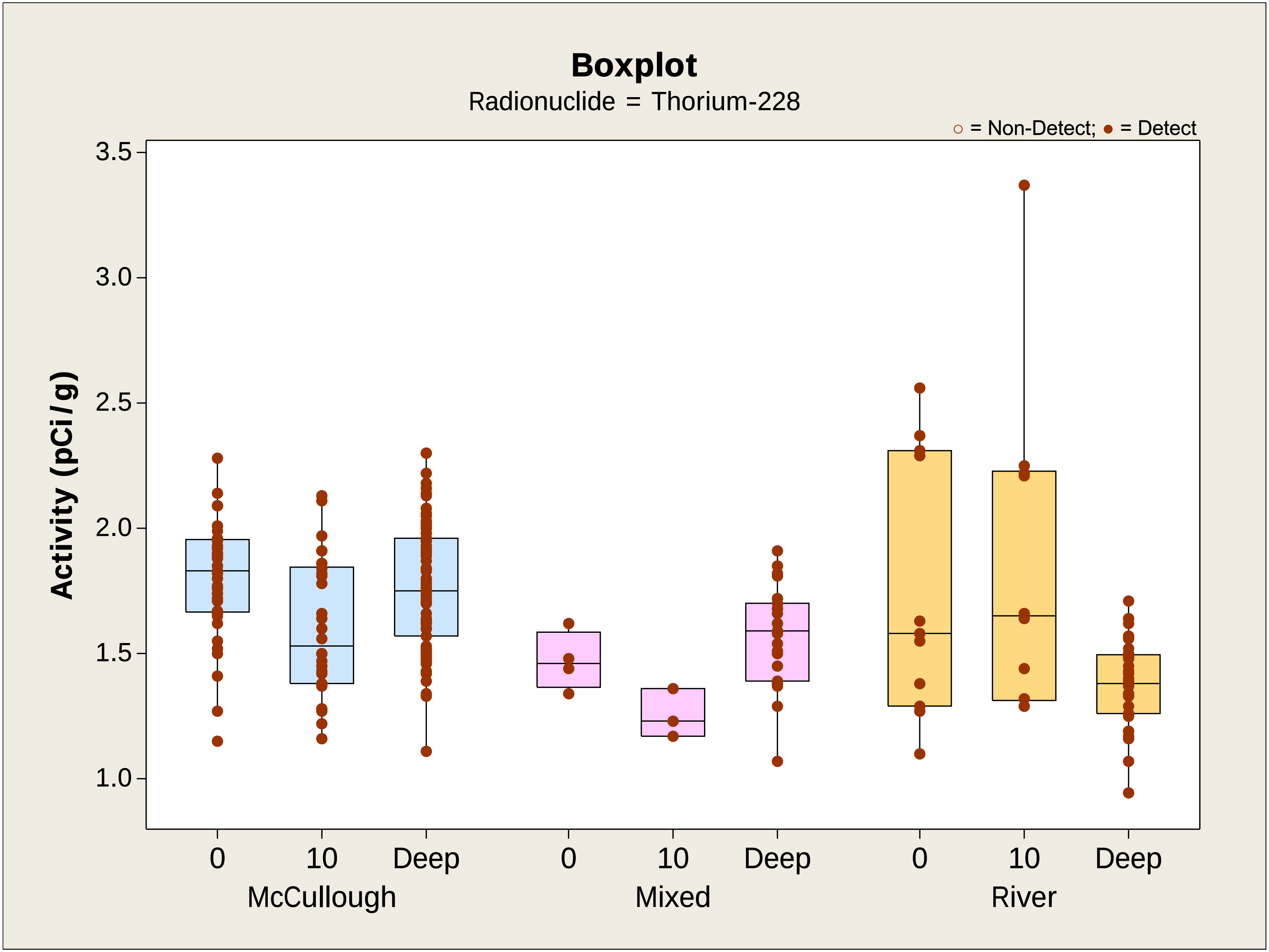


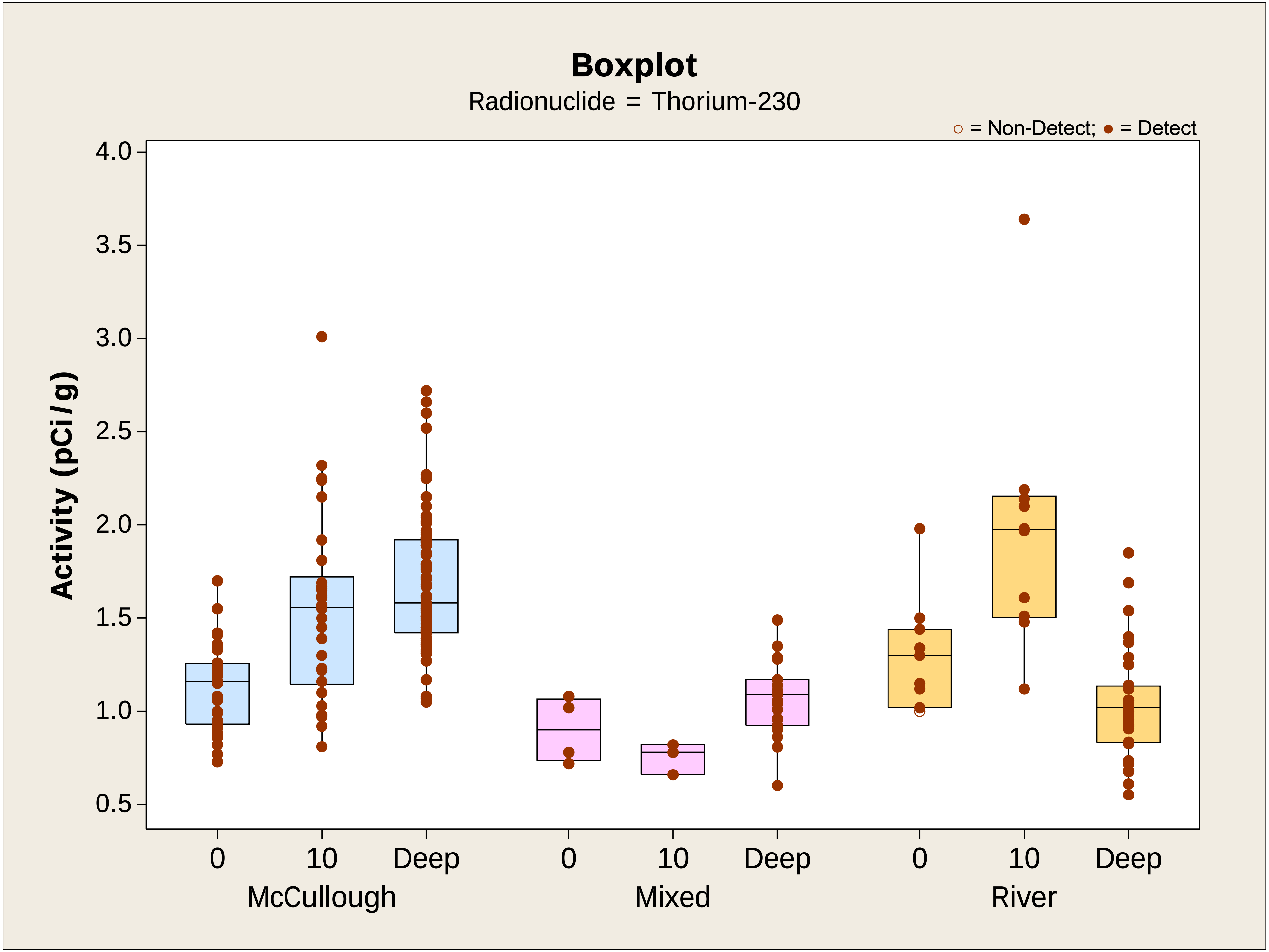
Boxplot
Metal = Zinc
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
0
20
40
60
80
100
120
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

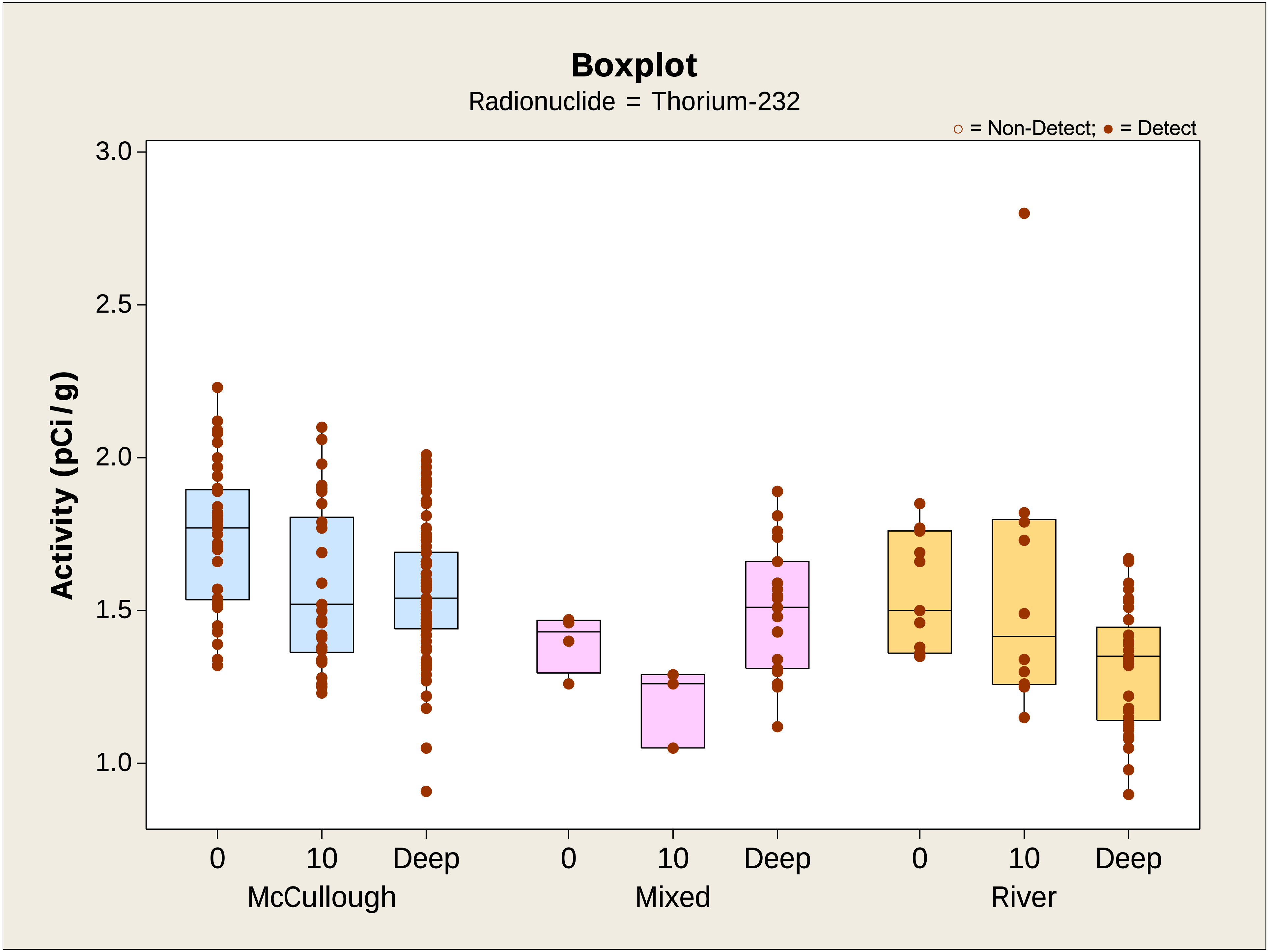

Boxplot
Metal = Zirconium
○ = Non-Detect; ● = Detect
Concentration (mg/kg)
200
150
100
50
0
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River

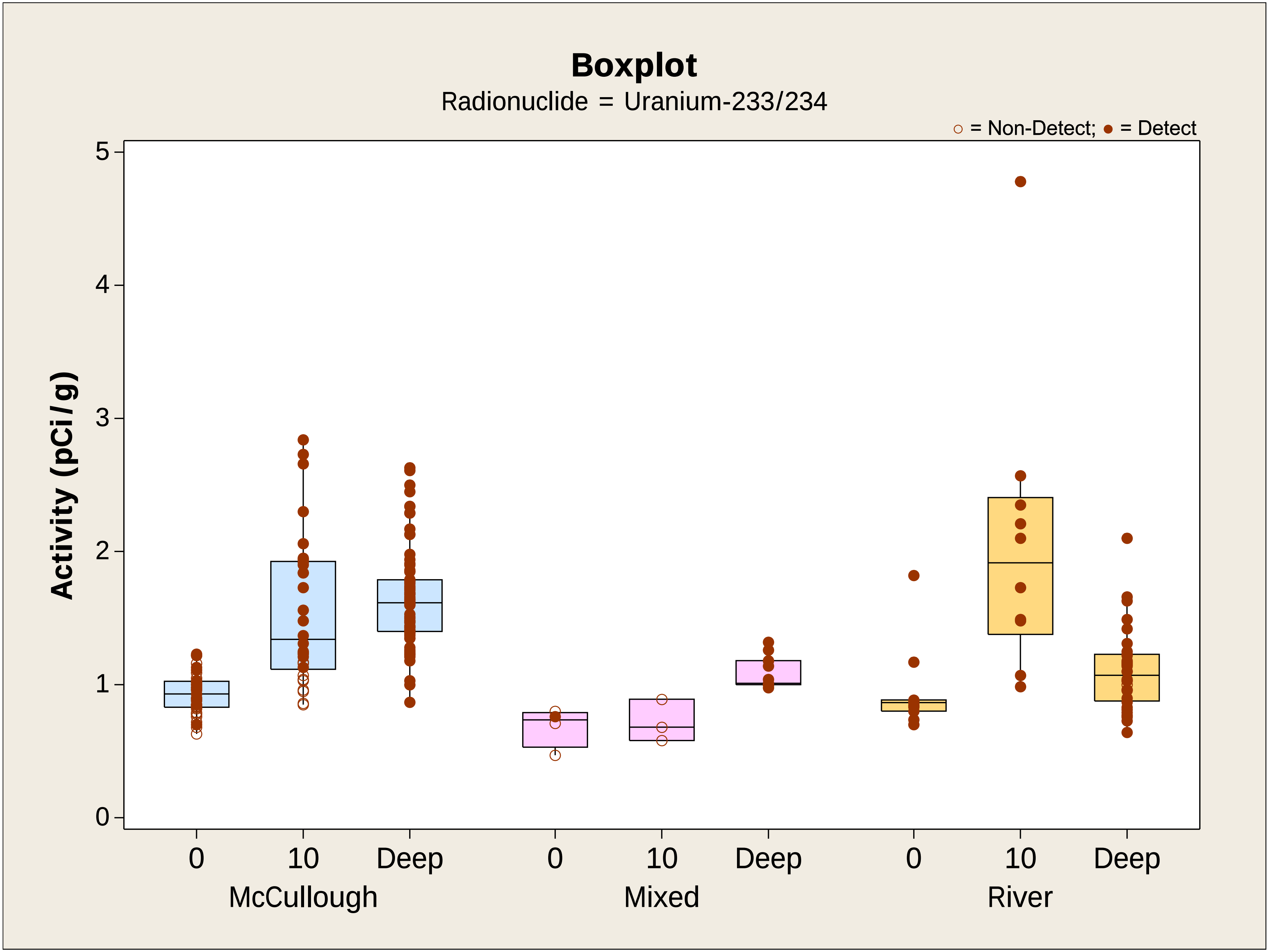

Boxplot
Radionuclide = Radium-226
○ = Non-Detect; ● = Detect
Activity (pCi/g)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River

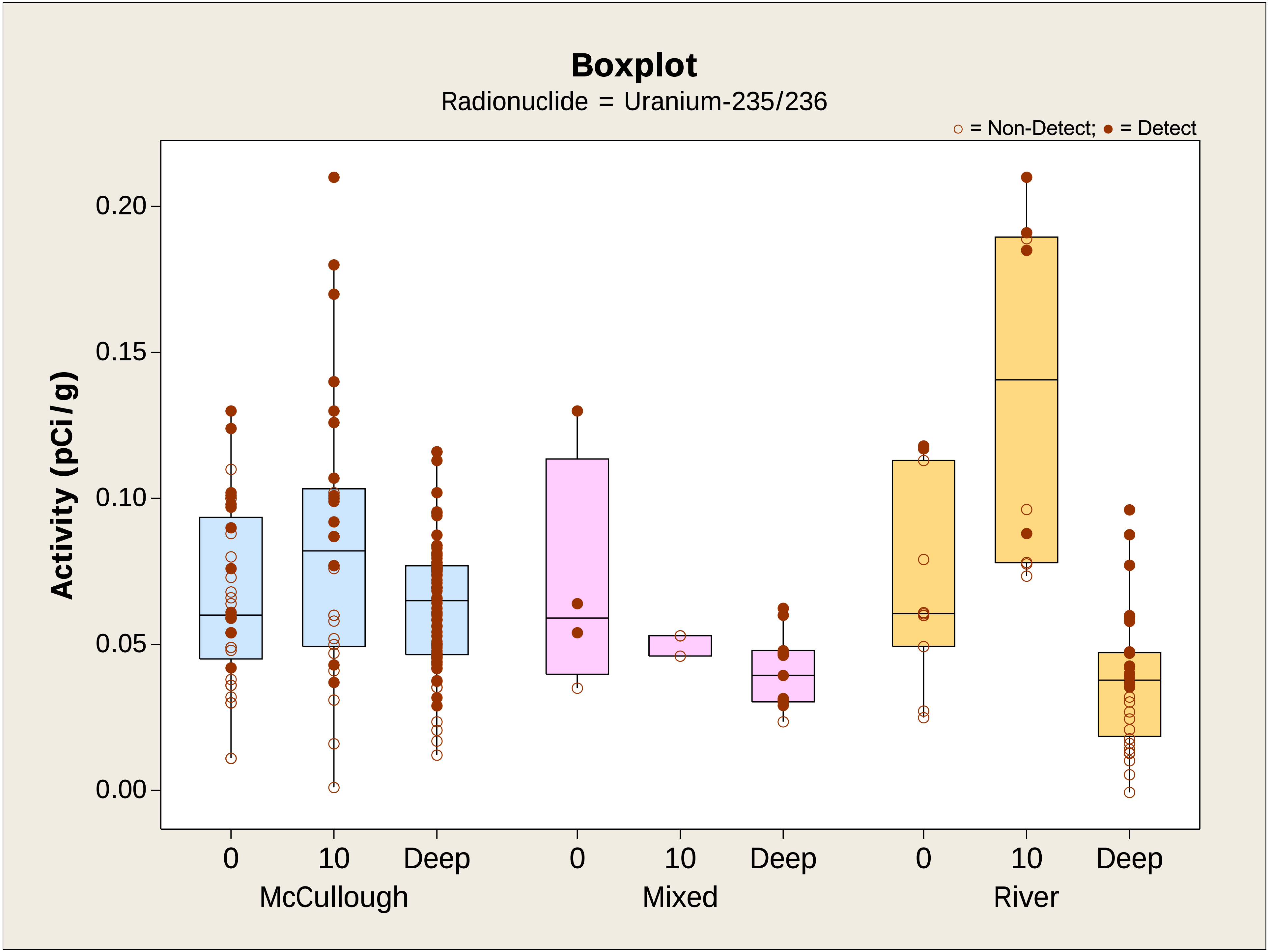

Boxplot
Radionuclide = Radium-228
○ = Non-Detect; ● = Detect
Activity (pCi/g)
3.0
2.5
2.0
1.5
1.0
0.5
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River


Boxplot
Radionuclide = Thorium-228
○ = Non-Detect; ● = Detect
Activity (pCi / g)
3.5
3.0
2.5
2.0
1.5
1.0
0
10
Deep
McCullough
Mixed
River

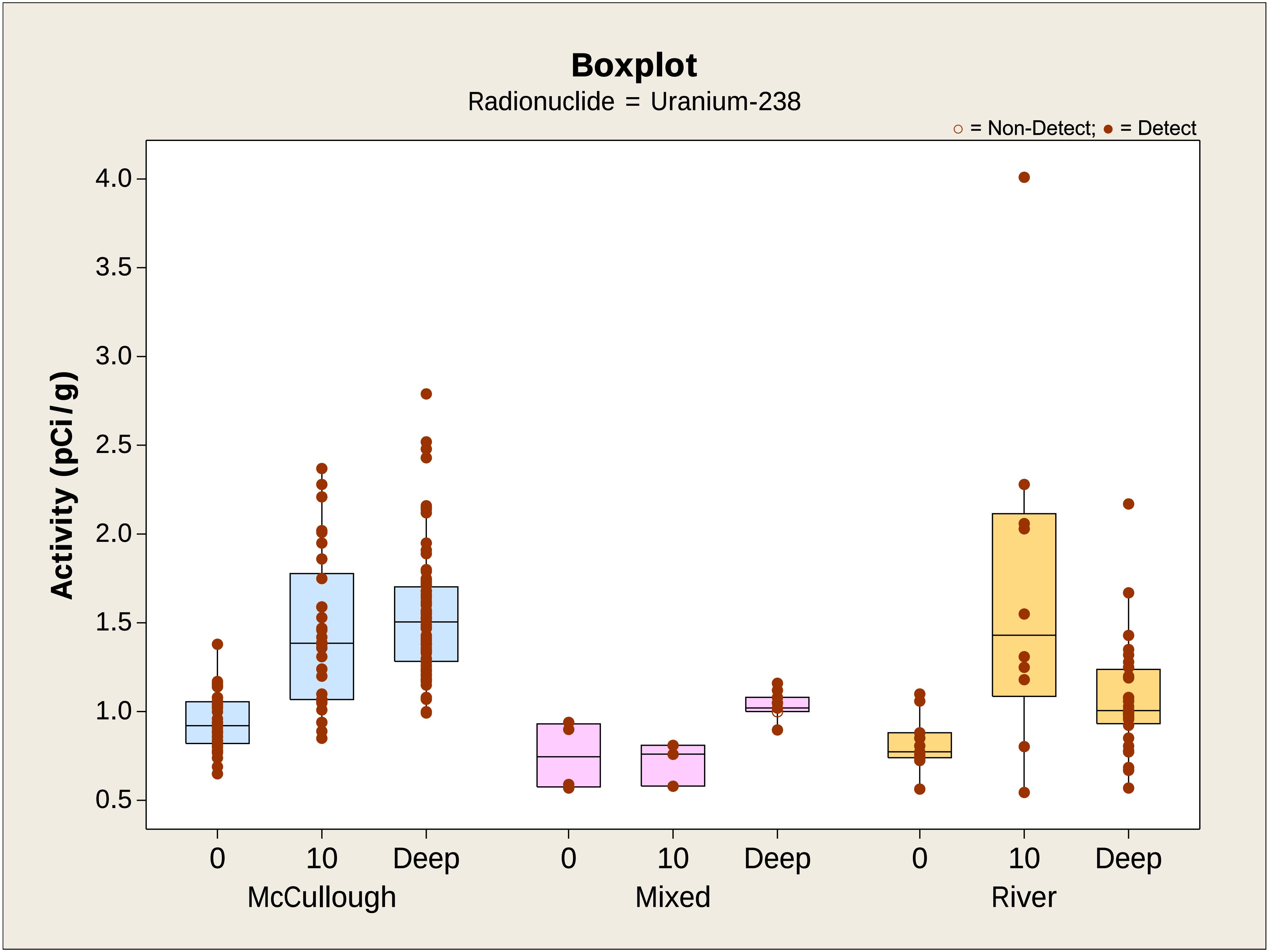

Boxplot
Radionuclide = Thorium-230
○ = Non-Detect; ● = Detect
Activity (pCi / g)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River


Boxplot
Radionuclide = Thorium-232
○ = Non-Detect; ● = Detect
Activity (pCi / g)
3.0
2.5
2.0
1.5
1.0
0
10
Deep
McCullough
Mixed
River


Boxplot
Radionuclide = Uranium-233/234
○ = Non-Detect; ● = Detect
Activity (pCi / g)
0
1
2
3
4
5
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River



Boxplot
Radionuclide = Uranium-235/236
○ = Non-Detect; ● = Detect
Activity (pCi/g)
0.20
0.15
0.10
0.05
0.00
0
10
Deep
0
10
Deep
0
10
Deep
McCullough
Mixed
River



Boxplot
Radionuclide = Uranium-238
○ = Non-Detect; ● = Detect
Activity (pCi / g)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
10
Deep
McCullough
0
10
Deep
Mixed
0
10
Deep
River

APPENDIX G

DATASET COMPARISON STATISTICS

TABLE G-1
COMPARISON OF ALL STRATIGRAPHIC UNITS FOR METALS AND RADIONUCLIDES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 2)

Metal		Qal - McCullough		Qal - River		Qal - Mixed		UMCf		Parametric Test: ANOVA			Parametric Test: Tukey HSD					
		SW Signif	Normal?	SW Signif	Normal?	SW Signif	Normal?	SW Signif	Normal?	F	*p*	Significant Difference?	McC ≠ River	River ≠ Mixed	McC ≠ Mixed	McC ≠ UMCf	River ≠ UMCf	Mixed ≠ UMCf
Aluminum	Al	0.057	Yes	0.012	No	0.826	Yes	0.786	Yes	2.46	0.0650	*No*						
Antimony	Sb	< 0.001	No	0.004	No	0.489	Yes	0.061	Yes	25.82	< 0.001	Yes	✓	✓		✓	✓	
Arsenic	As	< 0.001	No	0.002	No	0.942	Yes	0.021	No	22.67	< 0.001	Yes	✓		✓	✓		
Barium	Ba	< 0.001	No	< 0.001	No	0.387	Yes	0.005	No	51.18	< 0.001	Yes	✓	✓	✓	✓	✓	✓
Beryllium	Be	0.003	No	0.029	No	0.635	Yes	0.694	Yes	5.63	0.0010	Yes	✓	✓			✓	
Boron *	Bo	< 0.001	No	< 0.001	No	< 0.001	No	< 0.001	No	**See Table G-5**								
Cadmium	Cd	< 0.001	No	0.004	No	0.006	No	0.022	No	1.07	0.3650	No						
Calcium	Ca	0.096	Yes	0.915	Yes	0.975	Yes	0.312	Yes	1.49	0.2190	No						
Chromium	Cr	0.013	No	< 0.001	No	< 0.001	No	0.159	Yes	7.44	< 0.001	Yes		✓	✓	✓		
Chromium VI *	Cr VI	< 0.001	No	< 0.001	No	< 0.001	No	< 0.001	No	**See Table G-5**								
Cobalt	Co	0.003	No	0.772	Yes	0.002	No	0.032	No	40.44	< 0.001	Yes	✓	✓		✓	✓	✓
Copper	Cu	0.002	No	0.162	Yes	0.940	Yes	0.066	Yes	46.51	< 0.001	Yes	✓	✓		✓	✓	✓
Iron	Fe	< 0.001	No	0.467	Yes	0.112	Yes	0.079	Yes	24.76	< 0.001	Yes	✓	✓		✓		✓
Lead	Pb	< 0.001	No	< 0.001	No	0.001	No	0.353	Yes	34.27	< 0.001	Yes	✓		✓	✓	✓	
Lithium	Li	< 0.001	No	0.311	Yes	0.098	Yes	< 0.001	No	15.81	< 0.001	Yes	✓			✓	✓	✓
Magnesium	Mg	0.487	Yes	0.001	No	0.476	Yes	0.027	No	8.64	< 0.001	Yes				✓	✓	
Manganese	Mn	< 0.001	No	< 0.001	No	< 0.001	No	0.014	No	10.87	< 0.001	Yes	✓	✓			✓	
Mercury	Hg	< 0.001	No	< 0.001	No	< 0.001	No	< 0.001	No	3.96	0.0100	Yes	✓					
Molybdenum	Mo	< 0.001	No	0.023	No	< 0.001	No	0.700	Yes	3.12	0.0280	Yes		✓				
Nickel	Ni	< 0.001	No	0.524	Yes	0.235	Yes	0.070	Yes	5.24	0.0020	Yes	✓					
Niobium	Nb	< 0.001	No	< 0.001	No	< 0.001	No	< 0.001	No	**See Table G-5**								
Palladium	Pd	< 0.001	No	0.178	Yes	0.206	Yes	0.078	Yes	1.79	0.1510	No						
Phosphorus	P	0.123	Yes	0.142	Yes	0.557	Yes	0.336	Yes	91.54	< 0.001	**Yes**	✓		✓	✓		
Platinum *	Pt	< 0.001	No	< 0.001	No	< 0.001	No	< 0.001	No	**See Table G-5**								
Potassium	K	0.023	No	< 0.001	No	0.519	Yes	0.028	No	45.16	< 0.001	Yes	✓	✓		✓	✓	✓
Selenium *	Se	< 0.001	No	< 0.001	No	< 0.001	No	< 0.001	No	**See Table G-5**								
Silicon	Si	0.004	No	0.246	Yes	< 0.001	No	< 0.001	No	20.40	< 0.001	Yes		✓	✓	✓	✓	
Silver	Ag	< 0.001	No	< 0.001	No	< 0.001	No	< 0.001	No	1.04	0.3770	No						
Sodium	Na	< 0.001	No	0.036	No	0.210	Yes	0.013	No	38.34	< 0.001	Yes	✓	✓	✓	✓	✓	
Strontium	Sr	< 0.001	No	< 0.001	No	0.152	Yes	0.043	No	4.34	0.0060	Yes				✓	✓	
Thallium *	Tl	< 0.001	No	< 0.001	No	< 0.001	No	< 0.001	No	**See Table G-5**								
Tin **	Sn	< 0.001	No	< 0.001	No	< 0.001	No	0.198	Yes	31.09	< 0.001	Yes	✓	✓	✓		✓	✓
Titantium	Ti	0.235	Yes	0.937	Yes	0.445	Yes	0.004	No	28.50	< 0.001	Yes	✓		✓	✓		
Tungsten	W	< 0.001	No	< 0.001	No	0.004	No	< 0.001	No	**See Table G-5**								
Uranium	U	< 0.001	No	0.063	Yes	0.015	No	< 0.001	No	9.42	< 0.001	Yes	✓		✓			
Vanadium	V	< 0.001	No	0.216	Yes	0.230	Yes	0.002	No	30.77	< 0.001	Yes	✓	✓	✓	✓		✓
Zinc	Zn	0.054	Yes	< 0.001	No	0.179	Yes	0.324	Yes	9.93	< 0.001	Yes	✓	✓			✓	
Zirconium	Zr	0.894	Yes	< 0.001	No	< 0.001	No	0.507	Yes	66.29	< 0.001	Yes	✓		✓	✓	✓	✓
Radium 226		0.238	Yes	0.928	Yes	0.101	Yes	0.012	No	57.99	< 0.001	Yes	✓		✓	✓		
Radium 228		0.066	Yes	0.247	Yes	0.084	Yes	0.509	Yes	4.29	0.0070	**Yes**				✓		
Thorium 228		0.570	Yes	0.957	Yes	0.781	Yes	0.065	Yes	31.55	< 0.001	**Yes**	✓	✓	✓	✓		✓
Thorium 230		0.002	No	0.078	Yes	0.984	Yes	0.010	No	52.24	< 0.001	Yes	✓		✓	✓		
Thorium 232		0.375	Yes	0.502	Yes	0.622	Yes	0.081	Yes	13.63	< 0.001	**Yes**	✓	✓		✓		✓
Uranium 233/234		0.005	No	0.010	No	0.009	No	0.005	No	32.73	< 0.001	Yes	✓		✓	✓		
Uranium 235/236		0.361	Yes	0.132	Yes	0.296	Yes	0.181	Yes	13.80	< 0.001	**Yes**	✓		✓	✓		
Uranium 238		< 0.001	No	0.001	No	0.533	Yes	< 0.001	No	25.65	< 0.001	Yes	✓		✓	✓		

All data are from the 2008 deep background dataset.
All statistical anlayses were performed using SPSS v. 15.0
All non-detected values were replaced by ½ SQL--Gehan ranking was not used to accommodate nondetects in the Kruskal-Wallis model.
Bold blue italics indicates constituents for which parametric test results are valid; otherwise, non-parametric test results are valid (less valid results shaded back in gray font)
Black values indicate results for preferred tests. Grey text and green boxes with grey checks indicate results and pairwise comparisons for less preferred tests (based on distribution of the data)

SW Signif = Shapiro-Wilk significance -- if significance < 0.05, then reject the null hypothesis of normality
p = probability
No = not statistically significant at the signficance level (α) of 0.05
Yes = statistically significant at the signficance level (α) of 0.05
≠ = not equal to
* = test not conducted because one or more soil strata had less than 4 detected values
** = comparison test not conducted with Qal/River dataset because it had less than 50% detections

TABLE G-1
COMPARISON OF ALL STRATIGRAPHIC UNITS FOR METALS AND RADIONUCLIDES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 2 of 2)

Metal		Nonparametric Test: Kruskal-Wallis X^2	p	Significant Difference?	Box Plots: McC ≠ River	River ≠ Mixed	McC ≠ Mixed	McC ≠ UMCf	River ≠ UMCf	Mixed ≠ UMCf	Notes
Aluminum	Al	6.815	0.078	*No*							
Antimony	Sb	59.409	< 0.001	**Yes**	✓	✓	✓	✓	✓		River > Mixed & UMCf > McCullough
Arsenic	As	62.751	< 0.001	**Yes**	✓		✓	✓			UMCf & Mixed & River > McCullough
Barium	Ba	94.745	< 0.001	**Yes**	✓	✓	✓	✓	✓	✓	Mixed > River > UMCf > McCullough
Beryllium	Be	29.641	< 0.001	**Yes**	✓	✓			✓		UMCf & Mixed & McCullough > River
Boron *	Bo						See Table G-5				
Cadmium	Cd	3.463	0.326	No							
Calcium	Ca	4.092	0.252	No							
Chromium	Cr	27.609	< 0.001	**Yes**		✓	✓	✓	✓		UMCf & Mixed > River & McCullough
Chromium VI *	Cr VI						See Table G-5				
Cobalt	Co	74.601	< 0.001	**Yes**	✓	✓		✓	✓	✓	Mixed & McCullough > UMCf > River
Copper	Cu	76.147	< 0.001	**Yes**	✓	✓	✓	✓	✓	✓	McCullough > Mixed > UMCf > River
Iron	Fe	63.063	< 0.001	**Yes**	✓	✓		✓	✓	✓	Mixed & McCullough > UMCf > River
Lead	Pb	91.867	< 0.001	**Yes**	✓		✓	✓			UMCf & River & Mixed > McCullough
Lithium	Li	86.216	< 0.001	**Yes**	✓	✓		✓	✓	✓	UMCf > River > Mixed & McCullough
Magnesium	Mg	29.518	< 0.001	**Yes**	✓	✓		✓	✓	✓	UMCf > Mixed & McCullough > River
Manganese	Mn	39.865	< 0.001	**Yes**	✓	✓			✓		UMCf & Mixed & McCullough > River
Mercury	Hg	10.404	0.015	**Yes**	✓						
Molybdenum	Mo	11.902	0.008	**Yes**	✓	✓	✓	✓	✓		McCullough > UMCf & Mixed > River
Nickel	Ni	20.740	< 0.001	**Yes**	✓						McCullough > River
Niobium	Nb						See Table G-5				
Palladium	Pd	4.547	0.208	No							
Phosphorus	P	105.993	< 0.001	Yes	✓		✓	✓			
Platinum *	Pt						See Table G-5				
Potassium	K	101.188	< 0.001	**Yes**	✓	✓	✓	✓	✓	✓	River > UMCf > Mixed > McCullough
Selenium *	Se						See Table G-5				
Silicon	Si	50.974	< 0.001	**Yes**		✓	✓	✓	✓		McCullough & River > Mixed & UMCf
Silver	Ag	6.462	0.091	No							
Sodium	Na	85.439	< 0.001	**Yes**	✓	✓	✓	✓	✓	✓	River > McCullough > UMCf > Mixed
Strontium	Sr	10.186	0.017	**Yes**				✓	✓		McCullough & River > UMCf
Thallium *	Tl						See Table G-5				
Tin **	Sn	62.73	< 0.001	**Yes**			✓				McCullough > Mixed
Titantium	Ti	68.039	< 0.001	**Yes**	✓		✓	✓			McCullough > River & Mixed & UMCf
Tungsten	W						See Table G-5				
Uranium	U	41.359	< 0.001	**Yes**	✓		✓	✓			McCullough > River & Mixed & UMCf
Vanadium	V	68.457	< 0.001	**Yes**	✓	✓	✓	✓		✓	McCullough > Mixed > River & UMCf
Zinc	Zn	25.305	< 0.001	**Yes**	✓	✓			✓		River > McCullough & Mixed & UMCf
Zirconium	Zr	100.725	< 0.001	**Yes**	✓		✓	✓	✓	✓	McCullough > UMCf > Mixed & River
Radium 226		77.830	< 0.001	**Yes**	✓		✓	✓			McCullough > Mixed & River & UMCf
Radium 228		10.096	0.018	Yes				✓			McCullough > UMCf
Thorium 228		64.299	< 0.001	Yes	✓	✓	✓	✓		✓	McCullough > Mixed > River & UMCf
Thorium 230		90.942	< 0.001	**Yes**	✓		✓	✓			McCullough > Mixed & River & UMCf
Thorium 232		35.044	< 0.001	Yes	✓	✓		✓		✓	McCullough & Mixed > River & UMCf
Uranium 233/234		68.443	< 0.001	**Yes**	✓		✓	✓			McCullough > Mixed & River & UMCf
Uranium 235/236		34.889	< 0.001	Yes	✓		✓	✓			McCullough > Mixed & River & UMCf
Uranium 238		66.104	< 0.001	**Yes**	✓		✓	✓			McCullough > Mixed & River & UMCf

All data are from the 2008 deep background dataset.
All statistical anlayses were performed using SPSS v. 15.0
All non-detected values were replaced by ½ SQL--Gehan ranking was not used to accommodate nondetects in the Kruskal-Wallis model
Bold blue italics indicates constituents for which parametric test results are valid; otherwise, non-parametric test results are valid (less valid results shaded back in gray font)
Black values indicate results for preferred tests. Grey text and green boxes with grey checks indicate results and pairwise comparisons for less preferred tests (based on distribution of the data)

SW Signif = Shapiro-Wilk significance -- if significance < 0.05, then reject the null hypothesis of normality
p = probability
No = not statistically significant at the signficance level (α) of 0.05
Yes = statistically significant at the signficance level (α) of 0.05
≠ = not equal to
* = test not conducted because one or more soil strata had less than 4 detected values
** = comparison test not conducted with Qal/River dataset because it had less than 50% detections

TABLE G-2
COMPARISON OF Qal/McCULLOUGH DEPTH INTERVALS FOR METALS AND RADIONUCLIDES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 2)

Metal		Deep (20+ ft bgs)		2005 Surface (0 ft bgs)		2005 Subsurface (10 ft bgs)		Parametric Test: ANOVA			Parametric Test: Tukey HSD		
		SW Signif	Normal?	SW Signif	Normal?	SW Signif	Normal?	F	*p*	Significant Difference?	Deep ≠ Surface	Surface ≠ Subsurface	Deep ≠ Subsurface
Aluminum	Al	0.057	Yes	0.014	No	0.551	Yes	6.27	0.0020	Yes	✓	✓	
Antimony	Sb	< 0.001	Yes	0.020	No	< 0.001	No	19.38	< 0.001	Yes	✓		✓
Arsenic	As	< 0.001	Yes	0.025	No	0.052	Yes	0.28	0.7580	No			
Barium	Ba	< 0.001	Yes	< 0.001	Yes	0.011	No	1.88	0.1560	No			
Beryllium	Be	0.003	No	0.024	No	0.095	Yes	3.37	0.0370	Yes	✓		
Boron	Bo	< 0.001	Yes	< 0.001	Yes	< 0.001	No	6.40	0.0020	Yes	✓		
Cadmium *	Cd	< 0.001	Yes	< 0.001	Yes	< 0.001		**See Table G-6**					
Calcium	Ca	0.096	Yes	0.004	No	0.021	No	17.07	< 0.001	Yes		✓	✓
Chromium	Cr	0.013	No	0.453	Yes	0.593	Yes	12.94	< 0.001	Yes		✓	✓
Chromium VI *	Cr VI	< 0.001	Yes	< 0.001		< 0.001		**See Table G-6**					
Cobalt	Co	0.003	No	0.039	No	0.280	Yes	6.63	0.0020	Yes	✓		
Copper	Cu	0.002	No	0.335	Yes	0.943	Yes	8.98	< 0.001	Yes	✓		
Iron	Fe	< 0.001	Yes	0.709	Yes	0.459	Yes	13.88	< 0.001	Yes		✓	✓
Lead	Pb	< 0.001	Yes	< 0.001	Yes	0.415	Yes	36.47	< 0.001	Yes	✓	✓	✓
Lithium	Li	< 0.001	Yes	0.007	No	0.001	No	1.21	0.3000	No			
Magnesium	Mg	0.487	Yes	0.035	No	0.268	Yes	6.30	0.0020	Yes	✓		✓
Manganese	Mn	< 0.001	Yes	0.234	Yes	0.596	Yes	18.12	< 0.001	Yes	✓	✓	
Mercury	Hg	< 0.001	Yes	< 0.001	Yes	< 0.001	No	18.18	< 0.001	Yes	✓		✓
Molybdenum	Mo	< 0.001	Yes	0.006	No	< 0.001	No	0.17	0.8450	No			
Nickel	Ni	< 0.001	Yes	0.001	No	0.639	Yes	6.02	0.0030	Yes	✓	✓	
Niobium *	Nb	< 0.001	Yes	< 0.001		< 0.001		**See Table G-6**					
Palladium	Pd	< 0.001	Yes	< 0.001	Yes	0.278	Yes	11.24	< 0.001	Yes	✓	✓	
Phosphorus	P	0.123	Yes	0.375	Yes	0.380	Yes	6.47	0.0020	**Yes**	✓		
Platinum *	Pt	< 0.001	Yes	< 0.001		< 0.001		**See Table G-6**					
Potassium	K	0.023	No	0.002	No	0.059	Yes	38.02	< 0.001	Yes	✓	✓	
Selenium *	Se	< 0.001	Yes	< 0.001	Yes	< 0.001	No	**See Table G-6**					
Silicon	Si	0.004	No	< 0.001	Yes	0.004	No	22.04	< 0.001	Yes	✓	✓	
Silver *	Ag	< 0.001	Yes	< 0.001	Yes	< 0.001		**See Table G-6**					
Sodium	Na	< 0.001	Yes	< 0.001	Yes	0.981	Yes	44.93	< 0.001	Yes	✓	✓	✓
Strontium	Sr	< 0.001	Yes	< 0.001	Yes	0.133	Yes	12.24	< 0.001	Yes	✓	✓	
Thallium	Tl	< 0.001	Yes	< 0.001	Yes	< 0.001	No	**See Table G-6**					
Tin	Sn	< 0.001	Yes	0.612	Yes	0.914	Yes	10.55	< 0.001	Yes		✓	✓
Titantium	Ti	0.235	Yes	0.050	No	0.892	Yes	8.10	< 0.001	Yes	✓		✓
Tungsten *	W	< 0.001	Yes	< 0.001		< 0.001		**See Table G-6**					
Uranium	U	< 0.001	Yes	< 0.001	Yes	< 0.001	No	31.95	< 0.001	Yes	✓		✓
Vanadium	V	< 0.001	Yes	0.273	Yes	0.953	Yes	10.38	< 0.001	Yes	✓		✓
Zinc	Zn	0.054	Yes	< 0.001	Yes	0.483	Yes	31.54	< 0.001	Yes	✓	✓	
Zirconium	Zr	0.894	Yes	0.033	No	0.239	Yes	801.03	< 0.001	Yes	✓		✓
Radium 226		0.238	Yes	0.623	Yes	0.600	Yes	42.05	< 0.001	**Yes**	✓	✓	✓
Radium 228		0.066	Yes	0.443	Yes	0.620	Yes	25.79	< 0.001	**Yes**	✓		✓
Thorium 228		0.570	Yes	0.498	Yes	0.212	Yes	5.73	0.0040	**Yes**		✓	✓
Thorium 230		0.002	No	0.418	Yes	0.071	Yes	28.82	< 0.001	Yes	✓	✓	
Thorium 232		0.375	Yes	0.629	Yes	0.063	Yes	8.59	< 0.001	**Yes**	✓	✓	
Uranium 233/234		0.005	No	0.730	Yes	0.011	No	44.75	< 0.001	Yes	✓	✓	
Uranium 235/236		0.361	Yes	0.454	Yes	0.259	Yes	5.36	0.0060	**Yes**		✓	✓
Uranium 238		< 0.001	Yes	0.554	Yes	0.086	Yes	39.88	< 0.001	Yes	✓	✓	

Data are from the 2008 Qal McCullough deep data from 20 ft bgs and deeper ('Deep'), 2005 Qal McCullough data from 0 feet bgs ('Surface'), and 2005 Qal McCullough data from 10 feet bgs ('Subsurface').
All statistical anlayses were performed using SPSS v. 15.0
All non-detected values were replaced by ½ SQL--Gehan ranking was not used to accommodate nondetects in the Kruskal-Wallis model.
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p = probability
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Yes = statistically significant at the signficance level (α) of 0.05
≠ = not equal to
* = test not conducted because one or more soil strata had less than 4 detected values

TABLE G-2
COMPARISON OF Qal/McCULLOUGH DEPTH INTERVALS FOR METALS AND RADIONUCLIDES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Metal		Nonparametric Test: Kruskal-Wallis X^2	p	Significant Difference?	Box Plots: Deep ≠ Surface	Surface ≠ Subsurface	Deep ≠ Subsurface	Notes
Aluminum	Al	9.61	0.0080	**Yes**	✓	✓		0' > 10' & deep
Antimony	Sb	37.17	< 0.001	**Yes**	✓		✓	0' & 10' > deep
Arsenic	As	1.78	0.4100	No				
Barium	Ba	11.62	0.0030	**Yes**	✓			0' > deep
Beryllium	Be	4.98	0.0830	No				
Boron	Bo	48.40	< 0.001	**Yes**	✓			0' > deep
Cadmium *	Cd	**See Table G-6**						
Calcium	Ca	19.02	< 0.001	**Yes**		✓	✓	10' > 0' & deep
Chromium	Cr	22.29	< 0.001	**Yes**		✓	✓	0' & deep > 10'
Chromium VI *	Cr VI	**See Table G-6**						
Cobalt	Co	14.50	0.0010	**Yes**	✓		✓	0' & 10' > deep
Copper	Cu	16.97	< 0.001	**Yes**	✓			0' > deep
Iron	Fe	15.96	< 0.001	**Yes**		✓	✓	deep & 0' > 10'
Lead	Pb	68.42	< 0.001	**Yes**	✓	✓	✓	0' > deep > 10'
Lithium	Li	7.88	0.0200	**Yes**	✓		✓	deep > 0' & 10'
Magnesium	Mg	9.59	0.0080	**Yes**	✓		✓	0' & 10' > deep
Manganese	Mn	30.83	< 0.001	**Yes**	✓	✓	✓	0' > 10' > deep
Mercury	Hg	55.32	< 0.001	**Yes**	✓		✓	0' & 10' > deep
Molybdenum	Mo	0.415	0.8130	No				
Nickel	Ni	13.31	0.0010	**Yes**	✓	✓		0' > 10' & deep
Niobium *	Nb	**See Table G-6**						
Palladium	Pd	30.77	< 0.001	**Yes**	✓	✓		10' & deep > 0'
Phosphorus	P	11.92	0.0030	Yes	✓			
Platinum *	Pt	**See Table G-6**						
Potassium	K	42.91	< 0.001	**Yes**	✓	✓		0' > 10' & deep
Selenium *	Se	**See Table G-6**						
Silicon	Si	18.12	< 0.001	**Yes**	✓	✓		0' > 10' & deep
Silver *	Ag	**See Table G-6**						
Sodium	Na	71.92	< 0.001	**Yes**	✓	✓	✓	deep > 10' > 0'
Strontium	Sr	43.17	< 0.001	**Yes**	✓	✓		
Thallium	Tl	**See Table G-6**						
Tin	Sn	26.98	< 0.001	**Yes**		✓	✓	0' & deep > 10'
Titantium	Ti	33.88	< 0.001	**Yes**	✓		✓	deep > 0' & 10'
Tungsten *	W	**See Table G-6**						
Uranium	U	65.75	< 0.001	**Yes**	✓	✓	✓	deep > 10' > 0'
Vanadium	V	17.36	< 0.001	**Yes**	✓		✓	deep > 0' & 10'
Zinc	Zn	48.39	< 0.001	**Yes**	✓	✓		0' > 10' & deep
Zirconium	Zr	105.46	< 0.001	**Yes**	✓		✓	0' & 10' > deep
Radium 226		55.86	< 0.001	Yes	✓	✓	✓	deep > 10' > 0'
Radium 228		37.75	< 0.001	Yes	✓		✓	0' & 10' > deep
Thorium 228		10.47	0.0050	Yes		✓	✓	0' & deep > 10'
Thorium 230		52.15	< 0.001	**Yes**	✓	✓	✓	deep > 10' > 0'
Thorium 232		14.38	0.0010	Yes	✓	✓		0' > 10' & deep
Uranium 233/234		70.16	< 0.001	**Yes**	✓	✓		0' > 10' & deep
Uranium 235/236		4.97	0.8400	No				
Uranium 238		67.31	< 0.001	**Yes**	✓	✓		10' & deep > 0'

Data are from the 2008 Qal McCullough deep data from 20 ft bgs and deeper ('Deep'), 2005 Qal McCullough data from 0 feet bgs ('Surface'), and 2005 Qal McCullough data from 10 feet bgs ('Subsurface').
All statistical anlayses were performed using SPSS v. 15.0
All non-detected values were replaced by ½ SQL--Gehan ranking was not used to accommodate nondetects in the Kruskal-Wallis model.
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Yes = statistically significant at the signficance level (α) of 0.05
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TABLE G-3
COMPARISON OF Qal/RIVER DEPTH INTERVALS FOR METALS AND RADIONUCLIDES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 2)

Metal		Deep (20+ ft bgs)		2008 Surface (0 ft bgs)		2008 Subsurface (10 ft bgs)		Parametric Test: ANOVA			Parametric Test: Tukey HSD		
		SW Signif	Normal?	SW Signif	Normal?	SW Signif	Normal?	F	*p*	Significant Difference?	Deep ≠ Surface	Surface ≠ Subsurface	Deep ≠ Subsurface
Aluminum	Al	0.012	No	0.014	No	0.551	Yes	4.97	0.0100	Yes	✓		
Antimony	Sb	0.004	No	0.020	No	< 0.001	Yes	1.19	0.3130	No			
Arsenic	As	0.002	No	0.025	No	0.052	Yes	3.98	0.0240	Yes		✓	✓
Barium	Ba	< 0.001	Yes	< 0.001	Yes	0.011	No	0.19	0.8300	No			
Beryllium	Be	0.029	No	0.024	No	0.095	Yes	1.81	0.1730	No			
Boron	Bo	< 0.001	Yes	< 0.001	Yes	< 0.001	Yes	5.14	0.0090	Yes			✓
Cadmium	Cd	0.004	No	< 0.001	Yes	0.702	Yes	0.95	0.3950	No			
Calcium	Ca	0.915	Yes	0.004	No	0.021	No	4.13	0.0210	Yes			
Chromium	Cr	< 0.001	Yes	0.453	Yes	0.593	Yes	0.36	0.6990	No			
Chromium VI *	Cr VI	< 0.001	Yes	< 0.001		< 0.001		See Table G-7					
Cobalt	Co	0.772	Yes	0.039	No	0.280	Yes	6.35	0.0030	Yes	✓	✓	
Copper	Cu	0.162	Yes	0.335	Yes	0.943	Yes	8.00	0.0010	**Yes**	✓	✓	
Iron	Fe	0.467	Yes	0.709	Yes	0.459	Yes	1.43	0.2490	No			
Lead	Pb	< 0.001	Yes	< 0.001	Yes	0.415	Yes	2.83	0.0680	No			
Lithium *	Li	0.311	Yes	< 0.001		0.001	No	See Table G-7					
Magnesium	Mg	0.001	No	0.035	No	0.268	Yes	1.75	0.1830	No			
Manganese	Mn	< 0.001	Yes	0.234	Yes	0.596	Yes	6.46	0.0030	Yes	✓		
Mercury *	Hg	< 0.001	Yes	< 0.001		< 0.001		See Table G-7					
Molybdenum	Mo	0.023	No	0.006	No	< 0.001	Yes	11.27	< 0.001	Yes	✓		✓
Nickel	Ni	0.524	Yes	0.001	No	0.639	Yes	1.11	0.3390	No			
Niobium *	Nb	< 0.001	Yes	< 0.001		< 0.001		See Table G-7					
Palladium	Pd	0.178	Yes	< 0.001	Yes	0.278	Yes	4.46	0.0160	Yes			✓
Phosphorus	P	0.142	Yes	0.375	Yes	0.380	Yes	0.23	0.7960	No			
Platinum *	Pt	< 0.001	Yes	< 0.001		< 0.001		See Table G-7					
Potassium	K	< 0.001	Yes	0.002	No	0.059	Yes	4.69	0.0130	Yes		✓	✓
Selenium *	Se	< 0.001	Yes	< 0.001		< 0.001	Yes	See Table G-7					
Silicon	Si	0.246	Yes	< 0.001	Yes	0.004	No	11.89	< 0.001	Yes	✓	✓	
Silver	Ag	< 0.001	Yes	< 0.001	Yes	< 0.001	Yes	2.66	0.0790	No			
Sodium	Na	0.036	No	< 0.001	Yes	0.981	Yes	4.30	0.0180	Yes		✓	✓
Strontium	Sr	< 0.001	Yes	< 0.001	Yes	0.133	Yes	6.36	0.0030	Yes			✓
Thallium *	Tl	< 0.001	Yes	< 0.001	Yes	< 0.001	Yes	See Table G-7					
Tin	Sn	< 0.001	Yes	0.612	Yes	0.914	Yes	6.10	0.0040	Yes	✓		
Titantium	Ti	0.937	Yes	0.050	No	0.892	Yes	7.11	0.0020	Yes	✓		✓
Tungsten *	W	< 0.001	Yes	< 0.001		< 0.001		See Table G-7					
Uranium	U	0.063	Yes	< 0.001	Yes	< 0.001	Yes	6.02	0.0040	Yes		✓	✓
Vanadium	V	0.216	Yes	0.273	Yes	0.953	Yes	0.73	0.4850	No			
Zinc	Zn	< 0.001	Yes	< 0.001	Yes	0.483	Yes	0.22	0.8010	No			
Zirconium	Zr	< 0.001	Yes	0.033	No	< 0.001		9.23	< 0.001	Yes	✓		✓
Radium 226		0.928	Yes	0.623	Yes	0.600	Yes	6.06	0.0050	**Yes**		✓	✓
Radium 228		0.247	Yes	0.443	Yes	0.620	Yes	0.80	0.4570	No			
Thorium 228		0.957	Yes	0.498	Yes	0.212	Yes	8.30	0.0010	Yes	✓		✓
Thorium 230		0.078	Yes	0.418	Yes	0.071	Yes	22.14	< 0.001	**Yes**		✓	✓
Thorium 232		0.502	Yes	0.629	Yes	0.063	Yes	5.88	0.0050	Yes	✓		✓
Uranium 233/234		0.010	No	0.730	Yes	0.011	No	15.31	< 0.001	Yes		✓	✓
Uranium 235/236 *		0.132	Yes	0.454	Yes	0.259	Yes	35.16	< 0.001	**Yes**	✓	✓	✓
Uranium 238		0.001	No	0.554	Yes	0.086	Yes	9.79	< 0.001	Yes		✓	✓

Data are from the 2008 Qal River deep data from 20 ft bgs and deeper ('Deep'), 2008 Supplemental Qal River data from 0 feet bgs ('Surface'), and 2008 Supplemental Qal River data from 10 feet bgs ('Subsurface').
All statistical anlayses were performed using SPSS v. 15.0
All non-detected values were replaced by ½ SQL--Gehan ranking was not used to accommodate nondetects in the Kruskal-Wallis model.
Bold blue italics indicates constituents for which parametric test results are valid; otherwise, non-parametric test results are valid (less valid results shaded back in gray font)
Black values indicate results for preferred tests. Grey text and green boxes with grey checks indicate results and pairwise comparisons for less preferred tests (based on distribution of the data).

SW Signif = Shapiro-Wilk significance -- if significance < 0.05, then reject the null hypothesis of normality
p = probability
No = not statistically significant at the signficance level (α) of 0.05
Yes = statistically significant at the signficance level (α) of 0.05
≠ = not equal to
* = test not conducted because one or more soil strata had less than 4 detected values

TABLE G-3
COMPARISON OF Qal/RIVER DEPTH INTERVALS FOR METALS AND RADIONUCLIDES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Metal		Nonparametric Test: Kruskal-Wallis X^2	Kruskal-Wallis *p*	Kruskal-Wallis Significant Difference?	Box Plots: Deep ≠ Surface	Box Plots: Surface ≠ Subsurface	Box Plots: Deep ≠ Subsurface	Notes
Aluminum	Al	6.47	0.0390	**Yes**	✓			0' > deep
Antimony	Sb	2.76	0.2520	No				
Arsenic	As	5.51	0.0640	No				
Barium	Ba	2.03	0.3620	No				
Beryllium	Be	3.63	0.1630	No				
Boron	Bo	24.88	< 0.001	**Yes**			✓	
Cadmium	Cd	1.681	0.4320	No				No differences identified
Calcium	Ca	7.59	0.0230	**Yes**			✓	10' > deep
Chromium	Cr	0.04	0.9820	No				
Chromium VI *	Cr VI	**See Table G-7**						
Cobalt	Co	4.44	0.1090	No				0' > 10' & deep
Copper	Cu	6.07	0.0480	Yes	✓			0' > deep
Iron	Fe	1.01	0.6030	No				
Lead	Pb	2.69	0.2600	No				
Lithium *	Li	**See Table G-7**						
Magnesium	Mg	3.73	0.1550	No				
Manganese	Mn	19.71	< 0.001	**Yes**	✓	✓	✓	0' > 10' > deep
Mercury *	Hg	**See Table G-7**						
Molybdenum	Mo	17.69	< 0.001	**Yes**	✓		✓	0' & 10' > deep
Nickel	Ni	1.23	0.5410	No				
Niobium *	Nb	**See Table G-7**						
Palladium	Pd	4.10	0.1290	No				10' > deep
Phosphorus	P	0.56	0.7550	No				
Platinum *	Pt	**See Table G-7**						
Potassium	K	13.71	0.0010	**Yes**	✓	✓	✓	0' > deep > 10'
Selenium *	Se	**See Table G-7**						
Silicon	Si	21.94	< 0.001	**Yes**	✓	✓	✓	0' > 10' > deep
Silver	Ag	12.26	0.0020	**Yes**				
Sodium	Na	10.67	0.0050	**Yes**	✓	✓	✓	10' > deep > 0'
Strontium	Sr	6.97	0.0310	**Yes**			✓	10' > deep
Thallium *	Tl	**See Table G-7**						
Tin	Sn	10.73	0.0050	**Yes**	✓			
Titantium	Ti	9.99	0.0070	**Yes**	✓		✓	deep > 0' & 10'
Tungsten *	W	**See Table G-7**						
Uranium	U	7.75	0.0210	**Yes**		✓		10' > 0'
Vanadium	V	0.41	0.8150	No				
Zinc	Zn	0.05	0.9760	No				
Zirconium	Zr	11.34	0.0030	**Yes**	✓		✓	
Radium 226		7.68	0.0220	Yes		✓	✓	10' > 0' & deep
Radium 228		0.28	0.8690	No				
Thorium 228		7.69	0.0210	Yes	✓		✓	0' & 10' > deep
Thorium 230		22.56	< 0.001	Yes	✓	✓	✓	10' > 0' > deep
Thorium 232		8.57	0.0140	Yes	✓		✓	0' & 10' > deep
Uranium 233/234		17.29	< 0.001	**Yes**	✓	✓	✓	10' > deep > 0'
Uranium 235/236 *		27.17	< 0.001	Yes	✓	✓	✓	
Uranium 238		13.30	0.0010	**Yes**	✓	✓	✓	10' > deep > 0'

Data are from the 2008 Qal River deep data from 20 ft bgs and deeper ('Deep), 2008 Supplemental Qal River data from 0 feet bgs ('Surface'), and 2008 Supplemental Qal River data from 10 feet bgs ('Subsurface').
All statistical anlayses were performed using SPSS v. 15.0
All non-detected values were replaced by ½ SQL--Gehan ranking was not used to accommodate nondetects in the Kruskal-Wallis model.
Bold blue italics indicates constituents for which parametric test results are valid; otherwise, non-parametric test results are valid (less valid results shaded back in gray font)
Black values indicate results for preferred tests. Grey text and green boxes with grey checks indicate results and pairwise comparisons for less preferred tests (based on distribution of the data).

SW Signif = Shapiro-Wilk significance -- if significance < 0.05, then reject the null hypothesis of normality
p = probability
No = not statistically significant at the signficance level (α) of 0.05
Yes = statistically significant at the signficance level (α) of 0.05
≠ = not equal to
* = test not conducted because one or more soil strata had less than 4 detected values

TABLE G-4
COMPARISON OF Qal/MIXED DEPTH INTERVALS FOR METALS AND RADIONUCLIDES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 2)

Metal		Deep (20+ ft bgs)		2005 Surface (0 ft bgs)		2005 Subsurface (10 ft bgs)		Parametric Test: ANOVA			Tukey HSD		
		SW Signif	Normal?	SW Signif	Normal?	SW Signif	Normal?	F	p	Significant Difference?	Deep ≠ Surface	Surface ≠ Subsurface	Deep ≠ Subsurface
Aluminum *	Al	0.826	Yes	0.047	No	Data Considered Insufficient to Determine Distribution		9.79	0.001	Yes	✓		
Antimony *	Sb	0.489	Yes	0.779	Yes								
Arsenic *	As	0.942	Yes	0.871	Yes			8.38	0.005	Yes	✓		
Barium *	Ba	0.387	Yes	0.189	Yes			4.50	0.02	Yes	✓		
Beryllium *	Be	0.635	Yes	0.366	Yes			0.42	0.664	No			
Boron *	Bo	< 0.001	Yes	< 0.001									
Cadmium *	Cd	0.006	No	< 0.001									
Calcium *	Ca	0.975	Yes	0.151	Yes			2.52	0.099	No			
Chromium *	Cr	< 0.001	Yes	0.803	Yes			5.97	0.007	Yes	✓		
Chromium VI *	Cr VI	< 0.001	Yes	< 0.001									
Cobalt *	Co	0.002	No	0.139	Yes			0.17	0.841	No			
Copper *	Cu	0.940	Yes	0.798	Yes			3.28	0.052	No			
Iron *	Fe	0.112	Yes	0.140	Yes			15.22	< 0.001	Yes	✓		
Lead *	Pb	0.001	No	0.188	Yes			4.87	0.015	Yes	✓		
Lithium *	Li	0.098	Yes	0.446	Yes			12.47	< 0.001	Yes	✓		
Magnesium *	Mg	0.476	Yes	0.668	Yes			12.10	< 0.001	Yes	✓		
Manganese *	Mn	< 0.001	Yes	0.022	No			2.66	0.087	No			
Mercury *	Hg	< 0.001	Yes	0.603	Yes								
Molybdenum *	Mo	< 0.001	Yes	0.788	Yes			2.64	0.089	No			
Nickel *	Ni	0.235	Yes	0.928	Yes			7.59	0.002	Yes	✓		
Niobium *	Nb	< 0.001	Yes	< 0.001									
Palladium *	Pd	0.206	Yes	0.637	Yes			11.66	< 0.001	Yes	✓		
Phosphorus *	P	0.557	Yes	0.675	Yes			6.16	0.006	Yes	✓		
Platinum *	Pt	< 0.001	Yes	< 0.001									
Potassium *	K	0.519	Yes	< 0.001	Yes			2.81	0.078	No			
Selenium *	Se	< 0.001	Yes	0.115	Yes			8.98	0.001	Yes	✓		
Silicon *	Si	< 0.001	Yes	0.450	Yes			102.28	< 0.001	Yes	✓		
Silver *	Ag	< 0.001	Yes	< 0.001									
Sodium *	Na	0.210	Yes	0.657	Yes			25.81	< 0.001	Yes	✓		
Strontium *	Sr	0.152	Yes	0.864	Yes			10.39	< 0.001	Yes	✓		
Thallium *	Tl	< 0.001	Yes	0.422	Yes								
Tin *	Sn	< 0.001	Yes	0.298	Yes			0.53	0.597	No			
Titantium *	Ti	0.445	Yes	0.823	Yes			31.98	< 0.001	Yes	✓		
Tungsten *	W	0.004	No	< 0.001									
Uranium *	U	0.015	No	0.780	Yes			18;174	< 0.001	Yes	✓		
Vanadium *	V	0.230	Yes	0.478	Yes			48.54	< 0.001	Yes	✓		
Zinc *	Zn	0.179	Yes	0.724	Yes			5.80	0.008	Yes	✓		
Zirconium *	Zr	< 0.001	Yes	0.853	Yes			162.15	< 0.001	Yes	✓		
Radium 226 *		0.101	Yes	0.272	Yes			2.34	0.126	No			
Radium 228 *		0.084	Yes	< 0.001									
Thorium 228 *		0.781	Yes	0.908	Yes			4.00	0.03	Yes	✓		
Thorium 230 *		0.984	Yes	0.348	Yes			4.68	0.018	Yes	✓		
Thorium 232 *		0.622	Yes	0.220	Yes			3.55	0.043	Yes	✓		
Uranium 233/234 *		0.009	No	0.199	Yes			18.28	< 0.001	Yes	✓		
Uranium 235/236 *		0.296	Yes	0.324	Yes			2.91	0.086	No			
Uranium 238 *		0.533	Yes	0.106	Yes			14.71	< 0.001	Yes	✓		

Data are from the 2008 Qal Mixed deep data from 20 ft bgs and deeper ('Deep'), 2005 Qal Mixed data from 0 feet bgs ('Surface'), and 2005 Qal Mixed data from 10 feet bgs ('Subsurface').
All statistical anlayses were performed using SPSS v. 15.0
All non-detected values were replaced by ½ SQL--Gehan ranking was not used to accommodate nondetects in the Kruskal-Wallis model.
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Yes = statistically significant at the signficance level (α) of 0.05
≠ = not equal to
* = test not conducted because one or more soil strata had less than 4 detected values

TABLE G-4
COMPARISON OF Qal/MIXED DEPTH INTERVALS FOR METALS AND RADIONUCLIDES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 2 of 2)

Metal		Nonparametric Test						
		Kruskal-Wallis			Box Plots			
		X^2	*p*	Significant Difference?	Deep ≠ Surface	Surface ≠ Subsurface	Deep ≠ Subsurface	Notes
Aluminum *	Al	10.02	0.007	**Yes**	✓			
Antimony *	Sb							
Arsenic *	As	10.06	0.007	Yes	✓			
Barium *	Ba	6.32	0.043	Yes	✓			
Beryllium *	Be	0.42	0.811	No				
Boron *	Bo							
Cadmium *	Cd							
Calcium *	Ca	5.82	0.055	No				
Chromium *	Cr	12.36	0.002	**Yes**	✓			
Chromium VI *	Cr VI							
Cobalt *	Co	1.63	0.442	No				
Copper *	Cu	3.36	0.187	No				
Iron *	Fe	12.06	0.002	Yes	✓			
Lead *	Pb	3.16	0.207	No				
Lithium *	Li	12.84	0.002	Yes	✓			
Magnesium *	Mg	13.49	0.001	Yes	✓			
Manganese *	Mn	6.59	0.037	**Yes**	✓			
Mercury *	Hg							
Molybdenum *	Mo	6.38	0.041	**Yes**	✓			
Nickel *	Ni	10.16	0.006	Yes	✓			
Niobium *	Nb							
Palladium *	Pd	12.50	0.002	Yes	✓			
Phosphorus *	P	10.68	0.005	Yes	✓			
Platinum *	Pt							
Potassium *	K	6.02	0.049	**Yes**	✓			
Selenium *	Se	17.46	< 0.001	**Yes**	✓			
Silicon *	Si	13.96	0.001	**Yes**	✓			
Silver *	Ag							
Sodium *	Na	13.43	0.001	Yes	✓			
Strontium *	Sr	9.08	0.011	Yes	✓			
Thallium *	Tl							
Tin *	Sn	7.30	0.026	**Yes**	✓			
Titantium *	Ti	1.08	0.584	No				
Tungsten *	W							
Uranium *	U	14.31	0.001	**Yes**	✓			
Vanadium *	V	15.97	< 0.001	Yes	✓			
Zinc *	Zn	7.80	0.020	Yes	✓			
Zirconium *	Zr	14.50	0.001	**Yes**	✓			
Radium 226 *		6.54	0.038	Yes	✓			
Radium 228 *								
Thorium 228 *		7.30	0.026	Yes	✓			
Thorium 230 *		7.85	0.020	Yes	✓			
Thorium 232 *		6.17	0.046	Yes	✓			
Uranium 233/234 *		12.29	0.002	**Yes**	✓			
Uranium 235/236 *		4.25	0.119	No				
Uranium 238 *		11.12	0.004	Yes	✓			

Data are from the 2008 Qal Mixed deep data from 20 ft bgs and deeper ('Deep'), 2005 Qal Mixed data from 0 feet bgs ('Surface'), and 2005 Qal Mixed data from 10 feet bgs ('Subsurface').
All statistical anlayses were performed using SPSS v. 15.0
All non-detected values were replaced by ½ SQL--Gehan ranking was not used to accommodate nondetects in the Kruskal-Wallis model.
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TABLE G-5
TEST OF PROPORTIONS - DETECTED CONCENTRATIONS - ALL STRATIGRAPHIC UNITS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

		McCullough			River			Mixed			UMCf			Test of Proportions											
														McC vs. River		McC vs. Mixed		McC vs. UMCf		River vs. Mixed		River vs. UMCf		Mixed vs. UMCf	
Metal		N	#Detect	%Detect	N	#Detect	%Detect	N	#Detect	%Detect	N	#Detect	%Detect	Z stat	Different?	Z stat	Different?	Z stat	Different?	Z stat	Different?	Z stat	Different?	Z stat	Different?
Boron	Bo	79	20	25%	36	8	22%	24	3	13%	24	7	29%	0.13	*NS*	1.04	*NS*	0.11	*NS*	0.61	*NS*	0.31	*NS*	1.07	*NS*
Chromium VI	Cr (VI)	80	18	23%	41	16	39%	14	2	14%	23	2	9%	1.70	*NS*	0.34	*NS*	1.18	*NS*	1.37	*NS*	2.30	Yes	-0.02	*NS*
Niobium	Nb	79	6	8%	36	3	8%	24	3	13%	24	1	4%	-0.24	*NS*	0.33	*NS*	0.12	*NS*	0.09	*NS*	0.11	*NS*	0.52	*NS*
Platinum	Pt	79	7	9%	36	0	0%	24	0	0%	24	2	8%	1.42	*NS*	1.05	*NS*	-0.33	*NS*	--		-0.48	*NS*	0.72	*NS*
Selenium	Se	79	0	0%	36	0	0%	24	0	0%	24	0	0%	--		--		--		--		--		--	
Thallium	Tl	79	4	5%	36	0	0%	24	0	0%	24	0	0%	--		--		--		--		--		--	
Tungsten	W	79	25	32%	36	9	25%	24	15	63%	24	5	21%	0.50	*NS*	2.48	Yes	0.77	*NS*	2.64	Yes	0.06	*NS*	2.64	Yes

Notes:
* = Considered to have different reporting detection limits (SQL range is 10-fold or greater)
Blue highlights indicate datasets with less than 4 detects
N = sample size
NS = not significantly different at significance level of 0.05 (2-tailed test)
Yes = significantly different at significance level of 0.05 (2-tailed test)

Z-Test for Two Proportions from http://www.dimensionresearch.com/resources/calculators/ztest.html

TABLE G-6
COMPARISON OF TEST OF PROPORTIONS - DETECTED CONCENTRATIONS - Qal/McCULLOUGH DEPTH INTERVALS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 1)

		2008 Deep			2005 0 ft bgs			2005 10 ft bgs			Test of Proportions					
											Deep vs. Surf		Deep vs 10		Surv vs. 10	
Metal		N	#Detect	%Detect	N	#Detect	%Detect	N	#Detect	%Detect	Z stat	Different?	Z stat	Different?	Z stat	Different?
Antimony*	Sb	79	73	92%	37	23	62%	30	10	33%	3.76	Yes	6.21	Yes	2.10	Yes
Boron	Bo	79	20	25%	34	16	47%	30	8	27%	2.06	Yes	-0.10	*NS*	1.42	*NS*
Chromium VI	Cr (VI)	80	18	23%	34	0	0%	30	0	0%	2.73	Yes	2.55	Yes	--	
Niobium	Nb	79	6	8%	34	0	0%	30	0	0%	1.19	*NS*	1.08	*NS*	--	
Platinum	Pt	79	7	9%	34	1	3%	30	2	7%	0.73	*NS*	-0.02	*NS*	0.11	*NS*
Selenium*	Se	79	0	0%	37	22	59%	30	5	17%	7.36	Yes	3.20	Yes	3.30	Yes
Silver*	Ag	79	79	100%	37	3	8%	30	0	0%	9.92	Yes	10.20	Yes	1.00	NS
Thallium*	Tl	79	4	5%	37	13	35%	30	7	23%	3.99	Yes	2.47	Yes	2.47	Yes
Titanium	Ti	79	79	100%	37	37	100%	30	30	100%						
Tungsten*	W	79	25	32%	34	0	0%	30	0	0%	3.47	Yes	3.26	Yes	--	
Zirconium	Zr	79	79	100%	34	34	100%	30	30	100%						

Notes:
* = Considered to have different reporting detection limits (SQL range is 10-fold or greater)
Blue highlights indicate datasets with less than 4 detects
N = sample size
NS = not significantly different at significance level of 0.05 (2-tailed test)
Yes = significantly different at significance level of 0.05 (2-tailed test)

Z-Test for Two Proportions from http://www.dimensionresearch.com/resources/calculators/ztest.html

TABLE G-7
COMPARISON OF TEST OF PROPORTIONS - DETECTED CONCENTRATIONS - Qal/RIVER DEPTH INTERVALS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 1)

											Test of Proportions					
		2008 Deep			2008 Suppl. 0 ft bgs			2008 Suppl. 10 ft bgs			Deep vs. Surf		Deep vs 10		Surv vs. 10	
Metal		N	#Detect	%Detect	N	#Detect	%Detect	N	#Detect	%Detect	Z stat	Different?	Z stat	Different?	Z stat	Different?
Antimony	Sb	36	36	100%	12	5	42%	10	4	40%	4.49	Yes	4.45	Yes	-0.36	*NS*
Boron	Bo	36	8	22%	12	4	33%	10	6	60%	0.39	*NS*	1.91	*NS*	0.82	*NS*
Cadmium*	Cd	36	26	72%	12	7	58%	10	8	80%	0.54	*NS*	0.89	*NS*	0.63	*NS*
Chromium VI	Cr (VI)	41	16	39%	12	0	0%	10	0	0%	2.23	Yes	2.00	Yes	--	
Lithium*	Li	36	36	100%	12	0	0%	10	4	40%	6.54	Yes	4.45	Yes	1.87	*NS*
Mercury	Hg	28	5	18%	12	0	0%	10	0	0%	1.04	*NS*	0.89	*NS*	--	
Niobium	Nb	36	3	8%	12	1	8%	10	0	0%	-0.60	*NS*	0.22	*NS*	-0.09	*NS*
Platinum	Pt	36	0	0%	12	0	0%	10	0	0%	--		--		--	
Selenium	Se	36	0	0%	12	0	0%	10	0	0%	--		--		--	
Thallium*	Tl	36	0	0%	12	5	42%	10	0	0%	3.55	Yes	--		1.81	*NS*
Tin	Sn	36	16	44%	12	7	58%	10	5	50%	0.50	*NS*	-0.05	*NS*	-0.04	*NS*
Tungsten	W	36	9	25%	12	1	8%	10	1	10%	0.82	*NS*	0.58	*NS*	-0.61	*NS*
Zirconium	Zr	36	29	81%	12	5	42%	10	4	40%	2.20	Yes	2.12	Yes	-0.36	*NS*

Notes:
* = Considered to have different reporting detection limits (SQL range is 10-fold or greater)
Blue highlights indicate datasets with less than 4 detects
N = sample size
NS = not significantly different at significance level of 0.05 (2-tailed test)
Yes = significantly different at significance level of 0.05 (2-tailed test)

Z-Test for Two Proportions from http://www.dimensionresearch.com/resources/calculators/ztest.html

APPENDIX H

INTER-ELEMENT CORRELATION STATISTICAL EVALUATIONS AND SCATTERPLOTS

TABLE H-1
2008 DEEP Qal/McCULLOUGH - CORRELATION FOR METALS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 1)

Inter-Element Correlation Coefficients (upper triangle: Kendall Tau; lower triangle: Pearson Correlation Coefficient)

Metal		N	No. of Detects	Shapiro Wilks SW Signif	Shapiro Wilks Normal?	Param Test?	Al	Sb	As	Ba	Be	Bo	Cd	Ca	Cr (Tot)	Cr (VI)	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	Nb	Pd	P	Pt	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	W	U	V	Zn	Zr
Aluminum	Al	79	79	0.06	Yes	Yes		0.068	**.279(**)**	**.419(**)**	**.322(**)**	**.176(*)**	**.278(**)**	.254(**)	0.136	0.113	**.410(**)**	-0.079	**.434(**)**	**.379(**)**	-0.115	.464(**)	**.309(**)**	-0.059	0.03	0.053	0.042	**.629(**)**	0.115	0.162	**.185(*)**		**-.258(**)**	**.312(**)**	**.558(**)**	**.636(**)**		0.051	0.065	0.078	**.374(**)**	**.191(*)**	.298(**)	0.106
Antimony	Sb	79	73	< 0.001	No	No	0.166		**.364(**)**	0.059	**.264(**)**	-0.05	**.175(*)**	-0.115	**.191(*)**	0.12	0.087	-0.026	0.116	**.245(**)**	-0.007	0.113	0.116	0.017	0.127	-0.047	0.178	.205(*)	-.204(*)	**.222(*)**	**.372(**)**		-0.018	**.233(**)**	0.037	0.128		**.397(**)**	0.09	-0.075	**.301(**)**	**.195(*)**	-0.058	**.212(**)**
Arsenic	As	79	79	< 0.001	No	No	.392(**)	.344(**)		0.103	**.307(**)**	0.114	**.196(*)**	0.001	-0.015	0.009	0.121	**-.245(**)**	**.159(*)**	**.240(**)**	0.117	**.261(**)**	**.153(*)**	0.083	0.013	**-.160(*)**	0.031	**.351(**)**	-0.014	**.245(**)**	**.364(**)**		**-.191(*)**	**.221(**)**	**.180(*)**	**.219(**)**		0.121	**-.153(*)**	**-.198(*)**	**.556(**)**	0.057	0.075	0.017
Barium	Ba	79	79	< 0.001	No	No	.419(**)	0.159	0.205		**.176(*)**	**.214(*)**	**.214(**)**	0.055	0.088	**.299(**)**	**.314(**)**	0.132	**.299(**)**	**.390(**)**	**-.163(*)**	**.160(*)**	**.398(**)**	0.033	0.138	0.133	-0.03	**.407(**)**	0.057	0.032	**.226(**)**		**-.186(*)**	**.235(**)**	**.328(**)**	**.457(**)**		0.085	**.248(**)**	**.202(*)**	**.340(**)**	**.164(*)**	**.247(**)**	**.323(**)**
Beryllium	Be	79	79	0.00	No	No	.495(**)	.377(**)	.415(**)	.224(*)		-0.048	**.230(**)**	-0.038	0.014	0.021	0.133	0.082	0.05	**.249(**)**	0.102	**.183(*)**	**.232(**)**	-0.106	0.087	0.057	0	**.161(*)**	0.129	0.176	**.327(**)**		0.071	0.002	**.172(*)**	**.213(**)**		**.219(**)**	0.083	0.129	0.124	-0.066	**.286(**)**	**.295(**)**
Boron	Bo	79	13	< 0.001	No	No	.304(**)	-0.069	0.208	0.123	0.019		0.164	0.046	0.07	0.18	**.220(*)**	**-.204(*)**	**.242(**)**	**.283(**)**	0.073	0.073	.184(*)	-0.057	**.194(*)**	0.067	0.071	**.331(**)**	-0.042	0.145	0.025		**-.560(**)**	**.283(**)**	0.094	0.17		-0.104	-0.068	-0.018	.209(*)	0.099	-0.022	0.138
Cadmium	Cd	79	73	< 0.001	No	No	.275(*)	0.207	.239(*)	0.189	.286(*)	.232(*)		**.237(**)**	0.08	-0.072	**.164(*)**	0.038	**.213(**)**	**.279(**)**	-0.103	**.165(*)**	**.323(**)**	**-.224(**)**	**.264(**)**	**.175(*)**	0.079	0.145	0.144	0.166	**.380(**)**		**-.164(*)**	0.033	0.054	0.103		0.127	0.14	0.026	0.156	0.085	**.224(**)**	**.336(**)**
Calcium	Ca	79	79	0.10	Yes	Yes	**.343(**)**	-0.032	0.04	0.077	0.023	.241(*)	0.214		0.117	0.02	-0.076	**-.163(*)**	-0.052	-0.04	0.099	.356(**)	-0.065	-0.162	0.007	-0.001	0.086	0.148	0.001	-0.031	-0.014		0.033	0.121	**.241(**)**	**.244(**)**		-0.111	-0.042	-0.094	0.065	**-.153(*)**	-0.023	-0.057
Chromium	Cr (Tot)	79	79	0.01	No	No	0.122	.294(**)	0.002	0.075	0.047	0.047	-0.048	0.162		-0.003	**.253(**)**	0.131	**.285(**)**	**.176(*)**	-0.064	0.081	0.149	0.082	**.225(**)**	**.259(**)**	-0.026	0.137	0.008	0.058	0.034		-0.046	**.267(**)**	0.11	0.124		**.232(**)**	**.327(**)**	0.065	**.160(*)**	**.360(**)**	0.115	**.158(*)**
Chromium VI	Cr (VI)	80	15	< 0.001	No	No	0.038	0.136	-0.072	-0.012	0.041	-0.025	-0.021	0.109	-0.139		0.021	-0.093	0.058	0.126	0	0.001	0.027	0.025	0.134	-0.066	0.068	.291(**)	-0.155	0.097	0.023		-0.03	**.271(**)**	**.213(*)**	**.277(**)**		0.168	-0.001	**.213(*)**	**.189(*)**	-0.01	-0.152	0.166
Cobalt	Co	79	79	0.00	No	No	.500(**)	0.116	.246(*)	.357(**)	0.2	0.219	.230(*)	-0.064	.356(**)	-0.077		**.178(*)**	**.638(**)**	**.531(**)**	**-.300(**)**	**.190(*)**	**.554(**)**	0.048	0.075	**.362(**)**	0.068	**.337(**)**	**.230(**)**	**.200(*)**	0.066		**-.309(**)**	**.249(**)**	**.272(**)**	**.272(**)**		0.094	**.257(**)**	**.184(*)**	**.260(**)**	**.497(**)**	**.442(**)**	0.098
Copper	Cu	79	79	0.00	No	No	-0.089	0.017	-0.194	.262(*)	.277(*)	-0.208	0.121	-0.113	0.182	-0.148	.228(*)		0.026	0.069	-0.066	-0.125	**.188(*)**	-0.032	**.170(*)**	**.442(**)**	-0.049	**-.203(**)**	**.202(**)**	0.059	0.07		**.201(**)**	-0.119	-0.061	-0.094		**.202(*)**	**.305(**)**	**.212(*)**	**-.220(**)**	0.026	**.270(**)**	**.257(**)**
Iron	Fe	79	79	< 0.001	No	No	.509(**)	0.129	.225(*)	.284(*)	-0.009	0.199	.260(*)	-0.06	.354(**)	-0.075	.755(**)	-0.076		**.455(**)**	**-.336(**)**	0.129	**.414(**)**	0.107	0.1	**.167(*)**	0.074	**.430(**)**	0.064	0.134	0.031		**-.402(**)**	**.315(**)**	**.274(**)**	**.316(**)**		0.1	**.264(**)**	0.159	**.300(**)**	**.662(**)**	**.267(**)**	0.115
Lead	Pb	79	79	< 0.001	No	No	.447(**)	.285(*)	.410(**)	.319(**)	.327(**)	.420(**)	.265(*)	-0.003	0.114	-0.051	.633(**)	0.087	.455(**)		**-.204(**)**	0.142	**.604(**)**	0.097	**.201(*)**	**.237(**)**	0.075	**.400(**)**	0.102	**.211(*)**	**.227(**)**		**-.327(**)**	**.321(**)**	**.187(*)**	**.291(**)**		**.187(*)**	**.202(**)**	0.151	**.355(**)**	**.362(**)**	**.338(**)**	**.252(**)**
Lithium	Li	79	67	< 0.001	No	No	-0.202	0.103	-0.015	-0.114	0.015	0.085	-0.109	0.071	-0.057	-0.021	-.287(*)	-0.007	-.336(**)	-0.16		**.166(*)**	**-.184(*)**	0.003	-0.001	-0.151	-0.049	-0.098	-0.098	0.056	0.048		0.142	-0.107	-0.1	0		-0.002	-0.123	-0.068	0.031	**-.312(**)**	-0.12	0.038
Magnesium	Mg	79	79	0.49	Yes	Yes	**.597(**)**	.298(**)	.388(**)	.308(**)	.382(**)	0.133	0.201	**.488(**)**	0.127	0.034	.228(*)	0.01	0.129	.244(*)	0.04		0.113	-0.136	0.007	-0.007	0.086	**.314(**)**	0.005	0.118	0.125		-0.082	**.167(*)**	**.309(**)**	**.389(**)**		0.054	-0.053	-0.11	**.256(**)**	-0.008	0.144	-0.017
Manganese	Mn	79	79	< 0.001	No	No	.365(**)	0.18	.353(**)	.386(**)	.239(*)	.277(*)	.444(**)	-0.041	0.131	-0.13	.715(**)	0.201	.414(**)	.717(**)	-.266(*)	0.167		0.079	**.212(**)**	**.311(**)**	-0.014	**.244(**)**	**.217(**)**	**.220(*)**	**.202(**)**		**-.224(**)**	**.164(*)**	0.133	**.186(*)**		0.106	**.289(**)**	**.229(**)**	**.197(*)**	**.334(**)**	**.428(**)**	**.278(**)**
Mercury	Hg	79	35	< 0.001	No	No	-0.099	0.026	0.057	0.044	-0.186	-0.098	-.391(**)	-.252(*)	0.087	-0.15	0.13	-0.1	0.107	0.059	0.077	-0.211	0.101		0.087	-0.113	0.107	0.095	**-.167(*)**	-0.079	-0.027		-0.034	**.260(**)**	0.071	0.049		0.148	0.088	**.212(*)**	0.138	**.181(*)**	0.01	0.029
Molybdenum	Mo	79	62	< 0.001	No	No	0.004	0.165	0.121	0.167	0.073	0.213	.225(*)	0.039	.370(**)	-0.092	0.049	0.198	0.1	.254(*)	0.009	0.057	.238(*)	0.023		0.142	0.103	0.072	-0.02	0.107	**.228(**)**		-0.104	0.147	0.002	0.003		**.295(**)**	0.122	**.190(*)**	0.024	0.029	0.063	**.315(**)**
Nickel	Ni	79	79	< 0.001	No	No	0.032	-0.073	-0.142	.387(**)	0.118	0.007	0.207	0.134	0.188	-0.128	.271(*)	.570(**)	.167(*)	0.139	-0.031	0.175	0.151	-.222(*)	0.056		0.015	-0.102	**.286(**)**	0.162	0.118		0.048	-0.135	-0.018	-0.054		0.036	**.246(**)**	0.109	-0.076	0.146	**.340(**)**	**.190(*)**
Niobium	Nb	79	6	< 0.001	No	No	0.031	0.176	0.054	0.192	-0.011	0.112	0.083	0.079	0.017	.334(**)	0.145	-0.006	0.074	0.086	-0.069	0.075	0.054	0.119	0.13	0.005		0.138	-0.156	**.218(*)**	-0.076		-0.084	0.084	0.066	0.094		**.186(*)**	-0.025	-0.053	-0.045	0.052	-0.055	-0.04
Palladium	Pd	79	79	< 0.001	No	No	.807(**)	.232(*)	.356(**)	.372(**)	.280(*)	.455(**)	0.114	.224(*)	0.071	0.043	.374(**)	-.227(*)	.430(**)	.431(**)	-0.107	.355(**)	.267(*)	0.016	0.087	-0.195	0.076		-0.069	**.191(*)**	0.144		**-.373(**)**	**.485(**)**	**.502(**)**	**.728(**)**		0.089	-0.022	0.055	**.523(**)**	**.249(**)**	0.055	0.043
Phosphorus	P	79	79	0.12	Yes	Yes	0.197	-.237(*)	0.14	0.154	.318(**)	0.048	.277(*)	0.026	-0.083	-0.11	.334(**)	.353(**)	0.064	0.169	-0.172	0.109	.284(*)	-.255(*)	-0.114	.433(**)	-0.105	-0.018		-0.009	-0.02		0.073	**-.207(**)**	0.048	-0.033		**-.188(*)**	0.128	0.013	-0.086	0.006	.433(**)	-0.078
Platinum	Pt	79	7	< 0.001	No	No	0.159	0.21	0.178	0.164	0.142	0.143	0.13	-0.012	0.054	-0.028	0.169	0.045	0.134	.394(**)	0.034	0.11	.264(*)	-0.125	0.061	0.063	0.102	0.177	0.016		**.292(**)**		-0.06	0.142	0.171	0.155		0.141	0.098	-0.08	0.139	0.063	0.028	0.123
Potassium	K	79	79	0.02	No	No	.279(*)	.502(**)	.481(**)	.348(**)	.473(**)	0.117	.455(**)	0.053	0.05	-0.019	0.099	0.105	0.031	.325(**)	0.131	.257(*)	.283(*)	-0.097	0.208	0.177	-0.076	.260(*)	-0.001	.284(*)			0.014	**.156(*)**	0.089	0.096		**.218(**)**	0.099	-0.068	**.257(**)**	-0.056	0.041	**.362(**)**
Selenium	Se	79	0																																									
Silicon	Si	79	79	0.00	No	No	-.344(**)	-0.064	-.269(*)	-0.12	0.136	-.676(**)	-.232(*)	-0.032	-0.036	0.125	-.418(**)	.364(**)	-.402(**)	-.452(**)	0.052	-0.071	-.323(**)	-0.068	-0.112	.274(*)	-0.094	-.525(**)	0.113	-0.043	-0.033			**-.277(**)**	-0.109	**-.163(*)**		0.07	0.089	-0.058	**-.299(**)**	**-.303(**)**	-0.039	-0.021
Silver	Ag	79	79	< 0.001	No	No	0.183	-0.008	0.03	0.058	-0.037	0.083	-.467(**)	0.095	0.185	-0.046	-0.062	-0.07	.315(**)	-0.051	0.053	0.202	-0.128	0.171	0.139	-.223(*)	-0.017	.375(**)	-.276(*)	-0.046	0.029		-0.053		**.373(**)**	**.334(**)**		**.330(**)**	0.088	0.057	**.322(**)**	**.231(**)**	-0.075	0.128
Sodium	Na	79	79	< 0.001	No	No	.702(**)	0.037	0.096	.302(**)	.255(*)	0.062	-0.102	0.17	0.096	-0.001	.248(*)	-0.084	.274(**)	0.161	-0.219	.272(*)	0.037	0.03	-0.063	0.042	-0.004	.566(**)	0.116	0.1	-0.02		-0.11	0.136		**.573(**)**		0.071	0.109	0.138	**.311(**)**	0.111	0.146	0.029
Strontium	Sr	79	79	< 0.001	No	No	.769(**)	0.207	.229(*)	.411(**)	.346(**)	.266(*)	0.071	.237(*)	-0.006	0.021	.231(*)	-0.09	.316(**)	.315(**)	-0.085	.392(**)	0.131	-0.019	0.027	-0.006	-0.122	.927(**)	0.005	0.154	0.207		-.303(**)	.406(**)	.605(**)			0.049	0.083	0.143	**.407(**)**	0.144	0.118	0.106
Thallium	Tl	79	0																																									
Tin	Sn	79	76	< 0.001	No	No	0.005	.485(**)	0.075	0.176	.296(**)	-0.187	-0.119	-0.14	.305(**)	0.078	0.163	.266(*)	0.1	0.213	-0.003	0.049	0.156	0.086	.306(**)	-0.006	0.187	0.048	-.275(*)	0.114	.255(*)		0.08	.293(**)	0.049	0.092			**.214(**)**	0.086	0.07	0.102	0.005	**.314(**)**
Titantium	Ti	79	79	0.23	Yes	Yes	0.133	0.185	-0.127	.343(**)	0.209	-0.1	.230(*)	-0.041	.423(**)	-0.12	.447(**)	.463(**)	.264(**)	.229(*)	-0.085	-0.013	.443(**)	0.089	0.073	.314(**)	0.039	-0.034	0.196	0.155	0.162		0.137	-0.196	0.116	0.012		.383(**)		**.222(*)**	0.017	**.325(**)**	.250(**)	.429(**)
Tungstun	W	79	25	< 0.001	No	No	-0.042	0.017	-0.148	0.042	-0.025	-0.056	0.041	-0.046	0.054	0.097	0.064	.285(*)	0.159	0.018	-0.058	-0.047	0.1	-0.022	0.066	0.051	-0.014	-0.068	0.043	-0.022	-0.07		0.093	-0.061	-0.008	0.012		0.108	.285(*)		-0.036	0.137	**.233(**)**	**.257(**)**
Uranium	U	79	79	< 0.001	No	No	.445(**)	.331(**)	.640(**)	0.195	.252(*)	.266(*)	0.092	0.137	0.161	-0.055	.317(**)	-0.219	.300(**)	.427(**)	-0.032	.355(**)	.248(*)	0.13	0.004	-0.09	-0.108	.508(**)	-0.043	0.146	.381(**)		-.361(**)	-0.022	0.217	.389(**)		0.023	0.005	-0.096		**.242(**)**	0.06	0.086
Vanadium	V	79	79	< 0.001	No	No	0.199	.225(*)	0.074	0.107	-0.197	0.047	0.12	-.231(*)	.431(**)	-0.131	.634(**)	-0.094	.662(**)	.311(**)	-.235(*)	-0.137	.405(**)	.337(**)	0.008	-0.092	0.117	.250(*)	-0.127	0.04	-0.108		-.451(**)	-0.15	0.173	0.109		0.116	.441(**)	0.08	.268(*)		**.162(*)**	0.063
Zinc	Zn	79	79	0.05	Yes	Yes	**.433(**)**	0.006	.273(*)	.292(**)	.536(**)	0.042	.294(**)	0.003	0.071	-0.146	.613(**)	.467(**)	.267(**)	.457(**)	-0.121	**.263(*)**	.532(**)	-0.02	-0.077	.396(**)	-0.019	0.12	**.627(**)**	0.026	0.141		-0.015	-0.192	0.159	0.143		0.041	**.410(**)**	0.088	0.152	0.117		.171(*)
Zirconium	Zr	79	79	0.89	Yes	Yes	0.159	.380(**)	0.069	.366(**)	.465(**)	0.169	.423(**)	-0.031	0.218	-0.044	0.199	.417(**)	0.115	.329(**)	0.087	0.072	.385(**)	-0.014	.309(**)	0.212	-0.004	0.094	-0.026	0.096	.568(**)		-0.007	-0.107	-0.079	0.123		.418(**)	**.627(**)**	.276(*)	0.148	0.078	**.332(**)**	

Kendall Tau

Pearson Correlation Coefficient

Inter-Element Correlation p-Values (upper triangle: Kendall Tau; lower triangle: Pearson Correlation Coefficient)

Metal	Al	Sb	As	Ba	Be	Bo	Cd	Ca	Cr (Tot)	Cr (VI)	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	Nb	Pd	P	Pt	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	W	U	V	Zn	Zr
Aluminum		0.397	0.000	0.000	0.000	0.045	0.000	0.001	0.079	0.199	0.000	0.307	0.000	0.000	0.140	0.000	0.000	0.484	0.702	0.498	0.651	0.000	0.136	0.077	0.017	.	0.001	0.000	0.000	0.000		0.514	0.397	0.368	0.000	0.013	0.000	0.170
Antimony	0.144		0.000	0.467	0.001	0.587	0.032	0.154	0.018	0.195	0.287	0.752	0.152	0.003	0.935	0.163	0.150	0.843	0.122	0.566	0.065	0.011	0.012	0.021	0.000	.	0.821	0.004	0.650	0.113		0.000	0.266	0.409	0.000	0.015	0.470	0.009
Arsenic	0.000	0.002		0.187	0.000	0.199	0.013	0.990	0.852	0.917	0.123	0.002	0.042	0.002	0.136	0.001	0.049	0.329	0.871	0.041	0.739	0.000	0.862	0.008	0.000	.	0.014	0.005	0.020	0.005		0.125	0.048	0.024	0.000	0.461	0.336	0.829
Barium	0.000	0.162	0.070		0.026	0.015	0.006	0.479	0.256	0.001	0.000	0.089	0.000	0.000	0.036	0.038	0.000	0.695	0.079	0.087	0.746	0.000	0.461	0.724	0.003	.	0.016	0.003	0.000	0.000		0.276	0.001	0.020	0.000	0.034	0.001	0.000
Beryllium	0.000	0.001	0.000	0.047		0.589	0.004	0.631	0.862	0.811	0.093	0.298	0.524	0.002	0.199	0.020	0.003	0.216	0.280	0.470	1.000	0.042	0.103	0.060	0.000	.	0.368	0.976	0.028	0.007		0.006	0.289	0.146	0.129	0.398	0.000	0.000
Boron	0.006	0.549	0.065	0.279	0.870		0.066	0.602	0.430	0.073	0.013	0.021	0.006	0.001	0.410	0.408	0.036	0.549	0.031	0.446	0.498	0.000	0.637	0.165	0.777	.	0.000	0.002	0.284	0.053		0.245	0.437	0.856	0.023	0.262	0.807	0.117
Cadmium	0.014	0.067	0.034	0.094	0.011	0.039		0.002	0.305	0.416	0.036	0.629	0.007	0.000	0.191	0.035	0.000	0.008	0.001	0.026	0.395	0.064	0.067	0.074	0.000	.	0.035	0.680	0.489	0.186		0.109	0.072	0.765	0.054	0.278	0.004	0.000
Calcium	0.002	0.781	0.729	0.501	0.844	0.033	0.058		0.129	0.824	0.330	0.036	0.498	0.608	0.202	0.000	0.395	0.054	0.932	0.993	0.351	0.056	0.990	0.737	0.852	.	0.672	0.120	0.002	0.002		0.158	0.588	0.276	0.415	0.047	0.770	0.461
Chromium	0.285	0.008	0.985	0.510	0.682	0.683	0.671	0.155		0.971	0.001	0.092	0.000	0.024	0.415	0.293	0.054	0.332	0.004	0.001	0.782	0.077	0.922	0.529	0.656	.	0.550	0.001	0.155	0.107		0.003	0.000	0.453	0.047	0.000	0.136	0.042
Chromium VI	0.742	0.239	0.537	0.919	0.724	0.831	0.853	0.344	0.229		0.812	0.293	0.511	0.156	0.996	0.988	0.756	0.792	0.134	0.453	0.518	0.001	0.078	0.356	0.796	.	0.729	0.002	0.015	0.002		0.060	0.988	0.031	0.039	0.913	0.084	0.059
Cobalt	0.000	0.309	0.029	0.001	0.077	0.052	0.042	0.577	0.001	0.507		0.022	0.000	0.000	0.000	0.014	0.000	0.572	0.340	0.000	0.459	0.000	0.003	0.030	0.394	.	0.000	0.002	0.000	0.000		0.235	0.001	0.035	0.001	0.000	0.000	0.205
Copper	0.436	0.881	0.087	0.020	0.013	0.065	0.288	0.320	0.108	0.200	0.044		0.741	0.373	0.396	0.106	0.015	0.706	0.031	0.000	0.598	0.009	0.009	0.524	0.365	.	0.009	0.130	0.428	0.224		0.010	0.000	0.015	0.006	0.735	0.000	0.001
Iron	0.000	0.257	0.046	0.011	0.939	0.079	0.021	0.597	0.001	0.515	0.000	0.507		0.000	0.000	0.095	0.000	0.203	0.204	0.032	0.421	0.000	0.409	0.145	0.684	.	0.000	0.000	0.000	0.000		0.203	0.001	0.069	0.000	0.000	0.001	0.138
Lead	0.000	0.011	0.000	0.004	0.003	0.000	0.018	0.981	0.319	0.659	0.000	0.444	0.000		0.009	0.067	0.000	0.249	0.011	0.002	0.416	0.000	0.190	0.022	0.004	.	0.000	0.000	0.016	0.000		0.018	0.009	0.083	0.000	0.000	0.000	0.001
Lithium	0.074	0.366	0.894	0.319	0.894	0.457	0.339	0.536	0.615	0.853	0.010	0.952	0.007	0.159		0.033	0.018	0.974	0.990	0.054	0.598	0.209	0.208	0.546	0.539	.	0.067	0.173	0.199	0.997		0.983	0.113	0.437	0.697	0.000	0.124	0.623
Magnesium	0.000	0.008	0.000	0.006	0.001	0.241	0.076	0.000	0.266	0.767	0.043	0.933	0.617	0.030	0.726		0.142	0.106	0.925	0.929	0.351	0.000	0.953	0.196	0.106	.	0.286	0.033	0.000	0.000		0.492	0.493	0.204	0.001	0.919	0.062	0.826
Manganese	0.001	0.113	0.001	0.000	0.034	0.013	0.000	0.718	0.250	0.260	0.000	0.076	0.000	0.000	0.018	0.141		0.344	0.007	0.000	0.882	0.002	0.005	0.016	0.009	.	0.003	0.035	0.083	0.016		0.176	0.000	0.008	0.014	0.000	0.000	0.000
Mercury	0.387	0.819	0.616	0.703	0.100	0.388	0.000	0.025	0.446	0.194	0.254	0.382	0.066	0.606	0.503	0.062	0.374		0.309	0.182	0.286	0.257	0.047	0.432	0.751	.	0.688	0.002	0.399	0.560		0.082	0.296	0.025	0.115	0.031	0.907	0.727
Molybdenum	0.973	0.147	0.289	0.141	0.522	0.059	0.046	0.730	0.001	0.426	0.671	0.080	0.512	0.024	0.939	0.619	0.035	0.842		0.072	0.273	0.364	0.798	0.253	0.004	.	0.185	0.064	0.983	0.973		0.000	0.120	0.032	0.770	0.714	0.421	0.000
Nickel	0.779	0.520	0.210	0.000	0.302	0.950	0.067	0.238	0.097	0.267	0.016	0.000	0.705	0.223	0.785	0.123	0.185	0.049	0.627		0.868	0.189	0.000	0.079	0.127	.	0.539	0.086	0.816	0.487		0.644	0.001	0.211	0.345	0.059	0.000	0.014
Niobium	0.790	0.122	0.637	0.091	0.924	0.325	0.466	0.489	0.879	0.003	0.202	0.958	0.335	0.451	0.545	0.511	0.634	0.295	0.252	0.962		0.134	0.091	0.047	0.405	.	0.360	0.369	0.471	0.305		0.047	0.782	0.606	0.635	0.573	0.548	0.664
Palladium	0.000	0.039	0.001	0.001	0.013	0.000	0.317	0.047	0.536	0.713	0.001	0.044	0.000	0.000	0.346	0.001	0.017	0.887	0.444	0.086	0.503		0.374	0.038	0.064	.	0.000	0.000	0.000	0.000		0.255	0.773	0.527	0.000	0.001	0.477	0.582
Phosphorus	0.081	0.035	0.219	0.176	0.004	0.675	0.013	0.820	0.470	0.342	0.003	0.001	0.876	0.137	0.130	0.337	0.011	0.024	0.318	0.000	0.358	0.876		0.925	0.796	.	0.345	0.008	0.536	0.666		0.017	0.097	0.881	0.287	0.939	0.000	0.313
Platinum	0.160	0.063	0.117	0.149	0.210	0.209	0.253	0.919	0.636	0.811	0.137	0.695	0.261	0.000	0.768	0.336	0.019	0.274	0.593	0.579	0.372	0.119	0.891		0.001	.	0.513	0.127	0.062	0.090		0.129	0.286	0.440	0.145	0.491	0.757	0.179
Potassium	0.013	0.000	0.000	0.002	0.000	0.304	0.000	0.641	0.663	0.872	0.386	0.357	0.696	0.003	0.249	0.022	0.011	0.398	0.066	0.120	0.505	0.021	0.990	0.011		.	0.859	0.046	0.246	0.213		0.005	0.199	0.431	0.001	0.464	0.594	0.000
Selenium	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.		.	.	.	.		.	.	.	.	.	.	.
Silicon	0.002	0.575	0.017	0.292	0.231	0.000	0.040	0.779	0.753	0.278	0.000	0.001	0.000	0.000	0.651	0.535	0.004	0.550	0.325	0.014	0.410	0.000	0.322	0.705	0.774	.		0.000	0.155	0.034		0.373	0.244	0.501	0.000	0.000	0.611	0.783
Silver	0.106	0.944	0.793	0.613	0.743	0.465	0.000	0.404	0.102	0.689	0.589	0.542	0.465	0.653	0.645	0.074	0.260	0.132	0.221	0.048	0.882	0.001	0.014	0.690	0.800	.	0.641		0.000	0.000		0.000	0.259	0.513	0.000	0.003	0.338	0.101
Sodium	0.000	0.743	0.402	0.007	0.023	0.586	0.373	0.135	0.402	0.990	0.027	0.464	0.013	0.155	0.053	0.016	0.743	0.793	0.583	0.711	0.972	0.000	0.308	0.382	0.862	.	0.333	0.233		0.000		0.362	0.155	0.110	0.000	0.150	0.057	0.703
Strontium	0.000	0.068	0.043	0.000	0.002	0.018	0.537	0.035	0.956	0.859	0.041	0.429	0.010	0.005	0.457	0.000	0.250	0.865	0.811	0.285	0.714	0.000	0.967	0.174	0.068	.	0.007	0.000	0.000			0.533	0.278	0.100	0.000	0.061	0.124	0.170
Thallium																																						
Tin	0.965	0.000	0.510	0.122	0.008	0.099	0.295	0.220	0.006	0.499	0.152	0.018	0.573	0.060	0.981	0.671	0.170	0.452	0.006	0.960	0.099	0.676	0.014	0.318	0.024	.	0.484	0.009	0.667	0.419			0.006	0.328	0.390	0.191	0.946	0.000
Titantium	0.244	0.102	0.266	0.002	0.065	0.383	0.042	0.719	0.000	0.297	0.000	0.000	0.000	0.043	0.455	0.910	0.000	0.436	0.521	0.005	0.731	0.768	0.083	0.173	0.155	.	0.229	0.083	0.307	0.914		0.001		0.010	0.831	0.000	0.001	0.000
Tungstun	0.714	0.884	0.194	0.716	0.828	0.624	0.721	0.689	0.636	0.400	0.577	0.011	0.613	0.872	0.612	0.680	0.383	0.850	0.565	0.653	0.900	0.551	0.707	0.849	0.538	.	0.416	0.594	0.948	0.916		0.344	0.011		0.686	0.113	0.007	0.003
Uranium	0.000	0.003	0.000	0.085	0.025	0.018	0.421	0.230	0.157	0.634	0.004	0.052	0.003	0.000	0.779	0.001	0.028	0.252	0.974	0.432	0.346	0.000	0.705	0.199	0.001	.	0.001	0.849	0.054	0.000		0.843	0.968	0.399		0.002	0.457	0.282
Vanadium	0.078	0.046	0.518	0.346	0.083	0.678	0.293	0.041	0.000	0.256	0.000	0.411	0.000	0.005	0.037	0.228	0.000	0.002	0.944	0.418	0.304	0.026	0.266	0.726	0.342	.	0.000	0.188	0.127	0.337		0.307	0.000	0.483	0.017		0.035	0.414
Zinc	0.000	0.961	0.015	0.009	0.000	0.710	0.009	0.980	0.534	0.206	0.000	0.000	0.004	0.000	0.290	0.019	0.000	0.863	0.501	0.000	0.868	0.291	0.000	0.822	0.214	.	0.899	0.091	0.162	0.209		0.717	0.000	0.439	0.181	0.306		0.027
Zirconium	0.163	0.001	0.545	0.001	0.000	0.137	0.000	0.785	0.054	0.704	0.078	0.000	0.139	0.003	0.444	0.526	0.000	0.903	0.006	0.060	0.971	0.412	0.821	0.401	0.000	.	0.954	0.346	0.490	0.279		0.000	0.000	0.014	0.193	0.492	0.003	

Kendall Tau

Pearson Correlation Coefficient

All statistical analyses were performed using SPSS v. 15.0.
All non-detected values were replaced by ½ SQL--Gehan ranking was not used to accommodate nondetects in the nonparametric analysis.

Notes:

1. When both metals are normally distributed, a parametric correlation analysis was conducted. The parametric Pearson correlation coefficient is a measure of linear association between two metals.
2. When either metal is not normally distributed or have non-detected values, a nonparametric correlation analysis was conducted. The nonparametric Kendall tau is a measure of the association between rank orders.

Significant correlations are indicated in either **BOLD BLUE** (nonparametric) or **BOLD ORANGE** (parametric) type.
Statistically insignificant correlations or correlations from less preferred analyses given the data distribution are indicated in **GREY**.

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
*** Correlation is significant at the 0.001 level (2-tailed).
0.000 = p-value < 0.001

TABLE H-2
2008 DEEP Qal/McCULLOUGH - CORRELATION FOR RADIONUCLIDES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 1)

Inter-Element Correlation Coefficients (upper triangle: Kendall Tau; lower triangle: Pearson Correlation Coefficient)

Radionuclide		N	No. of Detects	Shapiro-Wilk Signif.	Shapiro-Wilk Normal?	Param Test?	Ra226	Ra228	Th228	Th230	Th232	U233/234	U235/236	U238
Radium 226	Ra226	65	65	0.24	Yes	Yes		0.111	-0.077	**.391(**)**	-.187(*)	**.407(**)**	.249(**)	**.423(**)**
Radium 228	Ra228	64	64	0.07	Yes	Yes	0.106		-0.043	-0.086	0.036	-0.136	0.059	-0.059
Thorium 228	Th228	79	79	0.57	Yes	Yes	-0.127	-0.094		0.049	.316(**)	0.024	-0.09	-0.021
Thorium 230	Th230	79	79	0.002	No	No	.502(**)	-0.184	0.032		-0.049	**.441(**)**	**.201(*)**	**.437(**)**
Thorium 232	Th232	79	79	0.38	Yes	Yes	-0.240	0.043	**.511(**)**	-0.039		-0.094	-0.114	-0.148
Uranium 233/234	U233/234	76	76	0.005	No	No	.604(**)	-0.204	-0.038	.684(**)	-0.085		**.386(**)**	**.732(**)**
Uranium 235/236	U235/236	76	68	0.36	Yes	Yes	**.375(**)**	0.037	-0.150	.315(**)	-0.157	.547(**)		**.387(**)**
Uranium 238	U238	76	76	< 0.001	No	No	.643(**)	-0.096	-0.073	.688(**)	-0.109	.914(**)	.553(**)	

Inter-Element Correlation p-Values (upper triangle: Kendall Tau; lower triangle: Pearson Correlation Coefficient)

Radionuclide		Ra226	Ra228	Th228	Th230	Th232	U233/234	U235/236	U238
Radium 226	Ra226		0.198	0.368	0.000	0.029	0.000	0.003	0.000
Radium 228	Ra228	0.402		0.618	0.322	0.681	0.115	0.494	0.498
Thorium 228	Th228	0.314	0.458		0.531	0.000	0.757	0.251	0.791
Thorium 230	Th230	0.000	0.145	0.779		0.525	0.000	0.011	0.000
Thorium 232	Th232	0.054	0.737	0.000	0.732		0.233	0.147	0.062
Uranium 233/234	U233/234	0.000	0.105	0.745	0.000	0.467		0.000	0.000
Uranium 235/236	U235/236	0.002	0.770	0.195	0.006	0.177	0.000		0.000
Uranium 238	U238	0.000	0.453	0.530	0.000	0.351	0.000	0.000	

All statistical analyses were performed using SPSS v. 15.0.
All non-detected values were replaced by reported measured values.

Notes:

1. When both radionuclides are normally distributed, a parametric correlation analysis was conducted. The parametric Pearson correlation coefficient is a measure of linear association between two radionuclides.
2. When either radionuclide is not normally distributed or have non-detected values, a nonparametric correlation analysis was conducted. The nonparametric Kendall tau is a measure of the association between rank orders.

Significant correlations are indicated in either **BOLD BLUE** (nonparametric) or **BOLD ORANGE** (parametric) type.
Statistically insignificant correlations or correlations from less preferred analyses given the data distribution are indicated in **GREY**.

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
*** Correlation is significant at the 0.001 level (2-tailed).
0.000 = p-value < 0.001

2008 DEEP Qal/RIVER - CORRELATION FOR METALS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA

Inter-Element Correlation Coefficients

Metal		N	No. of Detects	Shapiro Wilks SW Signif	Shapiro Wilks Normal?	Param Test?	Al	Sb	As	Ba	Be	Bo	Cd	Ca	Cr (Tot)	Cr (VI)	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	Nb	Pd	P	Pt	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	W	U	V	Zn	Zr
Aluminum	Al	36	36	0.01	No	No		-0.087	0.195	0.183	.465(**)	0.073	-.271(*)	-0.126	.326(**)	0.004	0.212	0.165	.392(**)	0.014	-0.06	.261(*)	-0.013	-0.143	-0.185	-0.171		-0.164	-0.176		.471(**)		0.094	0.011	.278(*)	-0.064		0.183	.359(**)	0.176	-0.124	0.183	-0.037	0.095
Antimony	Sb	36	36	0.004	No	No	-0.153		0.005	0.063	-0.085	.317(*)	0.114	0.096	0.077	-0.013	0.04	-0.015	0.156	0.142	-0.005	-0.14	-0.018	-0.109	-0.124	0.124		.406(**)	0.086		-0.081		-.244(*)	0.139	-0.041	.394(**)		-0.145	0.025	0.135	0.193	.322(**)	0.069	-0.149
Arsenic	As	36	36	0.002	No	No	0.216	.361(*)		0.184	0.146	-0.239	0.037	-0.091	.295(*)	-0.081	-0.015	-0.047	-0.01	-0.098	-.281(*)	0.188	-.380(**)	-0.125	-0.063	-0.175		-0.105	-0.193		.284(*)		0.126	-.344(**)	.404(**)	0.026		.301(*)	-0.035	.459(**)	.258(*)	0.021	0.014	0.227
Barium	Ba	36	36	< 0.001	No	No	0.262	0.02	-0.033		0.193	-0.101	-0.09	-0.016	-0.047	0.223	-0.049	0.01	-0.029	-0.083	-.240(*)	0.027	0.068	-0.018	-0.055	-0.151		0.085	-.286(*)		.285(*)		-0.061	0.137	0.118	0.078		-0.049	-0.062	0.002	-0.075	-0.07	-0.169	0.032
Beryllium	Be	36	36	0.03	No	No	.834(**)	-0.19	0.093	0.195		0.036	-0.217	-0.051	.297(*)	-0.042	.341(**)	.358(**)	.371(**)	0.133	0.054	.342(**)	0.047	-0.024	0.042	-0.092		-0.162	-0.183		0.211		0.206	-0.007	0.016	-0.064		0.176	.322(**)	-0.019	0.069	0.18	-0.049	0.156
Boron	Bo	36	8	< 0.001	No	No	-0.037	.525(**)	0.238	-0.006	-0.048		-0.071	0.146	0.082	-0.216	0.113	0.058	.285(*)	0.187	.427(**)	-0.169	.281(*)	-0.072	0.062	.266(*)		.287(*)	.291(*)		-0.234		-.422(**)	0.083	-0.08	0.199		-0.224	.324(*)	-0.018	-0.14	.269(*)	0.095	-.454(**)
Cadmium	Cd	36	23	0.004	No	No	-.401(*)	0.063	0.07	-0.246	-0.285	-0.047		.291(*)	0.039	-0.058	.261(*)	0.188	0.08	0.167	-0.042	-.238(*)	0.121	0.134	.272(*)	.335(**)		0.074	.346(**)		-0.138		0.097	-0.107	-.276(*)	0.162		0.119	-0.012	0.086	0.069	0.082	.343(**)	0.208
Calcium	Ca	36	36	0.92	Yes	Yes	-0.158	0.065	-0.249	-0.07	-0.082	-0.019	.425(**)		-0.157	-0.092	0.042	0.023	0.019	0.144	-0.049	-0.171	.253(*)	0.152	0.12	0.054		0.211	0.095		-0.056		-0.159	0.169	-.239(*)	0.113		-.323(*)	-0.056	-.394(**)	0.044	-0.144	-0.095	-0.21
Chromium	Cr (Tot)	36	36	< 0.001	No	No	.407(*)	0.021	0.272	-0.109	.404(*)	0.066	0.014	-.343(*)		-.283(*)	.335(**)	.292(*)	.480(**)	0.144	-0.018	.346(**)	-0.223	0.038	0.178	0.05		-.263(*)	-0.082		0.168		0.128	-.312(**)	0.086	-0.084		.424(**)	.377(**)	.443(**)	0.204	.390(**)	0.169	.241(*)
Chromium VI	Cr (VI)	41	16	< 0.001	No	No	0.069	-0.139	-0.051	0.029	-0.001	-0.21	0.08	-0.131	-0.012		-0.194	-.282(*)	-.267(*)	-.292(*)	-.273(*)	-0.216	0.229	0	0.024	0.002		0.179	-0.153		.275(*)		0.017	0.124	0.076	0.188		-0.086	-.347(**)	-0.081	-0.196	-.309(*)	-0.223	-0.126
Cobalt	Co	36	36	0.77	Yes	Yes	0.167	-0.086	-0.113	-0.023	.329(*)	0.048	.394(*)	0.024	.472(**)	0.08		.619(**)	.585(**)	0.172	.248(*)	0.206	0.196	0.169	.340(**)	.365(**)		-0.095	.252(*)		0		0.162	-0.032	-.237(*)	0.021		.300(*)	.445(**)	0.086	0.09	.399(**)	.311(**)	.262(*)
Copper	Cu	36	36	0.16	Yes	Yes	0.135	-0.192	-0.156	0.16	.376(*)	-0.104	0.257	-0.121	.477(**)	0.018	.698(**)		.536(**)	.302(*)	.329(**)	0.166	0.165	0.093	.302(*)	.261(*)		-.275(*)	.238(*)		-0.072		0.167	0.055	-.305(**)	-0.166		0.243	.474(**)	0.06	0.068	.351(**)	.337(**)	.297(*)
Iron	Fe	36	36	0.47	Yes	Yes	.401(*)	0.119	-0.013	0.091	.455(**)	0.194	0.072	0.026	.596(**)	-0.22	.723(**)	.675(**)		.327(**)	.267(*)	0.168	0.104	0.079	0.196	.245(*)		-0.173	0.204		-0.027		0.045	-0.022	-0.125	-0.046		0.189	.715(**)	0.168	0.076	.625(**)	.259(*)	0.183
Lead	Pb	36	36	< 0.001	No	No	-0.121	-0.075	-0.199	-0.17	-0.048	0.056	0.238	0.327	-0.037	-0.259	0.115	0.314	0.326		.314(**)	-0.046	-0.043	0.028	0.134	0.101		-0.115	.309(**)		-.257(*)		0.077	0.179	-0.121	-0.104		0.007	.436(**)	-0.158	0.003	.368(**)	.348(**)	0.185
Lithium	Li	36	36	0.31	Yes	Yes	-0.199	-0.019	-.338(*)	-0.04	-0.019	.356(*)	0.01	-0.001	0.03	-0.209	.335(*)	.385(*)	.376(*)	.552(**)		0.029	0.153	-0.032	0.183	.290(*)		-0.096	.342(**)		-.356(**)		-0.056	0.053	-0.154	-0.118		0.071	.436(**)	-0.101	0.029	.327(**)	.307(**)	0.002
Magnesium	Mg	36	36	0.001	No	No	.412(*)	-0.111	0.189	-0.051	.490(**)	-0.126	-0.178	-.370(*)	.552(**)	0.065	.383(*)	.460(**)	.366(*)	-0.096	0.076		-.255(*)	-0.111	-0.005	-0.223		-.277(*)	-.329(**)		0.159		0.183	-0.126	0.091	-.236(*)		.353(**)	0.131	0.105	.305(*)	0.126	-0.072	.289(*)
Manganese	Mn	36	36	< 0.001	No	No	-0.185	0.057	-0.328	0.117	-0.067	0.153	0.185	0.308	-0.236	0.076	0.266	0.085	0.013	-0.113	0.289	-0.291		0.198	.261(*)	.312(**)		.257(*)	0.157		-0.099		-0.059	0.171	-.342(**)	0.15		-0.201	0.064	-.288(*)	-0.177	-0.043	0.027	-0.182
Mercury	Hg	28	5	< 0.001	No	No	-0.202	-0.154	-0.172	-0.121	-0.085	-0.114	0.19	0.055	-0.067	0.046	0.163	0.184	-0.068	-0.117	-0.092	-0.182	0.116		0.236	.348(*)		0.145	0.106		-0.152		0.253	-0.088	-0.17	0.203		-0.106	0.032	-0.021	0.207	0.088	.354(*)	0.09
Molybdenum	Mo	36	31	0.02	No	No	-.527(**)	-0.121	-0.159	-0.203	-0.295	0.021	.508(**)	0.094	0.086	0.216	.444(**)	.341(*)	0.123	0.093	0.282	-0.091	.358(*)	0.3		.253(*)		-0.074	0.182		-.316(**)		0.143	-0.203	-0.211	0.002		0.251	0.187	-0.072	0.109	0.138	0.146	0.074
Nickel	Ni	36	36	0.52	Yes	Yes	-.404(*)	0.113	-0.194	-0.193	-0.251	0.2	.497(**)	0.126	0.098	0.202	.504(**)	0.296	0.179	0.107	.412(*)	-0.187	.358(*)	.406(*)	.574(**)			0.201	.374(**)		-0.159		0.058	-0.029	-.240(*)	0.217		-0.011	0.159	0.023	0.036	.260(*)	.438(**)	0.052
Niobium	Nb	36	3																																									
Palladium	Pd	36	36	0.18	Yes	Yes	-0.188	.550(**)	-0.028	-0.006	-0.242	0.322	0.093	0.297	-.388(*)	0.185	-0.179	-.445(**)	-0.309	-0.216	-0.165	-.443(**)	.385(*)	0.245	-0.001	0.257			-0.011		-0.068		-0.146	0.142	-0.063	.791(**)		-.355(**)	-.270(*)	-0.185	0.169	-0.047	-0.05	-.284(*)
Phosphorus	P	36	36	0.14	Yes	Yes	-.451(**)	-0.011	-0.186	-0.156	-.347(*)	0.134	.421(*)	0.16	-0.178	-0.146	.390(*)	0.286	0.255	.474(**)	.566(**)	-0.291	0.15	0.124	.404(*)	.518(**)		-0.097			-.405(**)		-0.079	0.096	-0.2	-0.018		0.021	.288(*)	0.023	-0.221	0.217	.381(**)	-0.016
Platinum	Pt	36	0									0.123				-0.087																												
Potassium	K	36	36	< 0.001	No	No	.851(**)	-0.229	0.228	0.23	.630(**)	-0.2	-.351(*)	-0.133	0.212	0.254	-0.125	-0.131	-0.028	-0.283	-.504(**)	0.184	-0.246	-0.167	-.596(**)	-.440(**)		-0.037	-.575(**)				0.068	-0.005	.291(*)	0.019		0.125	-0.118	0.201	-0.059	-0.186	-0.16	0.086
Selenium	Se	36	0																																									
Silicon	Si	36	36	0.25	Yes	Yes	0.252	-0.302	0.079	-0.175	.407(*)	-0.27	0.123	-0.234	0.252	0.271	0.24	0.243	0.026	0.02	-0.134	0.204	-0.107	0.23	0.12	0.099		-0.157	-0.082		0.261			-0.07	-0.092	-0.1		.390(**)	0.107	-0.009	0.195	0.099	0.213	.523(**)
Silver	Ag	36	36	< 0.001	No	No	0.004	0.1	-0.273	0.106	0.004	-0.077	0.052	0.097	-0.224	0.11	0.122	0.038	-0.034	0.137	0.048	-0.166	0.037	-0.14	-0.169	0.122		0.101	0.189		0.031		.352(*)		-.239(*)	-0.04		-.338(**)	0.021	-.477(**)	-.292(*)	-0.125	-0.115	-0.081
Sodium	Na	36	36	0.04	No	No	.334(*)	0.171	.712(**)	0.057	0.039	0.179	-0.328	-0.296	0.057	0.023	-.406(*)	-.447(**)	-0.239	-0.13	-0.269	0.046	-.436(**)	-0.207	-.414(*)	-.423(*)		0.009	-0.2		.425(**)		-0.089	-0.17		-0.005		0.166	-0.049	.357(**)	0.01	-0.056	-0.045	-0.039
Strontium	Sr	36	36	< 0.001	No	No	-0.114	.705(**)	.421(*)	-0.101	-0.212	.490(**)	0.151	0.01	-0.059	0.141	-0.114	-.355(*)	-0.153	-0.221	-0.169	-0.244	0.106	0.136	0.007	0.249		.824(**)	-0.087		-0.033		-0.142	-0.11	0.304			-0.217	-0.197	0.05	.256(*)	0.065	0.037	-0.183
Thallium	Tl	36	0																																									
Tin	Sn	36	16	< 0.001	No	No	0.102	-0.161	.442(**)	-0.199	0.159	-0.041	0.2	-.413(*)	.511(**)	0.188	.378(*)	.351(*)	0.231	0.042	0.069	.502(**)	-0.313	-0.113	0.287	-0.001		-.513(**)	0.06		-0.02		.493(**)	0.003	0.205	-0.128			0.239	.448(**)	0.167	.258(*)	.293(*)	.472(**)
Titantium	Ti	36	36	0.94	Yes	Yes	0.315	-0.011	-0.027	0.109	.383(*)	0.231	0.025	-0.063	.444(**)	-0.318	.629(**)	.629(**)	.887(**)	.450(**)	.563(**)	0.211	0.102	0.001	0.196	0.167		-.412(*)	.408(*)		-0.115		0.091	0.024	-0.153	-0.261		0.299		0.105	-0.079	.566(**)	.335(**)	0.189
Tungsten	W	36	9	< 0.001	No	No	0.103	0.299	.748(**)	-0.181	-0.02	.337(*)	0.184	-.358(*)	.424(**)	-0.031	0.078	0.078	0.7	-0.211	-0.179	0.152	-0.318	0.022	0.014	0.071		-0.118	0.015		0.058		-0.031	-0.3	.471(**)	.381(*)		.488(**)	0.157		0.111	0.232	.274(*)	0.153
Uranium	U	36	36	0.06	Yes	Yes	-0.106	.529(**)	.529(**)	-0.273	0.052	.359(*)	0.128	-0.123	.341(*)	0.027	0.045	0.011	0.049	-0.104	-0.036	.370(*)	-0.169	0.138	0.134	0.11		0.265	-0.176		-0.187		0.141	-0.311	0.199	.557(**)		0.303	-0.113	.337(*)		0.226	0.126	0.2
Vanadium	V	36	36	0.22	Yes	Yes	0.104	.417(*)	0.262	-0.061	0.142	.391(*)	0.132	-0.215	.547(**)	-0.163	.530(**)	.441(**)	.765(**)	0.277	.389(*)	0.251	-0.023	0.061	0.261	0.328		-0.08	0.295		-0.266		0.079	-0.144	-0.028	0.215		.345(*)	.736(**)	.378(*)	.414(*)		.382(**)	0.197
Zinc	Zn	36	36	< 0.001	No	No	-0.186	-0.042	-0.018	-0.199	-0.058	0.1	.426(**)	0.064	0.062	-0.079	.385(*)	.330(*)	0.157	.436(**)	.418(*)	-0.062	0.118	.518(**)	0.235	.561(**)		-0.044	.610(**)		-0.287		0.187	0.056	-0.071	0.072		0.177	0.288	0.154	0.107	0.248		0.203
Zirconium	Zr	36	29	< 0.001	No	No	0.091	-0.199	.387(*)	-0.11	0.133	-0.317	0.241	-.351(*)	0.257	0.222	0.048	0.167	-0.09	-0.077	-.413(*)	.356(*)	-.523(**)	0.126	-0.014	-0.134		-0.313	-0.19		0.198		.636(**)	0.021	0.131	-0.102		.555(**)	-0.141	0.27	0.319	0.098	0.017	

Kendall Tau

Pearson Correlation Coefficient

Inter-Element Correlation p-Values

Metal	Al	Sb	As	Ba	Be	Bo	Cd	Ca	Cr (Tot)	Cr (VI)	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	Nb	Pd	P	Pt	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	W	U	V	Zn	Zr
Aluminum		0.467	0.096	0.117	0.000	0.586	0.024	0.282	0.006	0.977	0.074	0.160	0.001	0.902	0.605	0.025	0.913	0.356	0.119	0.145		0.164	0.131		0.000		0.421	0.924	0.017	0.586		0.147	0.002	0.182	0.297	0.117	0.754	0.420
Antimony	0.373		0.967	0.602	0.491	0.021	0.359	0.426	0.527	0.918	0.741	0.902	0.197	0.238	0.967	0.243	0.880	0.491	0.308	0.303		0.001	0.476		0.501		0.042	0.249	0.732	0.001		0.264	0.837	0.320	0.115	0.007	0.564	0.221
Arsenic	0.206	0.030		0.117	0.223	0.074	0.761	0.437	0.013	0.518	0.902	0.692	0.935	0.406	0.016	0.108	0.001	0.421	0.594	0.137		0.375	0.099		0.015		0.282	0.003	0.001	0.827		0.017	0.764	0.001	0.031	0.859	0.902	0.056
Barium	0.122	0.910	0.849		0.106	0.452	0.456	0.892	0.692	0.076	0.682	0.935	0.806	0.478	0.040	0.817	0.558	0.905	0.642	0.200		0.469	0.014		0.015		0.605	0.241	0.313	0.504		0.701	0.595	0.986	0.528	0.549	0.149	0.785
Beryllium	0.000	0.268	0.591	0.255		0.792	0.078	0.671	0.014	0.746	0.005	0.003	0.002	0.267	0.651	0.004	0.691	0.881	0.731	0.443		0.179	0.125		0.077		0.085	0.956	0.891	0.593		0.172	0.007	0.889	0.572	0.132	0.681	0.197
Boron	0.828	0.001	0.162	0.970	0.780		0.607	0.275	0.547	0.133	0.407	0.665	0.033	0.164	0.001	0.208	0.035	0.681	0.651	0.048		0.033	0.029		0.080		0.002	0.535	0.547	0.137		0.122	0.015	0.905	0.307	0.044	0.475	0.001
Cadmium	0.015	0.714	0.684	0.147	0.092	0.787		0.016	0.750	0.656	0.033	0.122	0.507	0.167	0.730	0.048	0.314	0.410	0.027	0.006		0.543	0.004		0.252		0.423	0.377	0.022	0.181		0.361	0.923	0.528	0.578	0.499	0.004	0.089
Calcium	0.356	0.706	0.143	0.685	0.636	0.913	0.010		0.185	0.463	0.722	0.849	0.870	0.220	0.673	0.145	0.030	0.326	0.312	0.643		0.074	0.414		0.633		0.173	0.149	0.041	0.333		0.010	0.633	0.003	0.711	0.220	0.414	0.076
Chromium	0.014	0.905	0.109	0.526	0.015	0.704	0.934	0.041		0.026	0.005	0.014	0.000	0.224	0.881	0.003	0.060	0.811	0.139	0.672		0.028	0.486		0.156		0.281	0.008	0.469	0.478		0.001	0.001	0.001	0.091	0.001	0.152	0.044
Chromium VI	0.693	0.425	0.773	0.869	0.995	0.226	0.650	0.452	0.946		0.130	0.026	0.034	0.020	0.030	0.086	0.069	1.000	0.848	0.988		0.158	0.223		0.029		0.895	0.325	0.547	0.134		0.527	0.006	0.567	0.128	0.014	0.076	0.324
Cobalt	0.329	0.617	0.512	0.896	0.050	0.782	0.017	0.888	0.004	0.648		0.000	0.000	0.147	0.037	0.083	0.098	0.282	0.005	0.002		0.427	0.033		1.000		0.172	0.785	0.046	0.859		0.019	0.000	0.520	0.458	0.001	0.009	0.029
Copper	0.434	0.262	0.362	0.351	0.024	0.546	0.130	0.481	0.003	0.919	0.000		0.000	0.011	0.005	0.160	0.160	0.551	0.012	0.028		0.021	0.044		0.539		0.156	0.643	0.010	0.160		0.056	0.000	0.652	0.573	0.003	0.004	0.013
Iron	0.015	0.489	0.940	0.596	0.005	0.256	0.675	0.880	0.000	0.203	0.000	0.000		0.005	0.023	0.152	0.376	0.613	0.101	0.038		0.144	0.081		0.817		0.703	0.849	0.288	0.693		0.135	0.000	0.206	0.528	0.000	0.027	0.122
Lead	0.482	0.662	0.244	0.321	0.781	0.745	0.161	0.052	0.831	0.133	0.506	0.062	0.052		0.007	0.693	0.713	0.858	0.262	0.390		0.332	0.008		0.028		0.513	0.127	0.300	0.376		0.953	0.000	0.232	0.978	0.002	0.003	0.119
Lithium	0.245	0.912	0.044	0.816	0.914	0.033	0.952	0.996	0.862	0.228	0.046	0.020	0.024	0.000		0.806	0.191	0.835	0.122	0.014		0.413	0.003		0.002		0.633	0.653	0.186	0.313		0.574	0.000	0.446	0.805	0.005	0.009	0.989
Magnesium	0.013	0.520	0.271	0.768	0.002	0.463	0.298	0.026	0.000	0.709	0.021	0.005	0.028	0.578	0.661		0.029	0.475	0.967	0.058		0.019	0.005		0.173		0.117	0.282	0.437	0.044		0.005	0.264	0.425	0.011	0.282	0.540	0.014
Manganese	0.280	0.740	0.051	0.498	0.699	0.375	0.281	0.068	0.165	0.665	0.117	0.622	0.938	0.512	0.088	0.085		0.201	0.028	0.008		0.029	0.177		0.398		0.614	0.145	0.003	0.200		0.110	0.586	0.029	0.138	0.713	0.817	0.123
Mercury	0.302	0.434	0.381	0.540	0.667	0.563	0.332	0.780	0.735	0.821	0.407	0.350	0.730	0.554	0.642	0.353	0.556		0.135	0.025		0.355	0.494		0.326		0.102	0.572	0.271	0.190		0.541	0.835	0.906	0.188	0.572	0.022	0.570
Molybdenum	0.001	0.483	0.355	0.236	0.081	0.904	0.002	0.587	0.620	0.214	0.007	0.042	0.477	0.590	0.096	0.598	0.032	0.120		0.034		0.538	0.126		0.008		0.229	0.087	0.076	0.989		0.050	0.116	0.590	0.371	0.245	0.219	0.537
Nickel	0.014	0.513	0.257	0.259	0.139	0.241	0.002	0.462	0.571	0.245	0.002	0.079	0.297	0.534	0.012	0.275	0.032	0.032	0.000			0.090	0.001		0.177		0.623	0.806	0.041	0.066		0.929	0.177	0.862	0.763	0.027	0.000	0.662
Niobium																																						
Palladium	0.272	0.001	0.871	0.971	0.155	0.055	0.589	0.079	0.019	0.287	0.296	0.007	0.067	0.206	0.337	0.007	0.020	0.208	0.995	0.130			0.924		0.567		0.214	0.230	0.595	0.000		0.005	0.022	0.165	0.161	0.692	0.672	0.017
Phosphorus	0.006	0.950	0.278	0.365	0.038	0.434	0.011	0.352	0.299	0.402	0.019	0.091	0.133	0.003	0.000	0.085	0.382	0.528	0.014	0.001		0.572			0.001		0.496	0.414	0.086	0.881		0.871	0.014	0.862	0.064	0.064	0.001	0.891
Platinum																																						
Potassium	0.000	0.180	0.182	0.177	0.000	0.243	0.036	0.438	0.215	0.141	0.468	0.448	0.869	0.095	0.002	0.283	0.148	0.395	0.000	0.007		0.829	0.000				0.558	0.967	0.013	0.870		0.322	0.313	0.127	0.621	0.111	0.169	0.469
Selenium																																						
Silicon	0.139	0.073	0.647	0.307	0.014	0.112	0.473	0.170	0.138	0.116	0.159	0.154	0.879	0.908	0.437	0.234	0.536	0.238	0.485	0.565		0.361	0.634		0.124			0.549	0.429	0.391		0.002	0.361	0.945	0.103	0.398	0.068	0.000
Silver	0.981	0.563	0.107	0.538	0.983	0.657	0.764	0.572	0.189	0.530	0.480	0.825	0.844	0.425	0.781	0.335	0.829	0.476	0.324	0.477		0.560	0.270		0.857		0.035		0.041	0.733		0.007	0.859	0.000	0.015	0.288	0.327	0.494
Sodium	0.046	0.319	0.000	0.742	0.822	0.296	0.051	0.079	0.742	0.895	0.014	0.006	0.161	0.448	0.113	0.789	0.008	0.292	0.012	0.010		0.957	0.243		0.010		0.604	0.322		0.967		0.188	0.673	0.007	0.934	0.633	0.703	0.743
Strontium	0.506	0.000	0.011	0.559	0.215	0.002	0.378	0.952	0.734	0.419	0.506	0.034	0.372	0.195	0.325	0.152	0.537	0.489	0.966	0.143		0.000	0.613		0.847		0.408	0.523	0.071			0.086	0.091	0.703	0.032	0.576	0.754	0.123
Thallium																																						
Tin	0.555	0.349	0.007	0.244	0.354	0.811	0.243	0.012	0.001	0.279	0.023	0.036	0.176	0.808	0.691	0.002	0.063	0.568	0.089	0.997		0.001	0.728		0.906		0.002	0.987	0.230	0.456			0.058	0.002	0.195	0.041	0.020	0.000
Titantium	0.062	0.950	0.875	0.527	0.021	0.176	0.885	0.715	0.007	0.063	0.000	0.000	0.000	0.006	0.000	0.216	0.555	0.997	0.253	0.329		0.013	0.014		0.504		0.597	0.887	0.372	0.124		0.077		0.425	0.510	0.000	0.004	0.110
Tungstun	0.549	0.076	0.000	0.558	0.907	0.044	0.282	0.032	0.010	0.860	0.650	0.652	0.321	0.217	0.296	0.377	0.059	0.910	0.936	0.679		0.494	0.929		0.738		0.860	0.076	0.004	0.022		0.003	0.361		0.412	0.080	0.038	0.251
Uranium	0.538	0.001	0.001	0.108	0.763	0.031	0.458	0.475	0.042	0.877	0.795	0.949	0.775	0.548	0.835	0.027	0.324	0.485	0.437	0.524		0.119	0.304		0.276		0.411	0.065	0.244	0.000		0.073	0.510	0.045		0.058	0.291	0.099
Vanadium	0.544	0.011	0.122	0.723	0.410	0.018	0.442	0.208	0.001	0.351	0.001	0.007	0.000	0.102	0.019	0.139	0.892	0.758	0.124	0.051		0.641	0.081		0.117		0.646	0.401	0.870	0.208		0.040	0.000	0.023	0.012		0.001	0.095
Zinc	0.277	0.808	0.915	0.244	0.737	0.561	0.010	0.709	0.720	0.653	0.020	0.049	0.360	0.008	0.011	0.719	0.491	0.005	0.167	0.000		0.798	0.000		0.090		0.275	0.745	0.680	0.676		0.303	0.088	0.371	0.535	0.144		0.085
Zirconium	0.596	0.245	0.020	0.524	0.438	0.059	0.156	0.036	0.130	0.200	0.780	0.329	0.603	0.655	0.012	0.033	0.001	0.522	0.934	0.435		0.063	0.268		0.248		0.000	0.902	0.447	0.553		0.000	0.411	0.111	0.058	0.571	0.922	

Kendall Tau

Pearson Correlation Coefficient

All statistical analyses were performed using SPSS v. 15.0.
All non-detected values were replaced by ½ SQL--Gehan ranking was not used to accommodate nondetects in the nonparametric analysis.

Notes:
1. When both metals are normally distributed, a parametric correlation analysis was conducted. The parametric Pearson correlation coefficient is a measure of linear association between two metals.
2. When either metal is not normally distributed or have non-detected values, a nonparametric correlation analysis was conducted. The nonparametric Kendall tau is a measure of the association between rank orders.

Significant correlations are indicated in either **BOLD BLUE** (nonparametric) or **BOLD ORANGE** (parametric) type.
Statistically insignificant correlations or correlations from less preferred analyses given the data distribution are indicated in **GREY**.

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
*** Correlation is significant at the 0.001 level (2-tailed).
0.000 = p-value < 0.001

TABLE H-4
2008 DEEP Qal/RIVER - CORRELATION FOR RADIONUCLIDES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 1)

Radionuclide		N	No. of Detects	Shapiro-Wilk Signif.	Shapiro-Wilk Normal?	Param Test?	Inter-Element Correlation Coefficients: Ra226	Ra228	Th228	Th230	Th232	U233/234	U235/236	U238
Radium 226	Ra226	28	28	0.93	Yes	Yes		0.176	-0.053	.324(*)	0.194	**.327(*)**	0.082	**.346(*)**
Radium 228	Ra228	28	28	0.25	Yes	Yes	0.241		0.048	0.149	0.248	0.051	-0.045	0.059
Thorium 228	Th228	33	33	0.96	Yes	Yes	-0.074	0.17		0.134	0.226	-0.041	-0.031	-0.1
Thorium 230	Th230	33	33	0.08	Yes	Yes	**.474(*)**	0.165	0.078		.398(**)	**.584(**)**	0.164	**.372(**)**
Thorium 232	Th232	33	33	0.50	Yes	Yes	0.148	0.233	**.362(*)**	**.496(**)**		**.293(*)**	0.03	**0.149**
Uranium 233/234	U233/234	32	31	0.01	No	No	.508(**)	0.022	-0.135	.788(**)	.395(*)		**.321(**)**	**.678(**)**
Uranium 235/236	U235/236	32	18	0.13	Yes	Yes	0.188	-0.164	-0.141	0.318	0.042	**.475(**)**		**.306(*)**
Uranium 238	U238	32	30	0.001	No	No	.475(*)	0.010	-0.210	.661(**)	0.244	.903(**)	.582(**)	

Upper triangle: Kendall Tau. Lower triangle: Pearson Correlation Coefficient.

Radionuclide		Inter-Element Correlation p-Values: Ra226	Ra228	Th228	Th230	Th232	U233/234	U235/236	U238
Radium 226	Ra226		0.192	0.692	0.016	0.149	0.015	0.540	0.010
Radium 228	Ra228	0.217		0.722	0.268	0.066	0.707	0.737	0.663
Thorium 228	Th228	0.710	0.387		0.277	0.067	0.745	0.808	0.426
Thorium 230	Th230	0.011	0.400	0.664		0.001	0.000	0.189	0.003
Thorium 232	Th232	0.452	0.234	0.038	0.003		0.019	0.808	0.236
Uranium 233/234	U233/234	0.006	0.910	0.461	0.000	0.025		0.008	0.000
Uranium 235/236	U235/236	0.339	0.405	0.443	0.076	0.820	0.005		0.012
Uranium 238	U238	0.011	0.959	0.248	0.000	0.179	0.000	0.000	

Upper triangle: Kendall Tau. Lower triangle: Pearson Correlation Coefficient.

All statistical analyses were performed using SPSS v. 15.0.
All non-detected values were replaced by reported measured values.

Notes:

1. When both radionuclides are normally distributed, a parametric correlation analysis was conducted. The parametric Pearson correlation coefficient is a measure of linear association between two radionuclides.
2. When either radionuclide is not normally distributed or have non-detected values, a nonparametric correlation analysis was conducted. The nonparametric Kendall tau is a measure of the association between rank orders.

Significant correlations are indicated in either **BOLD BLUE** (nonparametric) or **BOLD ORANGE** (parametric) type.
Statistically insignificant correlations or correlations from less preferred analyses given the data distribution are indicated in **GREY**.

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
*** Correlation is significant at the 0.001 level (2-tailed).
0.000 = p-value < 0.001

TABLE H-5
2008 DEEP Qal/MIXED - CORRELATION FOR METALS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 1)

Inter-Element Correlation Coefficients (Kendall Tau above diagonal / Pearson Correlation Coefficient)

Metal		N	No. of Detects	Shapiro Wilks SW Signif	Shapiro Wilks Normal?	Param Test?	Al	Sb	As	Ba	Be	Bo	Cd	Ca	Cr (Tot)	Cr (VI)	Co
Aluminum	Al	24	24	0.83	Yes	Yes		.367(*)	.383(**)	0.091	.782(**)		0.09	-0.083	.468(**)		.471(**)
Antimony	Sb	24	23	0.49	Yes	Yes	.439(*)		0.213	.387(*)	.432(**)		0.101	0.045	0.121		.369(*)
Arsenic	As	24	24	0.94	Yes	Yes	.519(**)	0.264		0.044	.456(**)		0.161	-0.088	.584(**)		.407(**)
Barium	Ba	24	24	0.39	Yes	Yes	0.16	.554(**)	0.13		0.078		0.015	0.022	-0.109		0.041
Beryllium	Be	24	24	0.63	Yes	Yes	.907(**)	.524(**)	.574(**)	0.13			0.152	-0.048	.447(**)		.547(**)
Boron	Bo	24	3														
Cadmium	Cd	24	22	0.01	No	No	0.01	0.176	0.232	0.112	0.242			.565(**)	0.086		0.117
Calcium	Ca	24	24	0.98	Yes	Yes	-0.162	0.097	-0.174	0.094	0.016		.654(**)		-0.102		-0.011
Chromium	Cr (Tot)	24	24	< 0.001	No	No	0.103	0.102	.499(*)	-0.05	0.333		.453(*)	0.272			.468(**)
Chromium VI	Cr (VI)	14	2														
Cobalt	Co	24	24	0.00	No	No	0.393	.602(**)	0.333	0.322	.494(*)		0.138	0.067	0.193		
Copper	Cu	24	24	0.94	Yes	Yes	.482(*)	.412(*)	.589(**)	0.102	.591(**)		0.344	-0.009	.559(**)		.623(**)
Iron	Fe	24	24	0.11	Yes	Yes	.681(**)	0.394	.663(**)	0.001	.735(**)		-0.087	-0.271	0.392		.524(**)
Lead	Pb	24	24	0.00	No	No	0.217	.737(**)	0.131	.544(**)	0.314		0.003	-0.089	0.073		.734(**)
Lithium	Li	24	24	0.10	Yes	Yes	.769(**)	0.202	.420(*)	-0.09	.780(**)		-0.036	-0.136	0.251		0.284
Magnesium	Mg	24	24	0.48	Yes	Yes	.784(**)	0.285	.730(**)	-0.044	.789(**)		0.169	-0.043	.472(*)		0.343
Manganese	Mn	24	24	< 0.001	No	No	0.365	.416(*)	0.317	0.309	.439(*)		0.348	0.2	0.268		.689(**)
Mercury	Hg	24	10	< 0.001	No	No	0.157	-0.011	0.188	-0.054	0.233		0.213	-0.104	0.226		0.327
Molybdenum	Mo	24	24	< 0.001	No	No	0.2	0.199	.460(*)	0.393	0.221		0.079	-0.144	0.284		0.159
Nickel	Ni	24	24	0.24	Yes	Yes	.819(**)	0.396	.735(**)	0.072	.822(**)		0.116	-0.124	.478(*)		.459(*)
Niobium	Nb	24	3														
Palladium	Pd	24	24	0.21	Yes	Yes	.506(*)	0.392	0.113	.510(*)	.405(*)		-0.088	-0.026	-0.157		0.14
Phosphorus	P	24	24	0.56	Yes	Yes	-0.152	-0.33	0.132	-0.104	-0.125		0.071	0.047	0.069		0.088
Platinum	Pt	24	0														
Potassium	K	24	24	0.52	Yes	Yes	.787(**)	0.336	.468(*)	0.033	.799(**)		0.364	0.022	0.358		0.263
Selenium	Se	24	0														
Silicon	Si	24	24	< 0.001	No	No	0.058	0.202	0.004	0.061	0.053		0.202	-0.062	0.026		0.054
Silver	Ag	24	24	< 0.001	No	No	0.001	0.088	0.143	-0.091	0.064		-0.27	-0.384	0.174		-0.023
Sodium	Na	24	24	0.21	Yes	Yes	0.148	.482(*)	-0.188	.458(*)	0.057		-0.063	0.047	-0.195		0.185
Strontium	Sr	24	24	0.15	Yes	Yes	.492(*)	.483(*)	0.186	.630(**)	0.375		0.013	0.057	-0.116		0.153
Thallium	Tl	24	0														
Tin	Sn	24	15	< 0.001	No	No	0.248	0.352	.439(*)	-0.059	.455(*)		0.372	-0.024	.455(*)		0.119
Titantium	Ti	24	24	0.44	Yes	Yes	.519(**)	.468(*)	.648(**)	0.07	.556(**)		0.178	-0.113	.526(**)		0.382
Tungsten	W	24	15	0.00	No	No	0.128	.430(*)	-0.075	0.288	0.233		0.206	-0.039	0.203		0.132
Uranium	U	24	24	0.02	No	No	.778(**)	0.393	0.372	-0.044	.884(**)		0.289	0.124	0.315		.519(**)
Vanadium	V	24	24	0.23	Yes	Yes	0.235	0.332	.619(**)	0.184	0.324		-0.016	-0.204	.466(*)		0.301
Zinc	Zn	24	24	0.18	Yes	Yes	.516(**)	0.307	.438(*)	0.022	.604(**)		0.315	-0.034	0.381		0.332
Zirconium	Zr	24	15	< 0.001	No	No	.465(*)	0.18	0.018	0.073	.430(*)		-0.12	-0.052	-0.057		0.103

Metal	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	Nb	Pd	P	Pt	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	W	U	V	Zn	Zr
Aluminum	.361(**)	.496(**)	0.243	.587(**)	.596(**)	.290(*)	0.022	0.087	.662(**)		.303(*)	-0.083		.633(**)		0.015	0.099	0.109	.304(*)		.329(*)	.384(*)	0.129	.635(**)	0.142	.473(**)	.417(**)
Antimony	.320(*)	0.271	.557(**)	0.16	0.163	0.223	-0.06	0.273	0.286		.390(*)	-0.265		.349(*)		0.004	0.108	.397(**)	.443(**)		.397(*)	.352(*)	.388(*)	.438(**)	0.209	0.22	0.207
Arsenic	.440(**)	.422(**)	0.088	0.26	.596(**)	0.259	0.125	.318(*)	.551(**)		0.088	0.095		.369(*)		0.062	-0.074	-0.186	0.128		0.288	.353(*)	-0.024	0.209	.358(*)	.442(**)	0.129
Barium	0.007	-0.091	.298(*)	-0.036	-0.026	0.076	-0.04	0.193	-0.029		.330(*)	-0.08		0.055		-0.098	-0.022	.403(**)	.439(**)		-0.09	-0.025	0.094	-0.048	0.051	-0.04	-0.02
Beryllium	.412(**)	.580(**)	0.248	.512(**)	.615(**)	.369(*)	0.014	0.207	.667(**)		0.287	0.004		.600(**)		0.007	0.146	0.037	0.258		.403(**)	.391(**)	0.203	.712(**)	0.263	.507(**)	.393(*)
Boron																											
Cadmium	0.214	-0.038	-0.026	-0.12	0.112	.321(*)	0.005	0.037	0.098		0.019	0.086		0.27		0.052	-0.235	-0.105	0.075		0.21	0.127	-0.02	0.255	-0.011	0.247	-0.004
Calcium	-0.044	-0.194	-0.131	-0.248	-0.055	0.221	-0.146	-0.098	-0.117		0.051	-0.022		0.033		-0.098	-0.251	-0.069	0.098		-0.027	-0.018	-0.031	0.096	-0.138	0.011	-0.016
Chromium	.482(**)	.508(**)	0.145	.438(**)	.572(**)	0.214	0.146	0.222	.615(**)		0.015	0.036		.383(**)		-0.04	0.111	-0.149	-0.047		.381(*)	.439(**)	0.106	.320(*)	.342(*)	.434(**)	0.164
Chromium VI																											
Cobalt	.632(**)	.644(**)	.306(*)	.366(*)	.520(**)	.493(**)	0.18	0.192	.694(**)		0.071	0.114		.295(*)		0.059	0.079	-0.007	0.044		.350(*)	.324(*)	0.151	.608(**)	.298(*)	.443(**)	0.174
Copper		.539(**)	.314(*)	0.161	.442(**)	.383(**)	0.276	0.157	.585(**)		-0.059	0.146		.333(*)		0.216	-0.085	-0.128	-0.055		.532(**)	.426(**)	0.275	.390(*)	.358(*)	.552(**)	-0.055
Iron	.732(**)		0.223	.429(**)	.542(**)	0.234	-0.04	0.183	.689(**)		-0.026	0.15		0.278		0.168	0.226	-0.044	-0.051		.505(**)	.474(**)	0.063	.527(**)	.523(**)	.571(**)	0.141
Lead	0.364	0.327		0.153	-0.004	-0.018	0.137	0.193	0.234		0.161	-0.211		0.2		-0.084	0.192	.294(*)	0.178		.365(*)	0.207	0.196	0.288	0.2	0.149	0.09
Lithium	.410(*)	.541(**)	0.119		.464(**)	0.077	0.076	0.084	.485(**)		0.25	-0.073		.450(**)		-0.201	0.274	0.084	0.164		0.244	0.208	-0.059	.482(**)	0.051	0.267	.462(**)
Magnesium	.648(**)	.713(**)	0.061	.786(**)		.327(*)	0.102	0.051	.661(**)		0.143	0.033		.562(**)		0.095	-0.011	-0.109	0.131		.354(*)	.371(*)	-0.02	.433(**)	0.266	.511(**)	0.293
Manganese	.492(*)	0.227	0.274	0.185	0.312		0.137	0.073	.399(**)		0.106	0.243		0.262		0.145	-0.144	-0.065	0.116		0.078	.326(*)	0.199	.388(*)	0.156	0.211	0.043
Mercury	.414(*)	0.073	0.066	0.262	0.287	.569(**)		-0.036	0.103		-0.188	0.102		0.084		0.138	-0.225	-0.137	-0.199		0.062	-0.031	0.129	-0.005	-0.129	0.107	-0.185
Molybdenum	0.178	0.191	0.16	0.053	0.052	.410(*)	0.152		0.165		0.106	0.281		0.036		-0.124	0.24	0.051	0.116		0.087	0.138	-0.027	0.032	.361(*)	0.131	-0.07
Nickel	.778(**)	.880(**)	0.19	.667(**)	.841(**)	0.384	0.219	0.329			0.044	0.066		.451(**)		0.092	0.067	-0.121	0.018		.423(**)	.464(**)	0.095	.585(**)	.337(*)	.591(**)	0.232
Niobium																											
Palladium	-0.112	-0.015	0.303	0.33	0.15	0.276	-0.163	0.332	0.142			-0.286		0.253		-.385(**)	0.097	.340(*)	.815(**)		-0.154	0.026	0.134	0.21	-0.169	-0.15	.566(**)
Phosphorus	0.128	0.163	-0.267	-0.154	-0.035	0.149	0.107	0.306	0.105		-.434(*)			-0.128		0.23	-0.074	-0.134	-0.229		-0.043	0.076	-0.204	-0.048	.327(*)	0.164	-.402(**)
Platinum																											
Potassium	.494(*)	.425(*)	0.134	.682(**)	.745(**)	.448(*)	.437(*)	0.162	.661(**)		0.373	-0.269				0	-0.004	0.145	0.269		.385(*)	.429(**)	0.161	.573(**)	0.069	.372(*)	.340(*)
Selenium																											
Silicon	0.36	0.313	-0.026	-0.189	0.031	-0.013	-0.036	-0.096	0.269		-.485(*)	0.306		-0.014			-0.255	-0.065	-0.218		.307(*)	0.233	0.086	0.024	0.259	.361(*)	-.399(**)
Silver	-0.097	0.179	0.164	0.275	0.124	-0.162	-0.192	0.027	0.013		0.112	-0.024		-0.033		-0.155		0.247	0.018		0.116	0.011	0.044	0.13	0.111	0.041	0.257
Sodium	-0.156	-0.166	.433(*)	0.123	-0.05	0.083	-0.261	0.044	-0.093		.571(**)	-0.198		0.085		-0.097	0.305		.442(**)		0	0.029	0.051	0.108	-0.054	-0.131	0.16
Strontium	-0.042	-0.005	0.3	0.226	0.152	0.312	-0.183	.441(*)	0.195		.951(**)	-0.329		0.353		-0.33	-0.007	.613(**)			-0.133	0.065	0.059	0.196	-0.098	-0.095	.409(**)
Thallium																											
Tin	.466(*)	.525(**)	0.235	0.291	.467(*)	-0.11	0.146	-0.081	.432(*)		-0.328	-0.06		.426(*)		.434(*)	0.25	-0.15	-0.28			.478(**)	0.292	.454(**)	.412(**)	.617(**)	-0.034
Titantium	.631(**)	.724(**)	0.312	0.336	.653(**)	0.244	0.026	0.176	.748(**)		0.062	-0.018		.568(**)		0.349	0.214	0.118	0.14		.597(**)		0.246	.419(**)	.512(**)	.393(**)	0.074
Tungsten	0.225	0.069	0.325	-0.083	-0.029	0.391	0.238	0.204	0.066		0.213	-0.329		0.278		0.195	0.063	0.028	0.175		0.163	0.138		0.155	-0.024	0.102	0.101
Uranium	.592(**)	.599(**)	0.24	.806(**)	.744(**)	.462(*)	0.36	-0.062	.704(**)		0.236	-0.132		.817(**)		0.066	0.033	0.089	0.171		.435(*)	.498(*)	0.107		0.192	.405(**)	.442(**)
Vanadium	.542(**)	.756(**)	0.33	0.137	0.399	-0.026	-0.114	0.319	.601(**)		-0.207	0.288		0.124		.416(*)	0.229	-0.092	-0.083		.631(**)	.749(**)	-0.059	0.173		.368(*)	-0.144
Zinc	.655(**)	.720(**)	0.199	0.385	.529(**)	0.122	0.111	0.066	.710(**)		-0.265	0.199		0.385		.668(**)	0.043	-0.218	-0.211		.656(**)	.539(**)	0.224	.514(*)	.548(**)		-0.016
Zirconium	-0.123	-0.012	0.18	.524(**)	0.253	0.216	-0.017	0.007	0.11		.796(**)	-.581(**)		.492(*)		-.622(**)	0.257	0.334	.601(**)		-0.236	0.041	0.186	.440(*)	-0.361	-0.263	

Pearson Correlation Coefficient

Kendall Tau

Inter-Element Correlation p-Values

Metal	Al	Sb	As	Ba	Be	Bo	Cd	Ca	Cr (Tot)	Cr (VI)	Co	Cu	Fe	Pb
Aluminum		0.015	0.009	0.535	0.000		0.549	0.568	0.001		0.001	0.014	0.001	0.096
Antimony	0.032		0.160	0.011	0.005		0.512	0.764	0.422		0.016	0.035	0.075	0.000
Arsenic	0.009	0.213		0.766	0.002		0.283	0.551	0.000		0.006	0.003	0.004	0.551
Barium	0.454	0.005	0.546		0.601		0.920	0.882	0.457		0.784	0.960	0.535	0.042
Beryllium	0.000	0.009	0.003	0.544			0.316	0.746	0.003		0.000	0.006	0.000	0.095
Boron														
Cadmium	0.964	0.410	0.276	0.603	0.254			0.000	0.566		0.437	0.154	0.803	0.861
Calcium	0.451	0.653	0.415	0.663	0.941		0.001		0.487		0.940	0.766	0.188	0.372
Chromium	0.633	0.636	0.013	0.816	0.112		0.026	0.198			0.002	0.001	0.001	0.321
Chromium VI														
Cobalt	0.058	0.002	0.112	0.125	0.014		0.521	0.757	0.367			0.000	0.000	0.039
Copper	0.017	0.046	0.002	0.635	0.002		0.100	0.967	0.005		0.001		0.000	0.033
Iron	0.000	0.057	0.000	0.995	0.000		0.685	0.200	0.058		0.009	0.000		0.130
Lead	0.309	0.000	0.543	0.006	0.136		0.990	0.681	0.733		0.000	0.081	0.119	
Lithium	0.000	0.344	0.041	0.675	0.000		0.868	0.526	0.238		0.178	0.046	0.006	0.579
Magnesium	0.000	0.178	0.000	0.838	0.000		0.431	0.843	0.020		0.101	0.001	0.000	0.779
Manganese	0.080	0.043	0.131	0.142	0.032		0.096	0.348	0.205		0.000	0.015	0.287	0.196
Mercury	0.464	0.960	0.379	0.801	0.274		0.319	0.630	0.289		0.119	0.044	0.734	0.760
Molybdenum	0.349	0.351	0.024	0.057	0.299		0.713	0.503	0.178		0.459	0.405	0.371	0.456
Nickel	0.000	0.055	0.000	0.737	0.000		0.590	0.564	0.018		0.024	0.000	0.000	0.373
Niobium														
Palladium	0.012	0.058	0.599	0.011	0.050		0.683	0.904	0.464		0.514	0.602	0.943	0.150
Phosphorus	0.478	0.115	0.538	0.629	0.561		0.741	0.826	0.749		0.682	0.552	0.448	0.208
Platinum														
Potassium	0.000	0.108	0.021	0.878	0.000		0.081	0.920	0.085		0.214	0.014	0.038	0.532
Selenium														
Silicon	0.789	0.345	0.984	0.775	0.807		0.345	0.772	0.905		0.804	0.084	0.136	0.904
Silver	0.998	0.683	0.504	0.674	0.766		0.202	0.064	0.417		0.916	0.653	0.402	0.445
Sodium	0.490	0.017	0.379	0.024	0.792		0.770	0.827	0.360		0.387	0.467	0.438	0.035
Strontium	0.015	0.017	0.384	0.001	0.071		0.952	0.791	0.589		0.475	0.845	0.983	0.154
Thallium														
Tin	0.242	0.092	0.032	0.786	0.026		0.073	0.910	0.026		0.578	0.022	0.009	0.270
Titantium	0.009	0.021	0.001	0.746	0.005		0.406	0.598	0.008		0.065	0.001	0.000	0.138
Tungstun	0.551	0.036	0.727	0.173	0.273		0.334	0.857	0.341		0.540	0.291	0.748	0.122
Uranium	0.000	0.058	0.074	0.838	0.000		0.171	0.563	0.134		0.009	0.002	0.002	0.259
Vanadium	0.269	0.113	0.001	0.388	0.123		0.942	0.340	0.022		0.153	0.006	0.000	0.115
Zinc	0.010	0.144	0.032	0.918	0.002		0.134	0.873	0.066		0.113	0.001	0.000	0.351
Zirconium	0.022	0.401	0.934	0.734	0.036		0.575	0.811	0.792		0.632	0.568	0.957	0.400

Metal	Li	Mg	Mn	Hg	Mo	Ni	Nb	Pd	P	Pt	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	W	U	V	Zn	Zr
Aluminum	0.000	0.000	0.047	0.889	0.551	0.000		0.039	0.568	.	0.000	.	0.921	0.502	0.457	0.037		0.032	0.009	0.399	0.000	0.333	0.001	0.006
Antimony	0.292	0.281	0.139	0.715	0.071	0.060		0.010	0.079	.	0.021	.	0.980	0.482	0.009	0.003		0.012	0.020	0.014	0.006	0.168	0.146	0.188
Arsenic	0.078	0.000	0.078	0.436	0.031	0.000		0.551	0.518	.	0.012	.	0.673	0.618	0.205	0.385		0.062	0.016	0.878	0.178	0.015	0.003	0.399
Barium	0.804	0.862	0.602	0.802	0.188	0.842		0.025	0.585	.	0.710	.	0.503	0.881	0.006	0.003		0.556	0.862	0.539	0.756	0.728	0.785	0.898
Beryllium	0.001	0.000	0.013	0.933	0.163	0.000		0.055	0.980	.	0.000	.	0.960	0.330	0.803	0.082		0.010	0.008	0.191	0.000	0.077	0.001	0.011
Boron																								
Cadmium	0.424	0.454	0.032	0.978	0.803	0.516		0.901	0.566	.	0.072	.	0.727	0.121	0.484	0.618		0.181	0.396	0.898	0.107	0.940	0.099	0.979
Calcium	0.091	0.710	0.130	0.358	0.503	0.426		0.728	0.882	.	0.823	.	0.503	0.091	0.637	0.503		0.858	0.901	0.838	0.535	0.346	0.941	0.919
Chromium	0.003	0.000	0.143	0.358	0.130	0.000		0.921	0.804	.	0.009	.	0.785	0.455	0.309	0.747		0.013	0.003	0.490	0.039	0.020	0.003	0.283
Chromium VI																								
Cobalt	0.014	0.000	0.001	0.264	0.195	0.000		0.636	0.440	.	0.046	.	0.690	0.600	0.960	0.765		0.024	0.029	0.330	0.000	0.044	0.003	0.260
Copper	0.274	0.003	0.009	0.084	0.285	0.000		0.691	0.321	.	0.024	.	0.143	0.567	0.385	0.710		0.001	0.004	0.073	0.012	0.015	0.000	0.720
Iron	0.004	0.000	0.112	0.802	0.214	0.000		0.862	0.308	.	0.059	.	0.253	0.129	0.766	0.728		0.001	0.001	0.682	0.001	0.000	0.000	0.357
Lead	0.297	0.980	0.901	0.388	0.188	0.112		0.274	0.150	.	0.172	.	0.568	0.196	0.044	0.224		0.017	0.157	0.201	0.063	0.172	0.309	0.557
Lithium		0.002	0.602	0.636	0.568	0.001		0.091	0.619	.	0.002	.	0.172	0.065	0.568	0.264		0.113	0.157	0.701	0.002	0.728	0.070	0.003
Magnesium	0.000		0.025	0.522	0.728	0.000		0.332	0.823	.	0.000	.	0.518	0.940	0.457	0.372		0.021	0.011	0.898	0.005	0.070	0.001	0.055
Manganese	0.386	0.138		0.388	0.620	0.007		0.471	0.096	.	0.074	.	0.321	0.332	0.655	0.427		0.609	0.026	0.192	0.012	0.286	0.150	0.779
Mercury	0.216	0.174	0.004		0.824	0.522		0.242	0.522	.	0.597	.	0.388	0.163	0.388	0.211		0.710	0.846	0.439	0.977	0.420	0.504	0.264
Molybdenum	0.805	0.809	0.047	0.478		0.263		0.471	0.056	.	0.804	.	0.398	0.106	0.728	0.427		0.574	0.346	0.858	0.836	0.014	0.371	0.645
Nickel	0.000	0.000	0.064	0.304	0.117			0.765	0.655	.	0.002	.	0.534	0.654	0.412	0.901		0.006	0.002	0.539	0.000	0.022	0.000	0.131
Niobium																								
Palladium	0.116	0.484	0.192	0.448	0.113	0.509			0.053	.	0.086	.	0.009	0.517	0.021	0.000		0.318	0.862	0.384	0.178	0.253	0.308	0.000
Phosphorus	0.471	0.871	0.487	0.618	0.146	0.624		0.034		.	0.385	.	0.118	0.619	0.359	0.118		0.778	0.602	0.184	0.756	0.025	0.264	0.008
Platinum																								
Potassium	0.000	0.000	0.028	0.033	0.451	0.000		0.073	0.204	.		.	1.000	0.980	0.321	0.066		0.012	0.003	0.294	0.000	0.637	0.011	0.026
Selenium																								
Silicon	0.377	0.885	0.951	0.867	0.654	0.204		0.016	0.146	.	0.949	.		0.086	0.655	0.136		0.046	0.112	0.574	0.877	0.078	0.014	0.009
Silver	0.193	0.565	0.450	0.369	0.900	0.952		0.601	0.913	.	0.877	.	0.470		0.096	0.901		0.457	0.941	0.778	0.407	0.455	0.784	0.096
Sodium	0.567	0.817	0.699	0.218	0.839	0.666		0.004	0.353	.	0.692	.	0.652	0.148		0.002		1.000	0.843	0.740	0.485	0.710	0.372	0.295
Strontium	0.289	0.478	0.138	0.393	0.031	0.362		0.000	0.117	.	0.091	.	0.115	0.974	0.001			0.385	0.655	0.701	0.205	0.503	0.519	0.007
Thallium																								
Tin	0.167	0.022	0.608	0.497	0.706	0.035		0.118	0.781	.	0.038	.	0.034	0.239	0.485	0.184			0.002	0.069	0.005	0.007	0.000	0.833
Titantium	0.109	0.001	0.250	0.903	0.411	0.000		0.773	0.933	.	0.004	.	0.095	0.315	0.583	0.514		0.002		0.107	0.007	0.000	0.007	0.627
Tungstun	0.700	0.893	0.059	0.263	0.340	0.759		0.317	0.116	.	0.188	.	0.362	0.768	0.897	0.415		0.448	0.519		0.338	0.878	0.506	0.528
Uranium	0.000	0.000	0.023	0.084	0.773	0.000		0.266	0.539	.	0.000	.	0.758	0.879	0.680	0.424		0.033	0.013	0.619		0.214	0.009	0.006
Vanadium	0.524	0.053	0.905	0.597	0.128	0.002		0.332	0.172	.	0.565	.	0.043	0.282	0.669	0.701		0.001	0.000	0.786	0.418		0.012	0.344
Zinc	0.063	0.008	0.570	0.607	0.759	0.000		0.211	0.351	.	0.064	.	0.000	0.842	0.306	0.321		0.000	0.007	0.292	0.010	0.006		0.919
Zirconium	0.009	0.233	0.312	0.937	0.976	0.607		0.000	0.003	.	0.015	.	0.001	0.226	0.111	0.002		0.267	0.849	0.385	0.031	0.083	0.214	

Pearson Correlation Coefficient

Kendall Tau

All statistical analyses were performed using SPSS v. 15.0.
All non-detected values were replaced by ½ SQL--Gehan ranking was not used to accommodate nondetects in the nonparametric analysis.

Notes:
1. When both metals are normally distributed, a parametric correlation analysis was conducted. The parametric Pearson correlation coefficient is a measure of linear association between two metals.
2. When either metal is not normally distributed or have non-detected values, a nonparametric correlation analysis was conducted. The nonparametric Kendall tau is a measure of the association between rank orders.

Significant correlations are indicated in either **BOLD BLUE** (nonparametric) or **BOLD ORANGE** (parametric) type.
Statistically insignificant correlations or correlations from less preferred analyses given the data distribution are indicated in GREY.
* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
*** Correlation is significant at the 0.001 level (2-tailed).
0.000 = p-value < 0.001

TABLE H-6
2008 DEEP Qal/MIXED - CORRELATION FOR RADIONUCLIDES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 1)

Radionuclide		N	No. of Detects	Shapiro-Wilk Signif.	Shapiro-Wilk Normal?	Param Test?	Inter-Element Correlation Coefficients: Ra226	Ra228	Th228	Th230	Th232	U233/234	U235/236	U238
Radium 226	Ra226	14	14	0.10	Yes	Yes		0.221	0.088	0.09	-0.068	0.514	-0.028	0.448
Radium 228	Ra228	14	13	0.08	Yes	Yes	**.621(*)**		0.253	-0.258	0.169	-0.197	-0.167	-0.177
Thorium 228	Th228	23	23	0.78	Yes	Yes	0.157	0.289		0.092	.373(*)	0.058	-0.345	-0.078
Thorium 230	Th230	23	23	0.98	Yes	Yes	0.060	-0.387	0.296		-0.19	0.314	0.13	0.357
Thorium 232	Th232	23	23	0.62	Yes	Yes	-0.123	0.265	**.556(**)**	-0.174		-0.467	-0.294	-.707(**)
Uranium 233/234	U233/234	11	7	0.01	No	No	0.632	0.104	0.189	0.548	-0.334		0.135	**.804(**)**
Uranium 235/236	U235/236	11	10	0.30	Yes	Yes	-0.177	-0.356	-0.451	0.168	-0.403	0.310		0.234
Uranium 238	U238	11	7	0.53	Yes	Yes	0.424	-0.055	-0.120	0.398	**-.708(*)**	.853(**)	0.462	

Upper triangle: Kendall Tau; lower triangle: Pearson Correlation Coefficient

Radionuclide		Inter-Element Correlation p-Values: Ra226	Ra228	Th228	Th230	Th232	U233/234	U235/236	U238
Radium 226	Ra226		0.273	0.661	0.659	0.741	0.058	0.917	0.107
Radium 228	Ra228	0.018		0.208	0.205	0.409	0.463	0.532	0.521
Thorium 228	Th228	0.592	0.316		0.542	0.014	0.810	0.139	0.748
Thorium 230	Th230	0.837	0.172	0.171		0.213	0.198	0.583	0.146
Thorium 232	Th232	0.676	0.360	0.006	0.427		0.054	0.212	0.004
Uranium 233/234	U233/234	0.068	0.791	0.578	0.081	0.316		0.576	0.001
Uranium 235/236	U235/236	0.650	0.347	0.164	0.621	0.219	0.354		0.336
Uranium 238	U238	0.255	0.887	0.725	0.226	0.015	0.001	0.152	

Upper triangle: Kendall Tau; lower triangle: Pearson Correlation Coefficient

All statistical analyses were performed using SPSS v. 15.0.
All non-detected values were replaced by reported measured values.

Notes:

1. When both radionuclides are normally distributed, a parametric correlation analysis was conducted. The parametric Pearson correlation coefficient is a measure of linear association between two radionuclides.
2. When either radionuclide is not normally distributed or have non-detected values, a nonparametric correlation analysis was conducted. The nonparametric Kendall tau is a measure of the association between rank orders.

Significant correlations are indicated in either **BOLD BLUE** (nonparametric) or **BOLD ORANGE** (parametric) type.
Statistically insignificant correlations or correlations from less preferred analyses given the data distribution are indicated in **GREY**.

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
*** Correlation is significant at the 0.001 level (2-tailed).
0.000 = p-value < 0.001

TABLE H-7
2008 DEEP UMCf - CORRELATION FOR METALS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 1)

Inter-Element Correlation Coefficients

Metal		N	No. of Detects	Shapiro Wilks SW Signif	Shapiro Wilks Normal?	Param Test?	Al	Sb	As	Ba	Be	Bo	Cd	Ca	Cr (Tot)	Cr (VI)	Co	Cu	Fe	Pb	Li
Aluminum	Al	24	24	0.79	Yes	Yes		.654(**)	.752(**)	.375(*)	.842(**)	-0.029	.485(**)	-0.007	.776(**)		.803(**)	.698(**)	.788(**)	.460(**)	-0.015
Antimony	Sb	24	23	0.06	Yes	Yes	.772(**)		.662(**)	.314(*)	.717(**)	0.134	.391(*)	-0.086	.627(**)		.669(**)	.704(**)	.677(**)	.370(*)	-0.079
Arsenic	As	24	24	0.02	No	No	.920(**)	.785(**)		.397(**)	.769(**)	0	.462(**)	0.117	.623(**)		.847(**)	.728(**)	.818(**)	.350(*)	-0.051
Barium	Ba	24	24	0.00	No	No	.434(*)	0.401	.420(*)		.355(*)	-0.126	.519(**)	0.149	.451(**)		.441(**)	.526(**)	.470(**)	0.135	-.295(*)
Beryllium	Be	24	24	0.69	Yes	Yes	.953(**)	.763(**)	.909(**)	.488(*)		0.044	.514(**)	0.081	.691(**)		.813(**)	.712(**)	.784(**)	.359(*)	-0.088
Boron	Bo	24	7	< 0.001	No	No	-0.006	0.267	0.061	-0.069	-0.064		-0.123	0.058	-0.039		-0.112	-0.029	-0.112	-0.286	.446(**)
Cadmium	Cd	24	18	0.02	No	No	.716(**)	.539(**)	.658(**)	.685(**)	.770(**)	-0.238		.308(*)	.481(**)		.535(**)	.614(**)	.539(**)	.370(*)	-.385(*)
Calcium	Ca	24	24	0.31	Yes	Yes	-0.048	-0.236	0.014	0.236	0.099	-0.11	0.352		-0.062		0.088	0.084	0.088	-0.204	-.307(*)
Chromium	Cr (Tot)	24	24	0.16	Yes	Yes	.869(**)	.779(**)	.689(**)	.422(*)	.819(**)	-0.087	.660(**)	-0.185			.696(**)	.672(**)	.696(**)	.419(**)	-0.12
Chromium VI	Cr (VI)	23	2																		
Cobalt	Co	24	24	0.03	No	No	.894(**)	.695(**)	.845(**)	.606(**)	.917(**)	-0.22	.844(**)	0.162	.818(**)			.837(**)	.956(**)	.365(*)	-0.117
Copper	Cu	24	24	0.07	Yes	Yes	.880(**)	.741(**)	.823(**)	.668(**)	.912(**)	-0.18	.871(**)	0.13	.826(**)		.969(**)		.830(**)	.333(*)	-0.157
Iron	Fe	24	24	0.08	Yes	Yes	.894(**)	.704(**)	.828(**)	.611(**)	.896(**)	-0.186	.821(**)	0.125	.838(**)		.984(**)	.966(**)		.343(*)	-0.161
Lead	Pb	24	24	0.35	Yes	Yes	.535(**)	.467(*)	.505(*)	0.203	.493(*)	-.430(*)	.565(**)	-0.217	.549(**)		.550(**)	.529(**)	.526(**)		0.044
Lithium	Li	24	24	< 0.001	No	No	-0.157	-0.055	-0.1	-0.277	-0.241	.881(**)	-.501(*)	-0.104	-0.288		-.419(*)	-.426(*)	-0.383	-.565(**)	
Magnesium	Mg	24	24	0.03	No	No	.793(**)	.789(**)	.759(**)	.443(*)	.739(**)	.497(*)	.517(**)	-0.157	.699(**)		.630(**)	.640(**)	.623(**)	0.283	0.296
Manganese	Mn	24	24	0.01	No	No	.769(**)	.731(**)	.763(**)	.653(**)	.770(**)	0.024	.779(**)	0.016	.681(**)		.846(**)	.836(**)	.805(**)	.454(*)	-0.239
Mercury	Hg	20	5	< 0.001	No	No	.528(*)	.460(*)	.630(**)	0.22	.459(*)	-0.072	0.428	0	0.261		0.443	0.408	0.395	.598(**)	-0.139
Molybdenum	Mo	24	23	0.70	Yes	Yes	.544(**)	.621(**)	.455(*)	.540(**)	.589(**)	0.12	.679(**)	0.156	.559(**)		.574(**)	.695(**)	.592(**)	0.188	-0.169
Nickel	Ni	24	24	0.07	Yes	Yes	.753(**)	.605(**)	.737(**)	.450(*)	.833(**)	-0.239	.734(**)	0.245	.710(**)		.900(**)	.831(**)	.880(**)	.483(*)	-.419(*)
Niobium	Nb	24	1																		
Palladium	Pd	24	24	0.08	Yes	Yes	.496(*)	0.402	.439(*)	.474(*)	.468(*)	0.172	0.365	0.24	.486(*)		.583(**)	.567(**)	.652(**)	-0.076	0.074
Phosphorus	P	24	24	0.34	Yes	Yes	.468(*)	0.2	.420(*)	.463(*)	.565(**)	-.565(**)	.670(**)	0.371	.409(*)		.720(**)	.701(**)	.719(**)	.405(*)	-.697(**)
Platinum	Pt	24	2																		
Potassium	K	24	24	0.03	No	No	.712(**)	.660(**)	.601(**)	0.11	.636(**)	.490(*)	0.375	-0.196	.639(**)		.408(*)	.429(*)	.419(*)	0.271	0.325
Selenium	Se	24	0																		
Silicon	Si	24	24	< 0.001	No	No	0.106	-0.15	-0.04	-0.339	0.125	-0.263	0.08	-0.001	0.106		-0.05	-0.082	-0.078	0.285	-0.156
Silver	Ag	24	24	< 0.001	No	No	0.031	0.097	0.019	0.222	0.204	0.109	0.243	.483(*)	0.02		0.207	0.283	0.201	-0.342	-0.008
Sodium	Na	24	24	0.01	No	No	0.04	0.053	-0.062	-0.202	0.098	-0.029	0.115	0.016	0.056		-0.009	0.019	-0.022	0.22	-0.166
Strontium	Sr	24	24	0.04	No	No	.455(*)	0.235	0.357	0.31	0.404	0.253	0.32	0.368	0.362		.458(*)	.427(*)	.539(**)	-0.147	0.215
Thallium	Tl	24	0																		
Tin	Sn	24	20	0.20	Yes	Yes	.786(**)	.691(**)	.748(**)	.489(*)	.871(**)	0.048	.655(**)	0.042	.695(**)		.799(**)	.819(**)	.797(**)	0.377	-0.123
Titantium	Ti	24	24	0.00	No	No	.602(**)	0.372	.512(*)	0.402	.689(**)	-0.336	.739(**)	0.338	.602(**)		.789(**)	.734(**)	.789(**)	.455(*)	-.506(*)
Tungsten	W	24	5	< 0.001	No	No	0.269	0.147	0.082	0.358	0.22	-0.259	0.284	-0.026	.483(*)		.405(*)	.407(*)	.453(*)	0.158	-0.22
Uranium	U	24	24	< 0.001	No	No	.701(**)	.819(**)	.685(**)	.485(*)	.711(**)	0.313	.696(**)	-0.107	.706(**)		.671(**)	.696(**)	.653(**)	.509(*)	-0.046
Vanadium	V	24	24	0.00	No	No	.779(**)	.501(*)	.683(**)	.562(**)	.791(**)	-.412(*)	.818(**)	0.224	.736(**)		.929(**)	.905(**)	.949(**)	.557(**)	-.559(**)
Zinc	Zn	24	24	0.32	Yes	Yes	.889(**)	.707(**)	.760(**)	.430(*)	.846(**)	-0.075	.754(**)	-0.113	.830(**)		.781(**)	.806(**)	.775(**)	.707(**)	-0.267
Zirconium	Zr	24	24	0.51	Yes	Yes	.619(**)	.510(*)	.677(**)	.419(*)	.767(**)	-0.052	.627(**)	0.318	.473(*)		.757(**)	.735(**)	.738(**)	0.278	-0.222

Metal	Mg	Mn	Hg	Mo	Ni	Nb	Pd	P	Pt	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	W	U	V	Zn	Zr
Aluminum	.659(**)	.647(**)	0.332	.465(**)	.693(**)		.377(*)	.291(*)		.455(**)		0.022	0.179	0.058	0.225		.633(**)	.477(**)	.349(*)	.676(**)	.616(**)	.771(**)	.562(**)
Antimony	.500(**)	.518(**)	0.281	.578(**)	.565(**)		.375(*)	0.272		.310(*)		-0.063	0.246	0.078	0.153		.695(**)	.403(**)	0.285	.633(**)	.515(**)	.578(**)	.580(**)
Arsenic	.565(**)	.618(**)	.372(*)	.436(**)	.672(**)		.435(**)	.305(*)		.295(*)		-0.095	0.222	-0.036	0.276		.682(**)	.434(**)	0.24	.669(**)	.601(**)	.567(**)	.701(**)
Barium	0.225	.475(**)	0.158	.439(**)	.434(**)		.387(**)	.359(*)		0.007		-0.221	0.255	-0.229	0.178		.344(*)	.298(*)	.419(*)	.334(*)	.422(**)	0.265	.368(*)
Beryllium	.574(**)	.650(**)	0.286	.526(**)	.718(**)		.297(*)	.343(*)		.384(**)		0.058	0.267	0.102	0.124		.736(**)	.516(**)	0.246	.753(**)	.567(**)	.664(**)	.692(**)
Boron	.329(*)	-0.092	-0.144	0.198	-0.17		0.058	-0.295		.392(*)		-0.092	0.262	0.189	0.15		0.167	-0.073	-0.261	0.137	-.320(*)	-0.044	0.087
Cadmium	0.235	.591(**)	0.317	.507(**)	.570(**)		.305(*)	.476(**)		0.15		-0.015	0.242	-0.107	0.146		.481(**)	.458(**)	0.322	.477(**)	.511(**)	.453(**)	.478(**)
Calcium	-0.157	0.102	-0.024	0.065	0.139		0.179	0.247		-0.157		-0.058	0.281	-0.058	0.211		0.096	0.171	0	0.081	0.098	-0.124	0.219
Chromium	.575(**)	.563(**)	0.165	.512(**)	.681(**)		.438(**)	0.221		.378(**)		-0.033	0.16	0.004	0.2		.514(**)	.473(**)	.451(**)	.672(**)	.524(**)	.679(**)	.441(**)
Chromium VI																							
Cobalt	.565(**)	.698(**)	0.348	.495(**)	.818(**)		.450(**)	.400(**)		0.281		-0.095	.299(*)	-0.022	0.247		.645(**)	.470(**)	.387(*)	.610(**)	.725(**)	.633(**)	.620(**)
Copper	.504(**)	.696(**)	0.317	.594(**)	.706(**)		.447(**)	.390(**)		0.204		-0.135	.336(*)	-0.055	0.2		.664(**)	.423(**)	.382(*)	.575(**)	.664(**)	.587(**)	.633(**)
Iron	.528(**)	.684(**)	.363(*)	.502(**)	.766(**)		.486(**)	.422(**)		0.259		-0.109	.295(*)	-0.051	0.284		.615(**)	.441(**)	.365(*)	.574(**)	.761(**)	.596(**)	.620(**)
Lead	0.193	0.255	.506(**)	0.131	.365(*)		-0.018	0.182		0.251		0.225	-0.237	0.138	-0.153		0.274	.288(*)	0.142	.397(**)	.332(*)	.582(**)	0.248
Lithium	0.244	-0.196	0.055	-0.153	-0.212		-0.223	-.465(**)		.353(*)		0.109	-0.128	0.145	-0.138		-0.019	-0.251	-0.245	-0.051	-.288(*)	0.087	-0.153
Magnesium		.446(**)	0.221	.338(*)	.448(**)		.336(*)	-0.025		.647(**)		-0.134	0.225	-0.004	0.207		.499(**)	0.196	0.234	.488(**)	.298(*)	.512(**)	.353(*)
Manganese	.745(**)		0.354	.514(**)	.633(**)		.332(*)	.370(*)		0.236		-0.109	.338(*)	-0.159	0.217		.509(**)	.330(*)	.353(*)	.476(**)	.541(**)	.500(**)	.502(**)
Mercury	0.409	.584(**)		0.212	0.3		-0.056	0.15		0.174		0.118	-0.126	-0.024	-0.024		0.218	-0.024	-0.012	0.12	0.308	.401(*)	0.158
Molybdenum	.502(*)	.631(**)	0.35		.422(**)		.339(*)	.319(*)		0.258		-0.101	.330(*)	-0.022	0.167		.531(**)	0.258	0.32	.462(**)	.359(*)	.449(**)	.480(**)
Nickel	.505(*)	.714(**)	0.264	0.339			.399(**)	.480(**)		0.244		-0.022	0.281	0.022	0.175		.545(**)	.455(**)	.463(**)	.581(**)	.638(**)	.589(**)	.544(**)
Niobium																							
Palladium	0.388	.408(*)	-0.036	.445(*)	.452(*)			.302(*)		0.088		-.390(**)	.416(**)	-.288(*)	.659(**)		.338(*)	.307(*)	.464(**)	.306(*)	.489(**)	0.2	.340(*)
Phosphorus	0.028	.454(*)	0.207	0.337	.741(**)		0.368			-0.062		0.101	0.221	0.051	0.21		.325(*)	.396(**)	0.288	0.256	.621(**)	0.261	.444(**)
Platinum																							
Potassium	.832(**)	.433(*)	0.324	0.384	0.345		0.164	-0.087				0.171	0.065	0.243	0.214		.292(*)	0.218	0.033	.411(**)	0.131	.519(**)	0.2
Selenium																							
Silicon	-0.059	-0.205	0.107	-0.133	0.059		-.495(*)	0.042		0.367			-.316(*)	.500(**)	-0.181		0.007	0.069	-0.179	0.081	-0.04	0.13	0.036
Silver	0.018	0.167	-0.226	.534(**)	0.205		.431(*)	0.291		-0.126		-0.349		-0.243	.287(*)		.396(**)	0.116	.353(*)	0.202	0.233	0.025	.368(*)
Sodium	-0.031	-0.128	-0.093	0.002	0.133		-0.392	0.202		0.329		.710(**)	-0.132		-0.072		0.044	0.192	-.353(*)	0.132	-0.033	0.196	0.124
Strontium	0.335	0.248	-0.011	0.374	0.36		.872(**)	0.327		0.311		-0.143	0.31	-0.084			0.118	0.2	0.233	0.095	.345(*)	0.109	0.211
Thallium																							
Tin	.658(**)	.649(**)	0.265	.632(**)	.703(**)		.537(**)	.506(*)		.512(*)		0.016	.422(*)	0.071	.440(*)			.447(**)	0.304	.687(**)	.462(**)	.495(**)	.774(**)
Titantium	0.304	.504(*)	0.066	0.317	.875(**)		.419(*)	.814(**)		0.264		0.269	0.179	0.385	.466(*)		.619(**)		0.277	.539(**)	.458(**)	.454(**)	.499(**)
Tungsten	0.15	0.333	-0.042	0.314	0.322		.492(*)	0.339		-0.1		-0.287	0.302	-.421(*)	0.277		0.328	0.237		0.236	.408(*)	0.299	0.169
Uranium	.845(**)	.758(**)	0.32	.540(**)	.615(**)		0.258	0.233		.724(**)		0.036	0.018	0.243	0.193		.662(**)	.526(**)	0.053		.400(**)	.557(**)	.684(**)
Vanadium	0.387	.673(**)	0.348	.522(**)	.839(**)		.574(**)	.852(**)		0.242		0.05	0.176	0.087	.525(**)		.695(**)	.861(**)	.466(*)	.486(*)		.483(**)	.477(**)
Zinc	.742(**)	.706(**)	.590(**)	.545(**)	.654(**)		0.216	.430(*)		.743(**)		0.339	-0.095	0.294	0.244		.676(**)	.606(**)	0.204	.760(**)	.710(**)		.444(**)
Zirconium	.433(*)	.513(*)	0.173	.481(*)	.742(**)		.518(**)	.644(**)		0.277		0.009	.440(*)	0.166	.469(*)		.871(**)	.751(**)	0.09	.541(**)	.704(**)	.479(*)	

Kendall Tau

Pearson Correlation Coefficient

Inter-Element Correlation p-Values

Metal	Al	Sb	As	Ba	Be	Bo	Cd	Ca	Cr (Tot)	Cr (VI)	Co	Cu	Fe	Pb	Li
Aluminum		0.000	0.000	0.011	0.000	0.858	0.001	0.960	0.000		0.000	0.000	0.000	0.002	0.921
Antimony	0.000		0.000	0.036	0.000	0.420	0.012	0.566	0.000		0.000	0.000	0.000	0.013	0.600
Arsenic	0.000	0.000		0.007	0.000	1.000	0.002	0.427	0.000		0.000	0.000	0.000	0.017	0.728
Barium	0.034	0.052	0.041		0.016	0.439	0.001	0.309	0.002		0.003	0.000	0.001	0.358	0.044
Beryllium	0.000	0.000	0.000	0.016		0.789	0.001	0.585	0.000		0.000	0.000	0.000	0.015	0.551
Boron	0.979	0.207	0.778	0.747	0.765		0.468	0.721	0.812		0.494	0.858	0.494	0.079	0.006
Cadmium	0.000	0.007	0.000	0.000	0.000	0.263		0.043	0.002		0.000	0.000	0.000	0.015	0.012
Calcium	0.822	0.267	0.950	0.266	0.645	0.609	0.092		0.673		0.551	0.568	0.551	0.164	0.037
Chromium	0.000	0.000	0.000	0.040	0.000	0.687	0.000	0.388			0.000	0.000	0.000	0.004	0.413
Chromium VI															
Cobalt	0.000	0.000	0.000	0.002	0.000	0.301	0.000	0.449	0.000			0.000	0.000	0.013	0.427
Copper	0.000	0.000	0.000	0.000	0.000	0.399	0.000	0.546	0.000		0.000		0.000	0.024	0.285
Iron	0.000	0.000	0.000	0.002	0.000	0.385	0.000	0.559	0.000		0.000	0.000		0.020	0.275
Lead	0.007	0.022	0.012	0.342	0.014	0.036	0.004	0.309	0.005		0.005	0.008	0.008		0.766
Lithium	0.465	0.800	0.641	0.189	0.256	0.000	0.013	0.628	0.172		0.041	0.038	0.065	0.004	
Magnesium	0.000	0.000	0.000	0.030	0.000	0.014	0.010	0.464	0.000		0.001	0.001	0.001	0.181	0.160
Manganese	0.000	0.000	0.000	0.001	0.000	0.912	0.000	0.943	0.000		0.000	0.000	0.000	0.026	0.260
Mercury	0.017	0.041	0.003	0.352	0.042	0.764	0.060	0.999	0.266		0.050	0.074	0.085	0.005	0.558
Molybdenum	0.006	0.001	0.026	0.006	0.002	0.578	0.000	0.468	0.005		0.003	0.000	0.002	0.379	0.429
Nickel	0.000	0.002	0.000	0.028	0.000	0.260	0.000	0.248	0.000		0.000	0.000	0.000	0.017	0.042
Niobium															
Palladium	0.014	0.052	0.032	0.019	0.021	0.421	0.079	0.259	0.016		0.003	0.004	0.001	0.722	0.731
Phosphorus	0.021	0.348	0.041	0.023	0.004	0.004	0.000	0.075	0.047		0.000	0.000	0.000	0.050	0.000
Platinum															
Potassium	0.000	0.000	0.002	0.610	0.001	0.015	0.071	0.358	0.001		0.048	0.037	0.042	0.200	0.121
Selenium															
Silicon	0.623	0.484	0.852	0.105	0.561	0.215	0.709	0.996	0.623		0.817	0.702	0.716	0.177	0.466
Silver	0.884	0.652	0.931	0.297	0.340	0.611	0.253	0.017	0.926		0.332	0.181	0.347	0.102	0.969
Sodium	0.853	0.805	0.773	0.344	0.648	0.894	0.593	0.939	0.793		0.968	0.928	0.919	0.302	0.438
Strontium	0.025	0.269	0.086	0.141	0.050	0.232	0.127	0.076	0.082		0.024	0.038	0.007	0.492	0.313
Thallium															
Tin	0.000	0.000	0.000	0.015	0.000	0.824	0.001	0.846	0.000		0.000	0.000	0.000	0.069	0.568
Titantium	0.002	0.073	0.010	0.051	0.000	0.108	0.000	0.106	0.002		0.000	0.000	0.000	0.025	0.012
Tungstun	0.203	0.492	0.703	0.086	0.302	0.222	0.179	0.905	0.017		0.049	0.048	0.026	0.462	0.302
Uranium	0.000	0.000	0.000	0.016	0.000	0.136	0.000	0.619	0.000		0.000	0.000	0.001	0.011	0.831
Vanadium	0.000	0.013	0.000	0.004	0.000	0.045	0.000	0.293	0.000		0.000	0.000	0.000	0.005	0.005
Zinc	0.000	0.000	0.000	0.036	0.000	0.728	0.000	0.599	0.000		0.000	0.000	0.000	0.000	0.208
Zirconium	0.001	0.011	0.000	0.041	0.000	0.808	0.001	0.130	0.020		0.000	0.000	0.000	0.188	0.297

Metal	Mg	Mn	Hg	Mo	Ni	Nb	Pd	P	Pt	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	W	U	V	Zn	Zr
Aluminum	0.000	0.000	0.071	0.001	0.000		0.011	0.047		0.002		0.882	0.224	0.691	0.124		0.000	0.001	0.036	0.000	0.000	0.000	0.000
Antimony	0.001	0.001	0.131	0.000	0.000		0.013	0.069		0.038		0.671	0.100	0.600	0.306		0.000	0.007	0.093	0.000	0.001	0.000	0.000
Arsenic	0.000	0.000	0.043	0.003	0.000		0.003	0.037		0.044		0.519	0.130	0.804	0.059		0.000	0.003	0.149	0.000	0.000	0.000	0.000
Barium	0.124	0.001	0.390	0.003	0.003		0.008	0.014		0.960		0.130	0.082	0.118	0.224		0.021	0.042	0.011	0.024	0.004	0.070	0.012
Beryllium	0.000	0.000	0.121	0.000	0.000		0.044	0.020		0.009		0.691	0.070	0.487	0.398		0.000	0.000	0.139	0.000	0.000	0.000	0.000
Boron	0.043	0.572	0.479	0.223	0.298		0.721	0.070		0.016		0.572	0.108	0.246	0.357		0.310	0.655	0.158	0.404	0.050	0.789	0.592
Cadmium	0.123	0.000	0.096	0.001	0.000		0.046	0.002		0.325		0.920	0.112	0.480	0.337		0.002	0.003	0.062	0.002	0.001	0.003	0.002
Calcium	0.286	0.487	0.897	0.655	0.345		0.223	0.091		0.286		0.691	0.056	0.691	0.150		0.517	0.243	1.000	0.584	0.503	0.399	0.136
Chromium	0.000	0.000	0.367	0.000	0.000		0.003	0.130		0.010		0.823	0.275	0.980	0.172		0.001	0.001	0.006	0.000	0.000	0.000	0.003
Chromium VI																							
Cobalt	0.000	0.000	0.058	0.001	0.000		0.002	0.006		0.056		0.519	0.042	0.882	0.091		0.000	0.001	0.020	0.000	0.000	0.000	0.000
Copper	0.001	0.000	0.085	0.000	0.000		0.002	0.008		0.164		0.358	0.022	0.710	0.172		0.000	0.004	0.021	0.000	0.000	0.000	0.000
Iron	0.000	0.000	0.048	0.001	0.000		0.001	0.004		0.078		0.457	0.044	0.728	0.053		0.000	0.003	0.028	0.000	0.000	0.000	0.000
Lead	0.188	0.082	0.006	0.372	0.013		0.901	0.215		0.087		0.124	0.107	0.346	0.297		0.065	0.050	0.393	0.007	0.024	0.000	0.091
Lithium	0.096	0.180	0.763	0.297	0.150		0.130	0.001		0.016		0.457	0.385	0.321	0.346		0.901	0.087	0.140	0.728	0.050	0.551	0.297
Magnesium		0.002	0.229	0.021	0.002		0.022	0.862		0.000		0.359	0.124	0.980	0.157		0.001	0.180	0.158	0.001	0.042	0.000	0.016
Manganese	0.000		0.053	0.000	0.000		0.024	0.011		0.107		0.457	0.021	0.275	0.137		0.001	0.024	0.033	0.001	0.000	0.001	0.001
Mercury	0.074	0.007		0.246	0.102		0.763	0.414		0.344		0.519	0.492	0.897	0.897		0.243	0.897	0.955	0.518	0.094	0.028	0.390
Molybdenum	0.012	0.001	0.130		0.004		0.021	0.029		0.078		0.487	0.024	0.882	0.254		0.000	0.078	0.053	0.002	0.014	0.002	0.001
Nickel	0.012	0.000	0.262	0.106			0.007	0.001		0.096		0.882	0.056	0.882	0.234		0.000	0.002	0.005	0.000	0.000	0.000	0.000
Niobium																							
Palladium	0.061	0.048	0.882	0.029	0.027			0.039		0.551		0.008	0.005	0.050	0.000		0.023	0.037	0.005	0.039	0.001	0.172	0.021
Phosphorus	0.896	0.026	0.381	0.108	0.000		0.077			0.673		0.487	0.130	0.728	0.150		0.028	0.007	0.082	0.082	0.000	0.074	0.002
Platinum																							
Potassium	0.000	0.034	0.163	0.064	0.099		0.443	0.687				0.244	0.655	0.096	0.143		0.049	0.136	0.844	0.005	0.372	0.000	0.172
Selenium																							
Silicon	0.783	0.336	0.655	0.535	0.786		0.014	0.847		0.078			0.031	0.001	0.215		0.960	0.637	0.279	0.585	0.785	0.372	0.804
Silver	0.932	0.436	0.337	0.007	0.336		0.036	0.168		0.557		0.094		0.096	0.050		0.008	0.427	0.033	0.171	0.112	0.862	0.012
Sodium	0.887	0.553	0.696	0.992	0.534		0.058	0.343		0.117		0.000	0.540		0.620		0.765	0.188	0.033	0.371	0.823	0.180	0.399
Strontium	0.110	0.243	0.964	0.072	0.084		0.000	0.119		0.139		0.505	0.140	0.697			0.425	0.172	0.158	0.518	0.018	0.457	0.150
Thallium																							
Tin	0.000	0.001	0.258	0.001	0.000		0.007	0.012		0.011		0.941	0.040	0.741	0.031			0.003	0.070	0.000	0.002	0.001	0.000
Titantium	0.148	0.012	0.781	0.131	0.000		0.042	0.000		0.212		0.204	0.402	0.063	0.022		0.001		0.094	0.000	0.002	0.002	0.001
Tungstun	0.484	0.112	0.861	0.135	0.125		0.015	0.105		0.644		0.174	0.151	0.040	0.190		0.117	0.264		0.157	0.014	0.071	0.309
Uranium	0.000	0.000	0.170	0.006	0.001		0.224	0.273		0.000		0.868	0.935	0.253	0.365		0.000	0.008	0.806		0.007	0.000	0.000
Vanadium	0.062	0.000	0.132	0.009	0.000		0.003	0.000		0.255		0.815	0.412	0.685	0.009		0.000	0.000	0.022	0.016		0.001	0.001
Zinc	0.000	0.000	0.006	0.006	0.001		0.310	0.036		0.000		0.105	0.659	0.163	0.250		0.000	0.002	0.338	0.000	0.000		0.002
Zirconium	0.035	0.010	0.465	0.017	0.000		0.010	0.001		0.190		0.965	0.031	0.438	0.021		0.000	0.000	0.676	0.006	0.000	0.018	

Kendall Tau

Pearson Correlation Coefficient

All statistical analyses were performed using SPSS v. 15.0.
All non-detected values were replaced by ½ SQL--Gehan ranking was not used to accommodate nondetects in the nonparametric analysis.

Notes:
1. When both metals are normally distributed, a parametric correlation analysis was conducted. The parametric Pearson correlation coefficient is a measure of linear association between two metals.
2. When either metal is not normally distributed or have non-detected values, a nonparametric correlation analysis was conducted. The nonparametric Kendall tau is a measure of the association between rank orders.

Significant correlations are indicated in either **BOLD BLUE** (nonparametric) or **BOLD ORANGE** (parametric) type.
Statistically insignificant correlations or correlations from less preferred analyses given the data distribution are indicated in **GREY**.
* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
*** Correlation is significant at the 0.001 level (2-tailed).
0.000 = p-value < 0.001

TABLE H-8
2008 DEEP UMCf - CORRELATION FOR RADIONUCLIDES
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 1)

Radionuclide		N	No. of Detects	Shapiro-Wilk Signif.	Shapiro-Wilk Normal?	Param Test?	Inter-Element Correlation Coefficients: Ra226	Ra228	Th228	Th230	Th232	U233/234	U235/236	U238
Radium 226	Ra226	18	14	0.01	No	No		0.197	0.054	0.176	-0.068	0.227	0.382	0.398
Radium 228	Ra228	18	17	0.51	Yes	Yes	0.157		.407(*)	0.092	0.277	-0.206	-0.057	-0.145
Thorium 228	Th228	24	24	0.07	Yes	Yes	0.127	.643(**)		0.189	.325(*)	0.12	0.19	0.275
Thorium 230	Th230	24	24	0.01	No	No	.596(**)	0	0.12		**.353(*)**	**.581(**)**	**.406(*)**	**.444(**)**
Thorium 232	Th232	24	24	0.08	Yes	Yes	0.205	0.414	**.674(**)**	.417(*)		**.337(*)**	0.106	0.287
Uranium 233/234	U233/234	22	12	0.01	No	No	.695(**)	-0.302	0.064	.787(**)	0.306		**.486(**)**	**.766(**)**
Uranium 235/236	U235/236	22	15	0.18	Yes	Yes	.602(*)	-0.192	0.136	.648(**)	0.165	.635(**)		**.586(**)**
Uranium 238	U238	22	11	< 0.001	No	No	.704(**)	-0.241	0.103	.755(**)	0.324	.942(**)	.699(**)	

Upper triangle: Kendall Tau. Lower triangle: Pearson Correlation Coefficient.

Radionuclide		Inter-Element Correlation p-Values: Ra226	Ra228	Th228	Th230	Th232	U233/234	U235/236	U238
Radium 226	Ra226		0.266	0.759	0.319	0.701	0.272	0.055	0.061
Radium 228	Ra228	0.534		0.019	0.596	0.111	0.305	0.766	0.483
Thorium 228	Th228	0.615	0.004		0.197	0.027	0.480	0.242	0.108
Thorium 230	Th230	0.009	1.000	0.576		0.016	0.001	0.012	0.009
Thorium 232	Th232	0.415	0.087	0.000	0.043		0.047	0.516	0.094
Uranium 233/234	U233/234	0.004	0.274	0.790	0.000	0.190		0.004	0.000
Uranium 235/236	U235/236	0.018	0.494	0.569	0.002	0.486	0.003		0.001
Uranium 238	U238	0.003	0.387	0.667	0.000	0.164	0.000	0.001	

Upper triangle: Kendall Tau. Lower triangle: Pearson Correlation Coefficient.

All statistical analyses were performed using SPSS v. 15.0.
All non-detected values were replaced by reported measured values.

Notes:

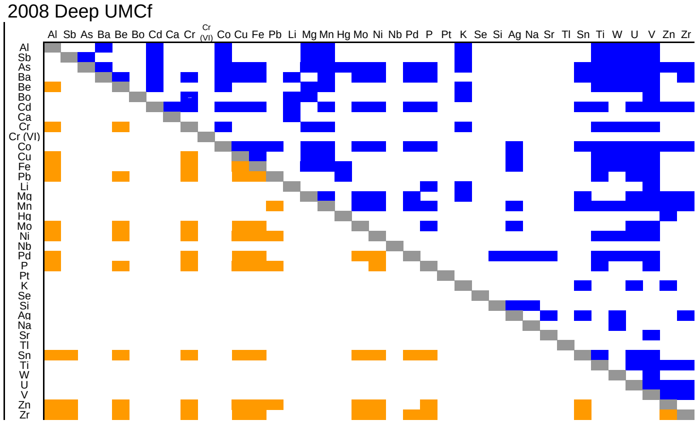
1. When both radionuclides are normally distributed, a parametric correlation analysis was conducted. The parametric Pearson correlation coefficient is a measure of linear association between two radionuclides.
2. When either radionuclide is not normally distributed or have non-detected values, a nonparametric correlation analysis was conducted. The nonparametric Kendall tau is a measure of the association between rank orders.

Significant correlations are indicated in either **BOLD BLUE** (nonparametric) or **BOLD ORANGE** (parametric) type.
Statistically insignificant correlations or correlations from less preferred analyses given the data distribution are indicated in **GREY**.

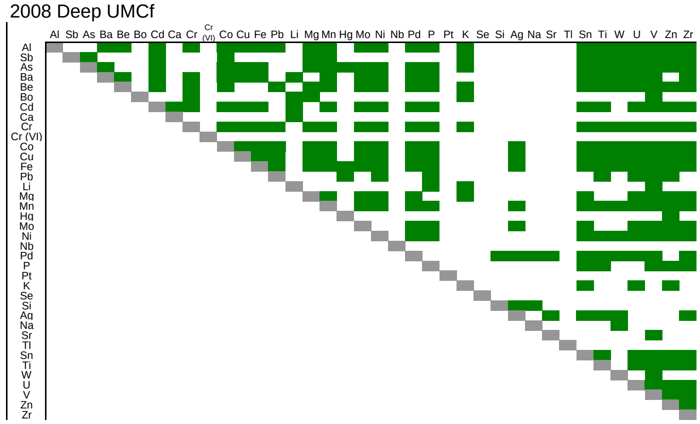
* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
*** Correlation is significant at the 0.001 level (2-tailed).
0.000 = p-value < 0.001

TABLE H-9
SUMMARY OF CORRELATIONS FOR METALS
2008 DEEP BACKGROUND STUDY
CLARK COUNTY, NEVADA
(Page 1 of 1)

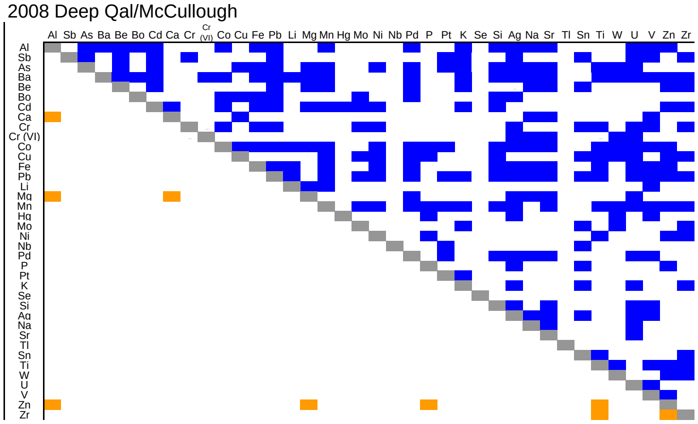
2008 Deep UMCf



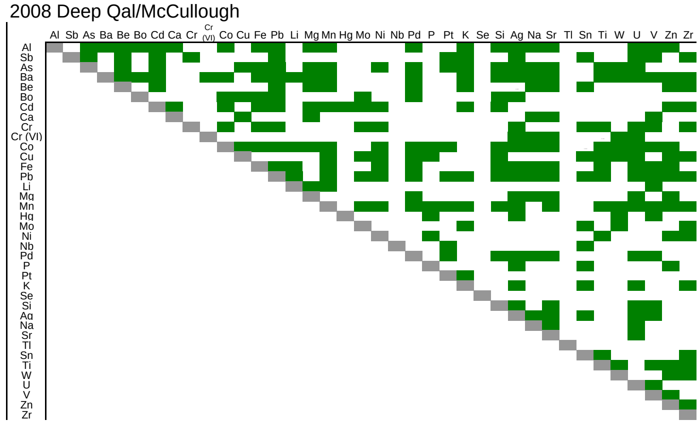
2008 Deep UMCf



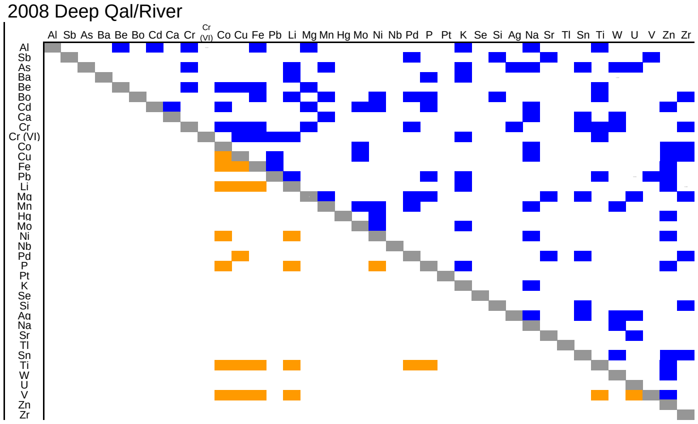
2008 Deep Qal/McCullough



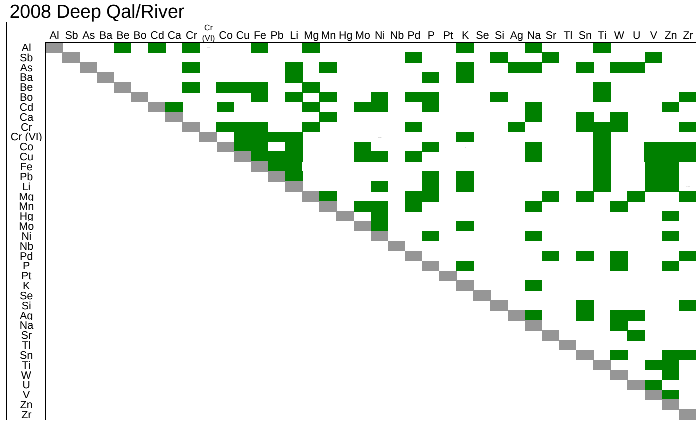
2008 Deep Qal/McCullough



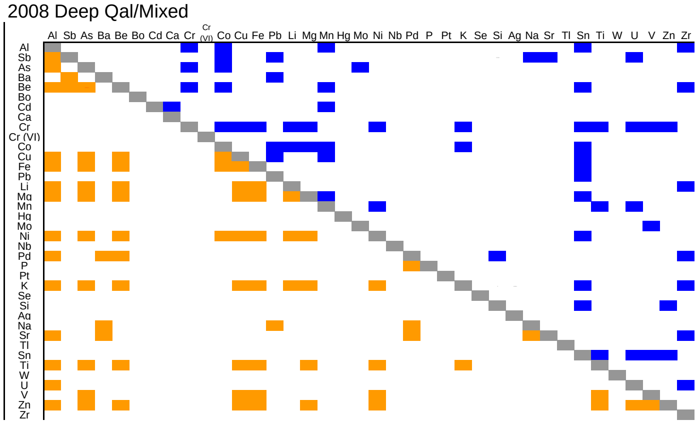
2008 Deep Qal/River



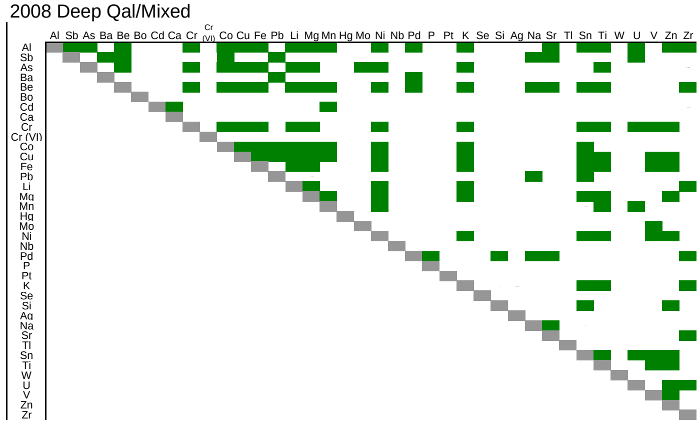
2008 Deep Qal/River



2008 Deep Qal/Mixed



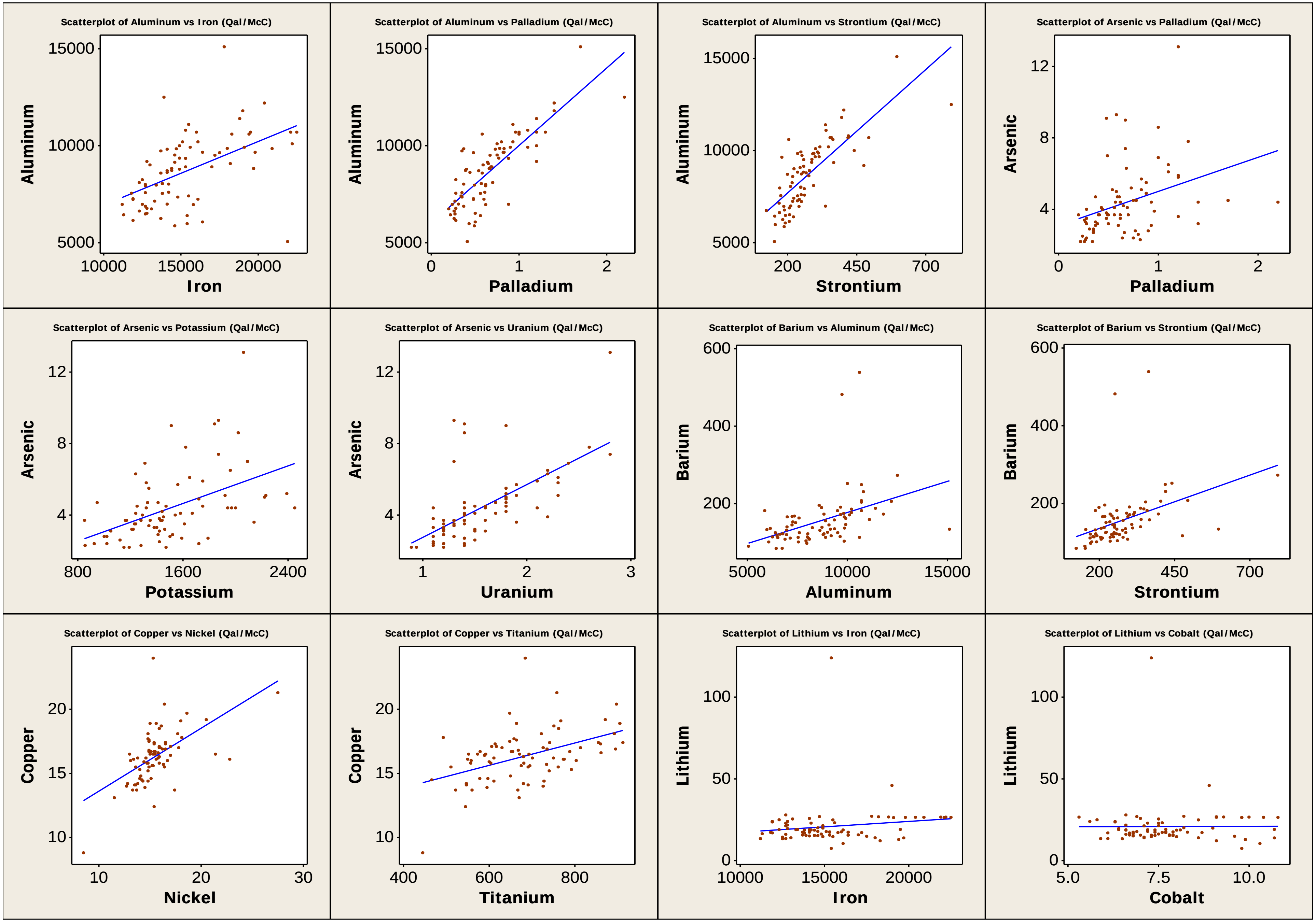
2008 Deep Qal/Mixed



Significant correlations are indicated in **BLUE** (nonparametric), **ORANGE** (parametric), and **GREEN** (combined).

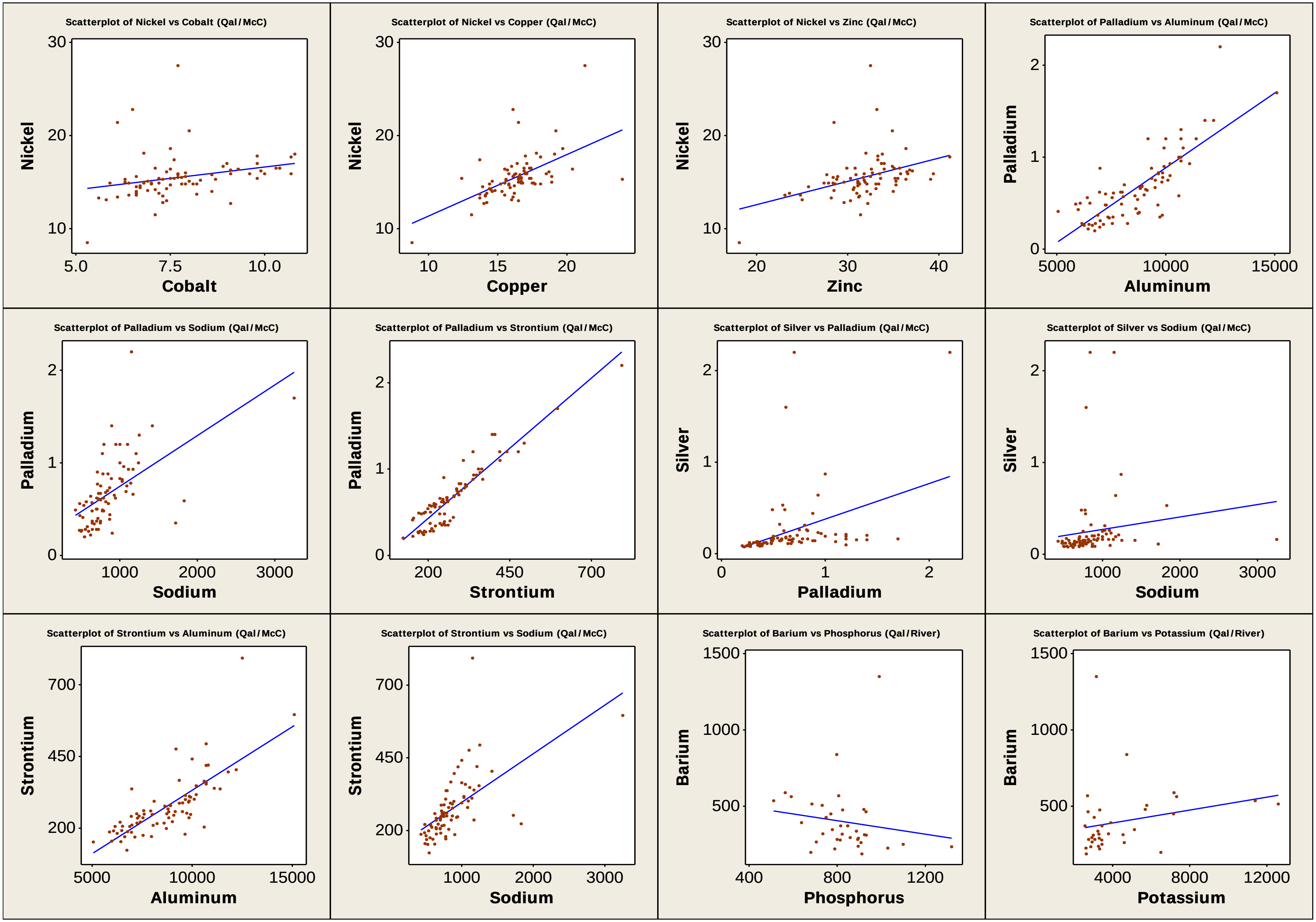
SCATTERPLOTS

OUTLIERS



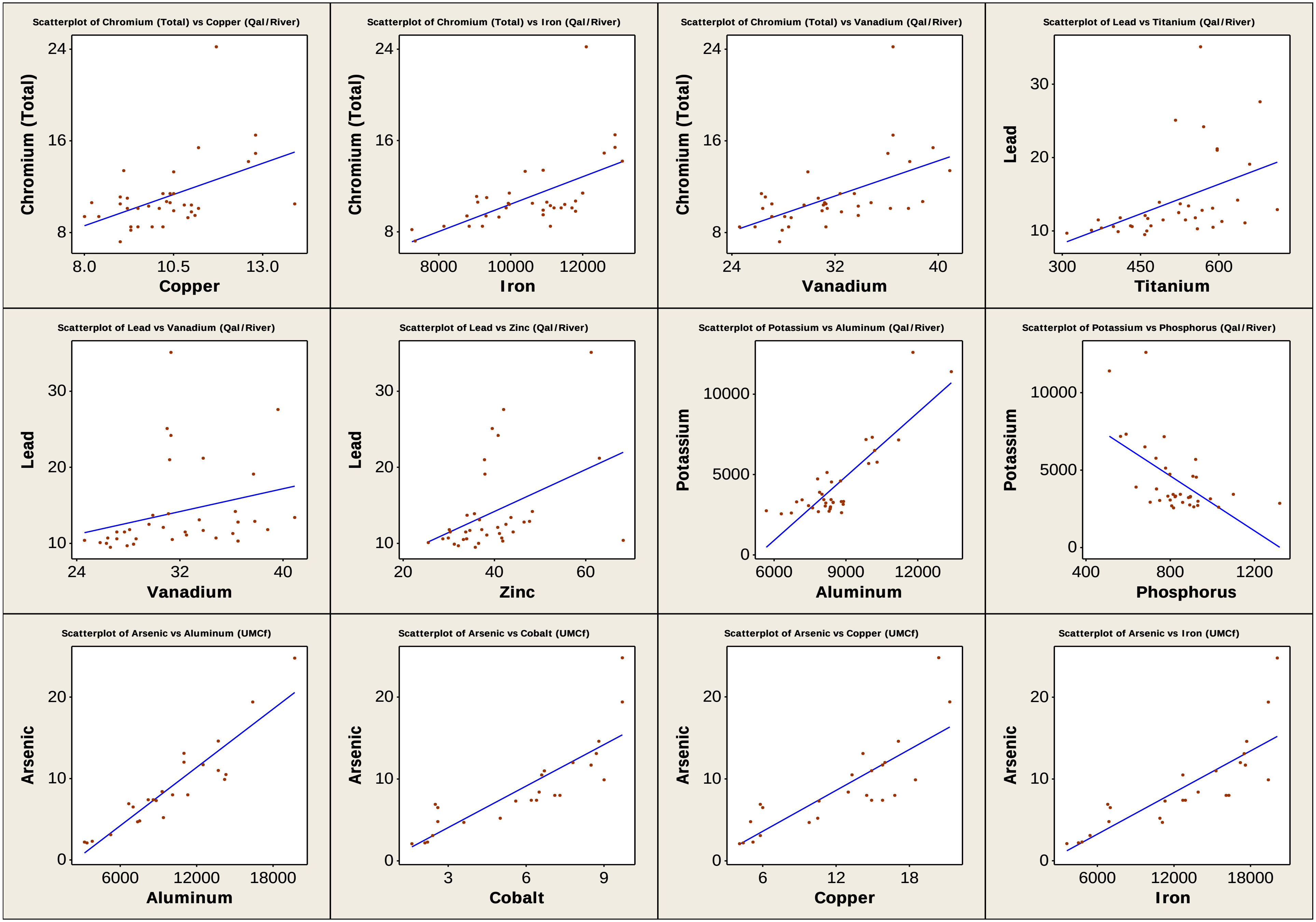
Scatterplot of Aluminum vs Iron (Qal/McC)
Aluminum
Iron
Scatterplot of Aluminum vs Palladium (Qal/McC)
Aluminum
Palladium
Scatterplot of Aluminum vs Strontium (Qal/McC)
Aluminum
Strontium
Scatterplot of Arsenic vs Palladium (Qal/McC)
Arsenic
Palladium
Scatterplot of Arsenic vs Potassium (Qal/McC)
Arsenic
Potassium
Scatterplot of Arsenic vs Uranium (Qal/McC)
Arsenic
Uranium
Scatterplot of Barium vs Aluminum (Qal/McC)
Barium
Aluminum
Scatterplot of Barium vs Strontium (Qal/McC)
Barium
Strontium
Scatterplot of Copper vs Nickel (Qal/McC)
Copper
Nickel
Scatterplot of Copper vs Titanium (Qal/McC)
Copper
Titanium
Scatterplot of Lithium vs Iron (Qal/McC)
Lithium
Iron
Scatterplot of Lithium vs Cobalt (Qal/McC)
Lithium
Cobalt

OUTLIERS

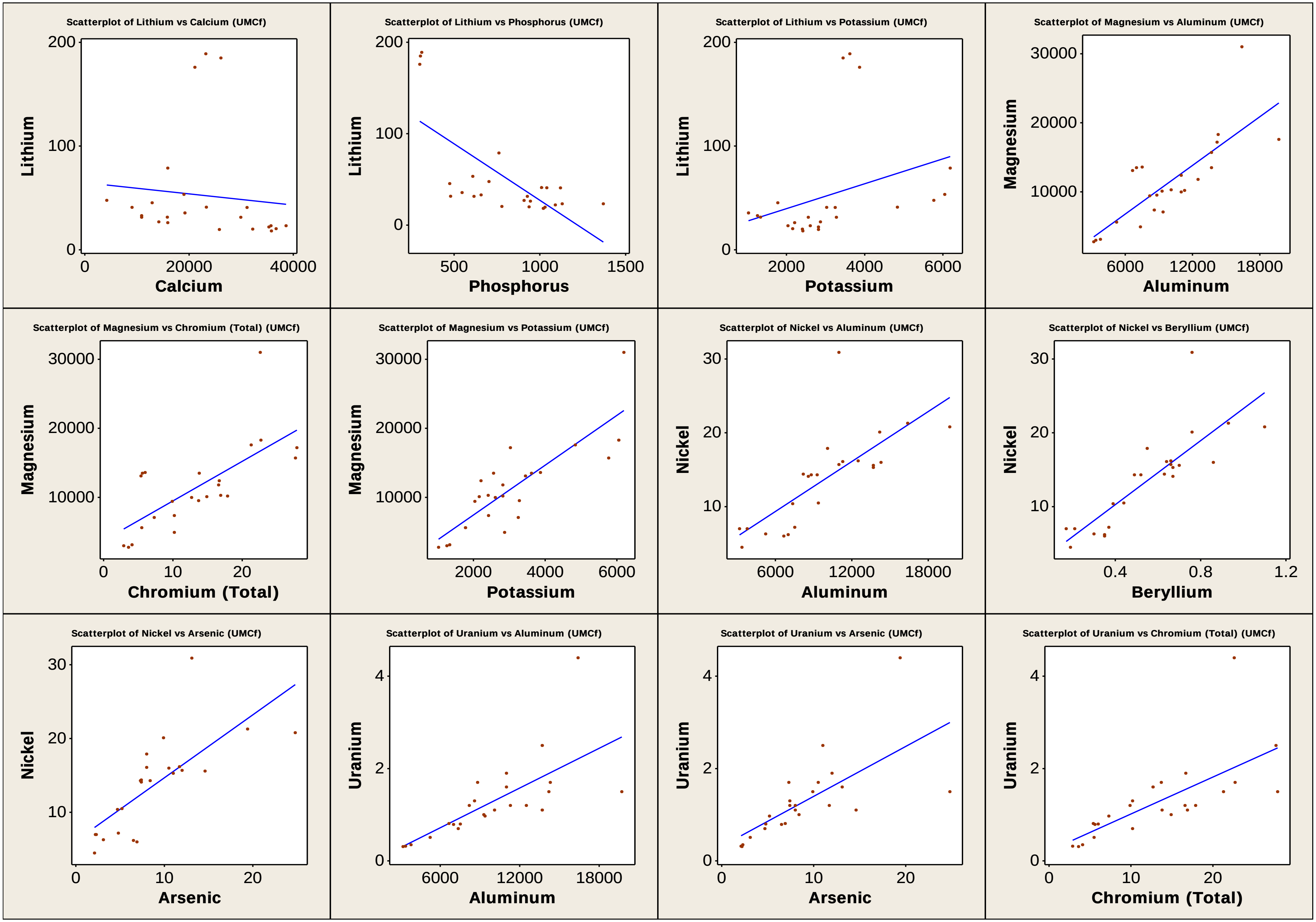


Scatterplot of Nickel vs Cobalt (Qal/McC)
Nickel
Cobalt
Scatterplot of Nickel vs Copper (Qal/McC)
Nickel
Copper
Scatterplot of Nickel vs Zinc (Qal/McC)
Nickel
Zinc
Scatterplot of Palladium vs Aluminum (Qal/McC)
Palladium
Aluminum
Scatterplot of Palladium vs Sodium (Qal/McC)
Palladium
Sodium
Scatterplot of Palladium vs Strontium (Qal/McC)
Palladium
Strontium
Scatterplot of Silver vs Palladium (Qal/McC)
Silver
Palladium
Scatterplot of Silver vs Sodium (Qal/McC)
Silver
Sodium
Scatterplot of Strontium vs Aluminum (Qal/McC)
Strontium
Aluminum
Scatterplot of Strontium vs Sodium (Qal/McC)
Strontium
Sodium
Scatterplot of Barium vs Phosphorus (Qal/River)
Barium
Phosphorus
Scatterplot of Barium vs Potassium (Qal/River)
Barium
Potassium

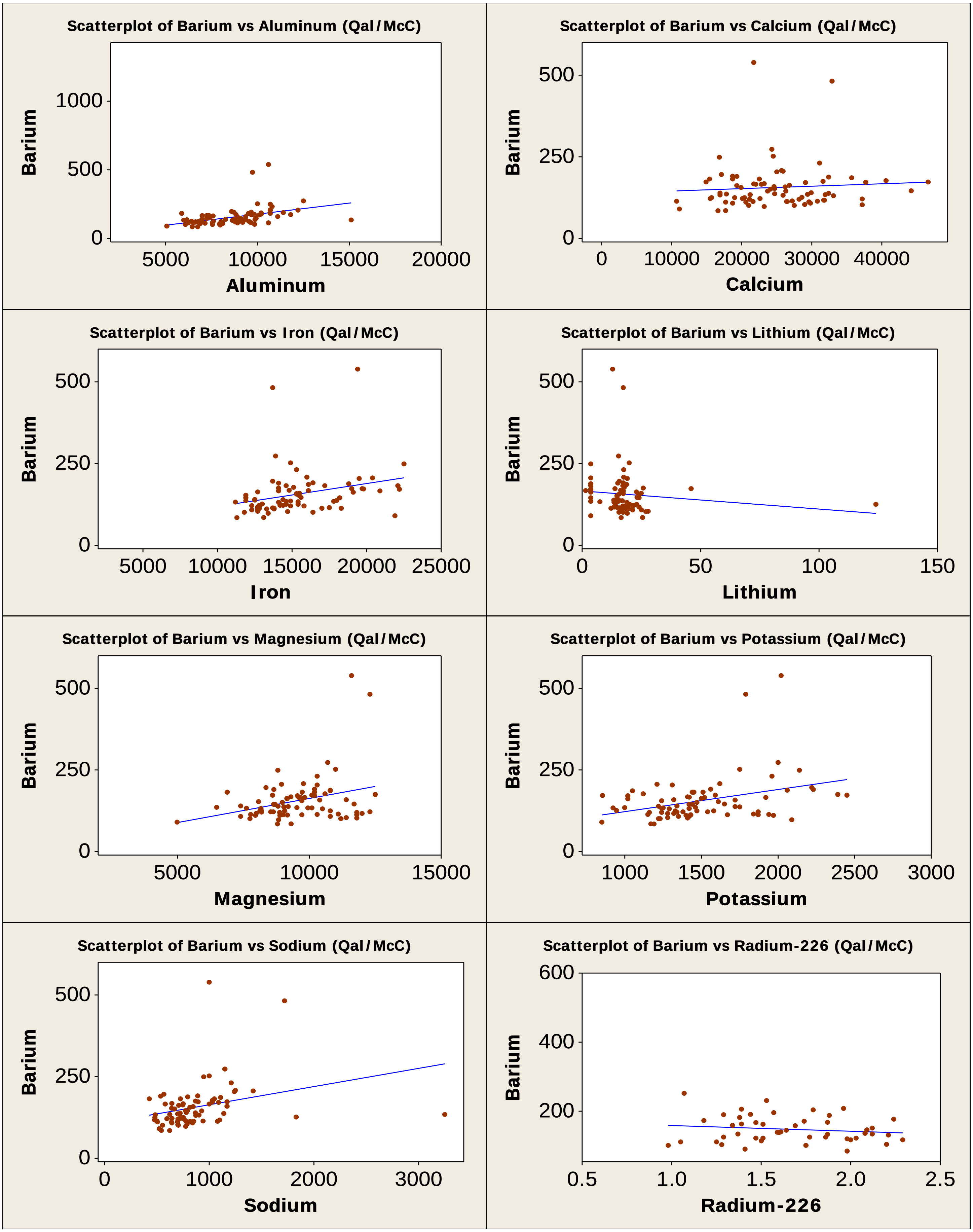
OUTLIERS


Scatterplot of Chromium (Total) vs Copper (Qal/River)
Chromium (Total)
24
16
8
8.0
10.5
13.0
Copper
Scatterplot of Chromium (Total) vs Iron (Qal/River)
Chromium (Total)
24
16
8
8000
10000
12000
Iron
Scatterplot of Chromium (Total) vs Vanadium (Qal/River)
Chromium (Total)
24
16
8
24
32
40
Vanadium
Scatterplot of Lead vs Titanium (Qal/River)
Lead
30
20
10
300
450
600
Titanium
Scatterplot of Lead vs Vanadium (Qal/River)
Lead
30
20
10
24
32
40
Vanadium
Scatterplot of Lead vs Zinc (Qal/River)
Lead
30
20
10
20
40
60
Zinc
Scatterplot of Potassium vs Aluminum (Qal/River)
Potassium
10000
5000
0
6000
9000
12000
Aluminum
Scatterplot of Potassium vs Phosphorus (Qal/River)
Potassium
10000
5000
0
400
800
1200
Phosphorus
Scatterplot of Arsenic vs Aluminum (UMCf)
Arsenic
20
10
0
6000
12000
18000
Aluminum
Scatterplot of Arsenic vs Cobalt (UMCf)
Arsenic
20
10
0
3
6
9
Cobalt
Scatterplot of Arsenic vs Copper (UMCf)
Arsenic
20
10
0
6
12
18
Copper
Scatterplot of Arsenic vs Iron (UMCf)
Arsenic
20
10
0
6000
12000
18000
Iron

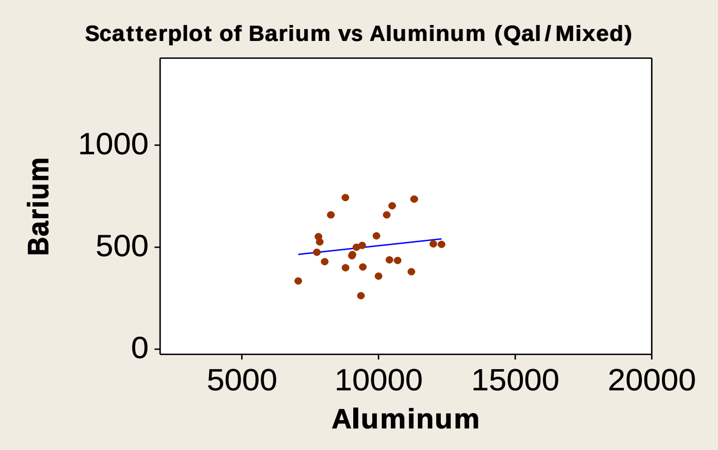
OUTLIERS

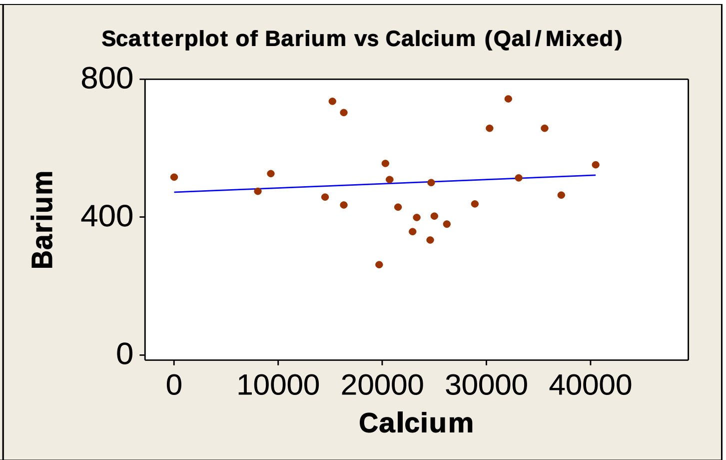

Scatterplot of Lithium vs Calcium (UMCf)
Lithium
200
100
0
0
20000
40000
Calcium
Scatterplot of Lithium vs Phosphorus (UMCf)
Lithium
200
100
0
500
1000
1500
Phosphorus
Scatterplot of Lithium vs Potassium (UMCf)
Lithium
200
100
0
2000
4000
6000
Potassium
Scatterplot of Magnesium vs Aluminum (UMCf)
Magnesium
30000
20000
10000
6000
12000
18000
Aluminum
Scatterplot of Magnesium vs Chromium (Total) (UMCf)
Magnesium
30000
20000
10000
0
10
20
Chromium (Total)
Scatterplot of Magnesium vs Potassium (UMCf)
Magnesium
30000
20000
10000
2000
4000
6000
Potassium
Scatterplot of Nickel vs Aluminum (UMCf)
Nickel
30
20
10
6000
12000
18000
Aluminum
Scatterplot of Nickel vs Beryllium (UMCf)
Nickel
30
20
10
0.4
0.8
1.2
Beryllium
Scatterplot of Nickel vs Arsenic (UMCf)
Nickel
30
20
10
0
10
20
Arsenic
Scatterplot of Uranium vs Aluminum (UMCf)
Uranium
4
2
0
6000
12000
18000
Aluminum
Scatterplot of Uranium vs Arsenic (UMCf)
Uranium
4
2
0
0
10
20
Arsenic
Scatterplot of Uranium vs Chromium (Total) (UMCf)
Uranium
4
2
0
0
10
20
Chromium (Total)

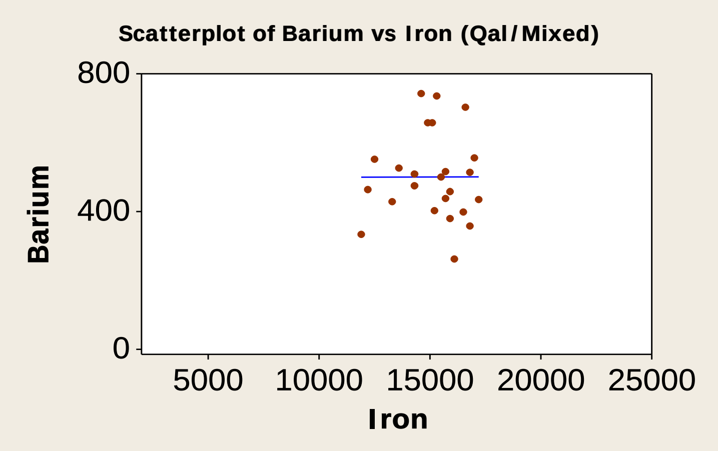
BARIUM WITH ALKALINE METALS – Qal/McCULLOUGH

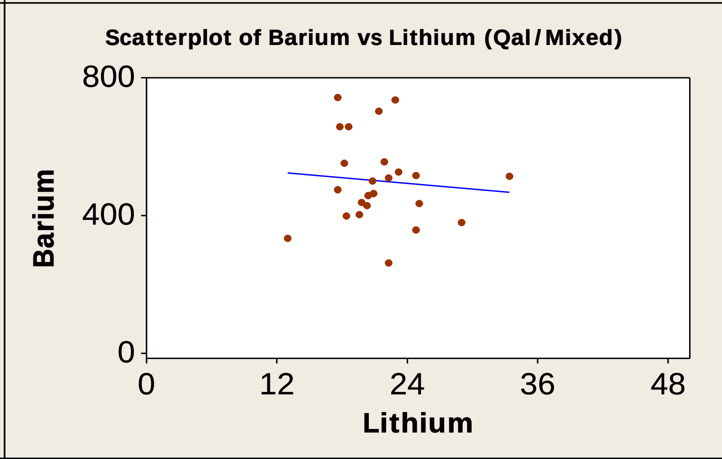


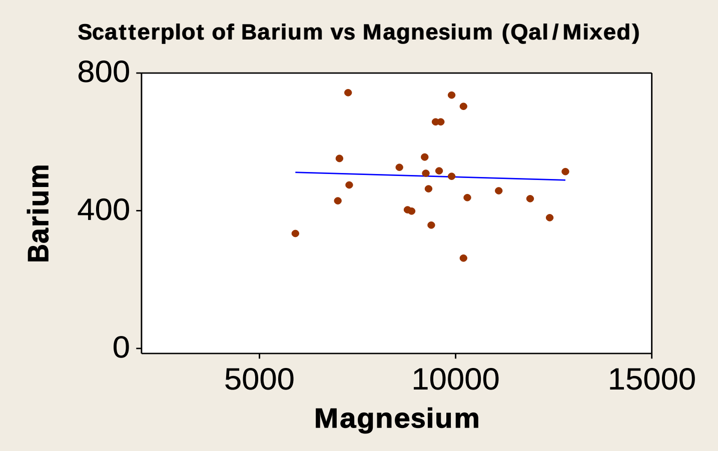
BARIUM WITH ALKALINE METALS – Qal/MIXED

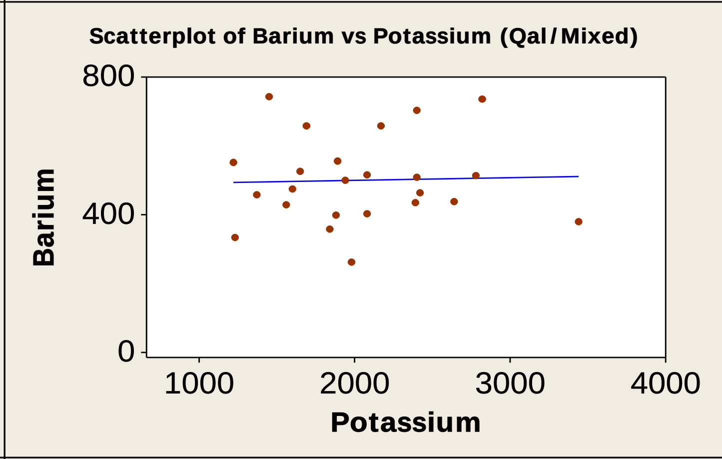


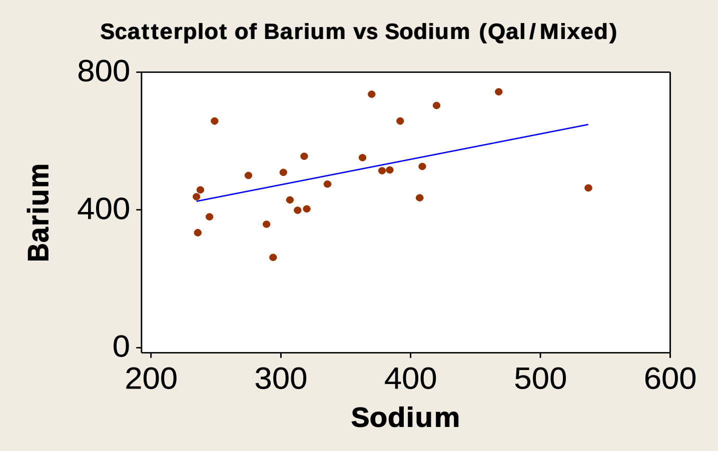


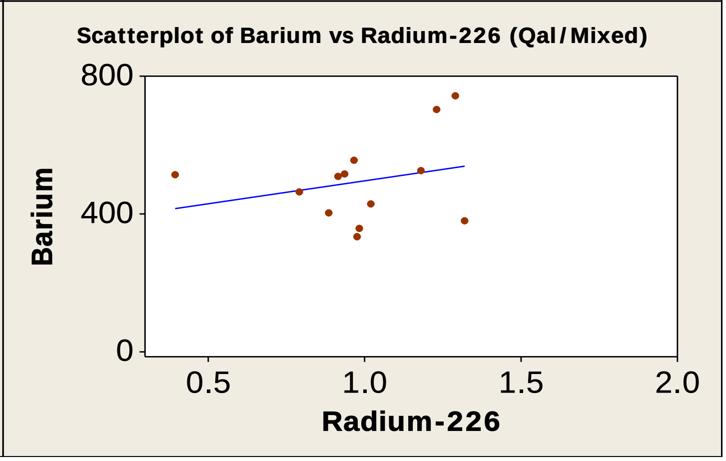




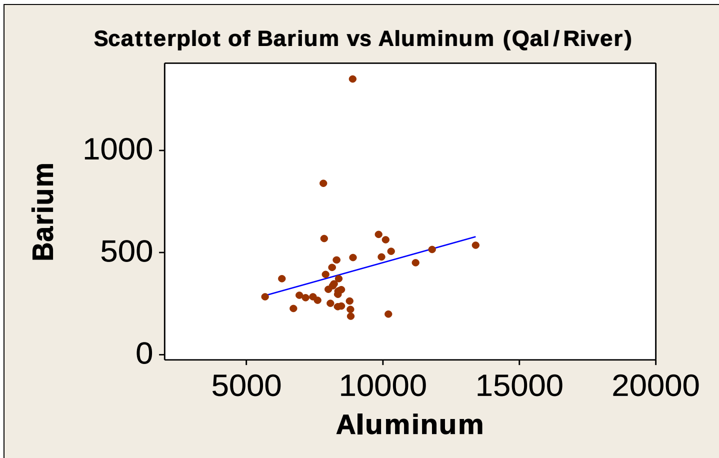


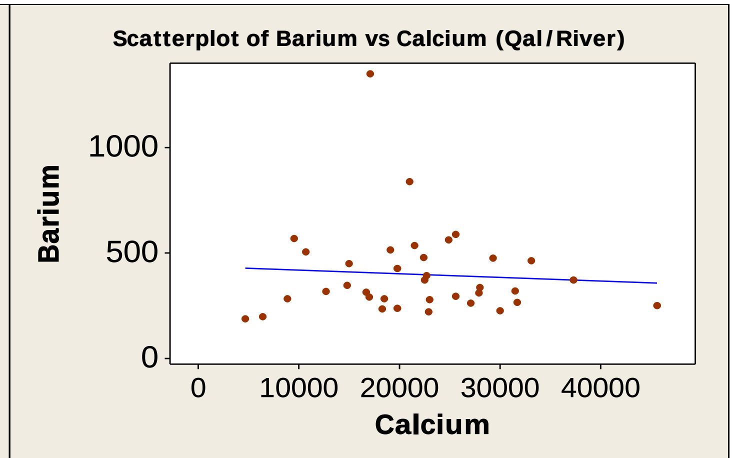


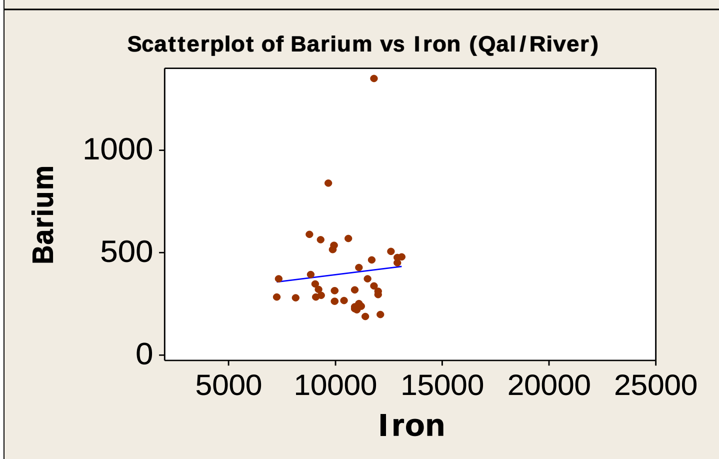


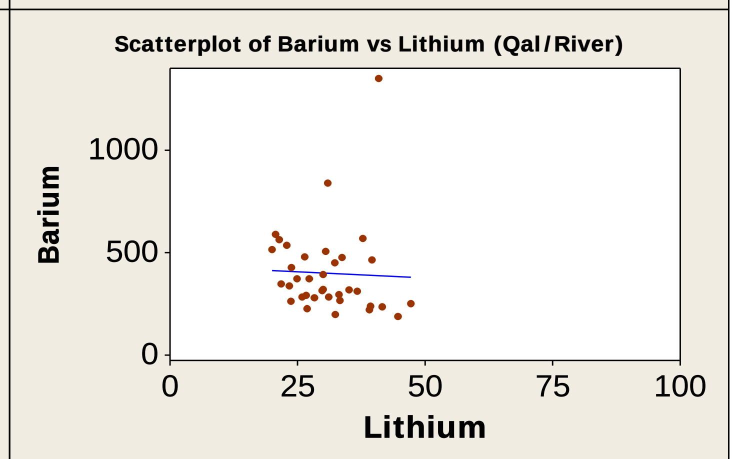


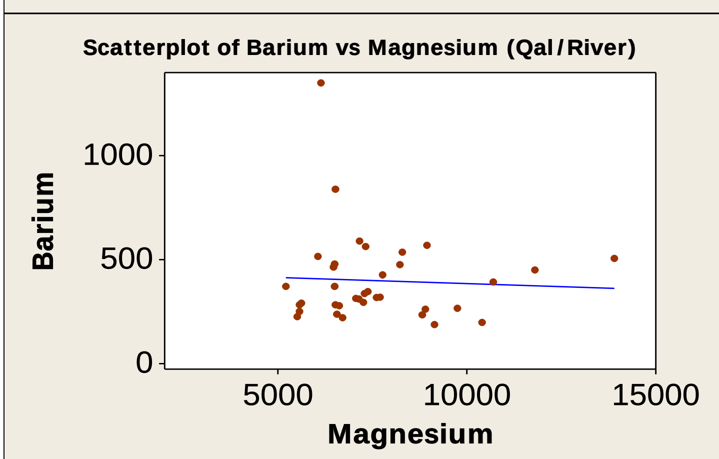
BARIUM WITH ALKALINE METALS – Qal/RIVER

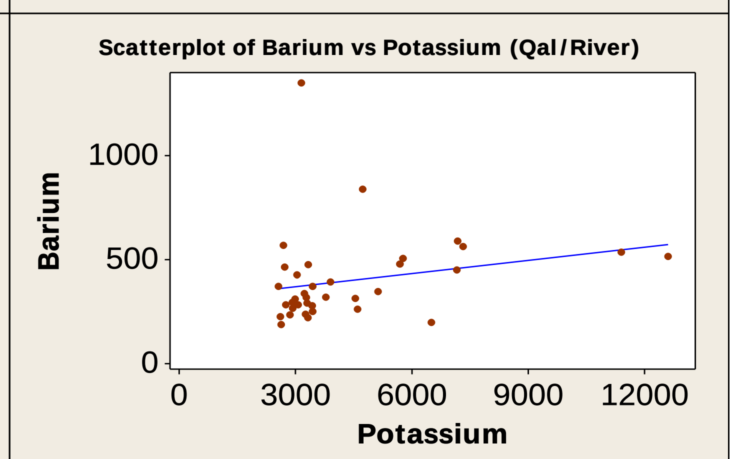


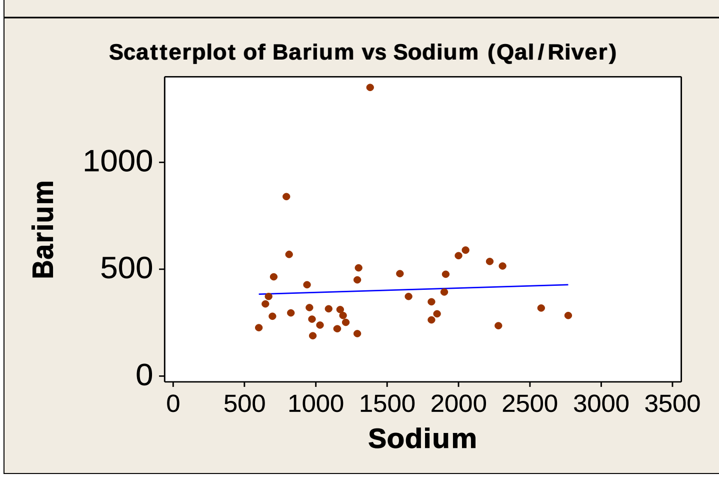


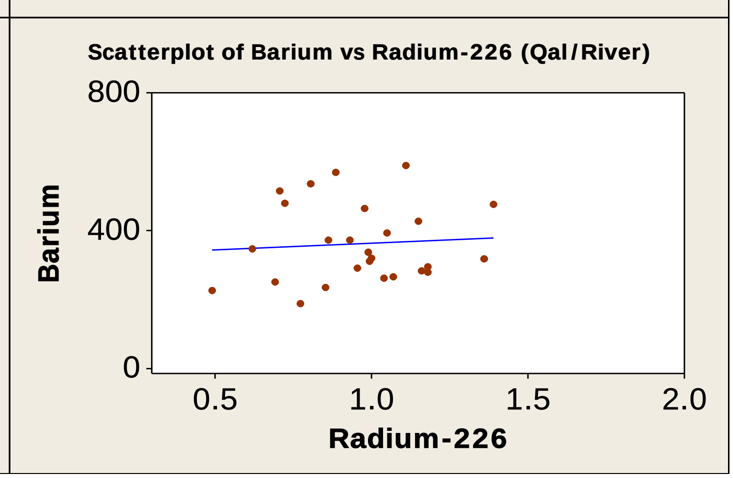




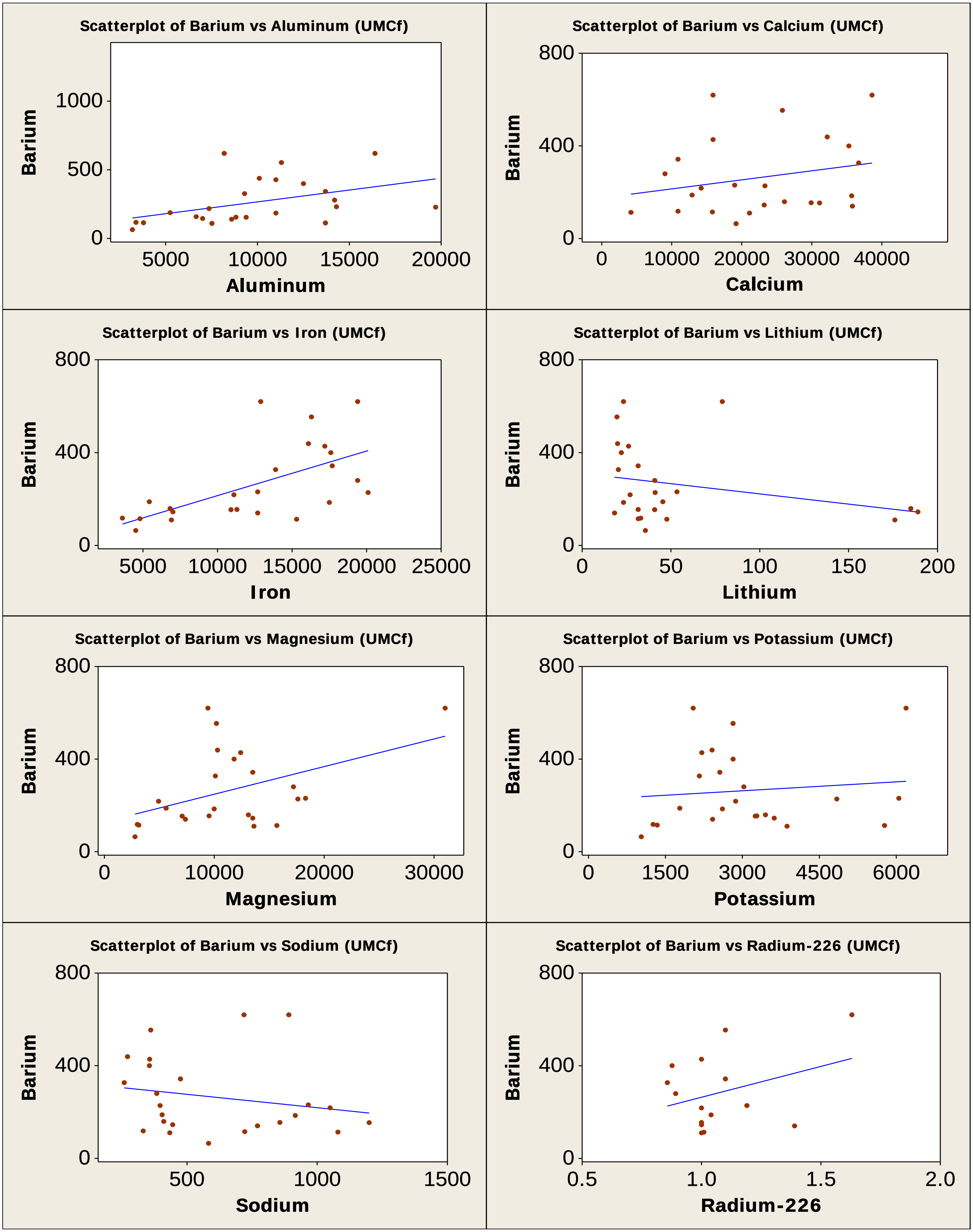




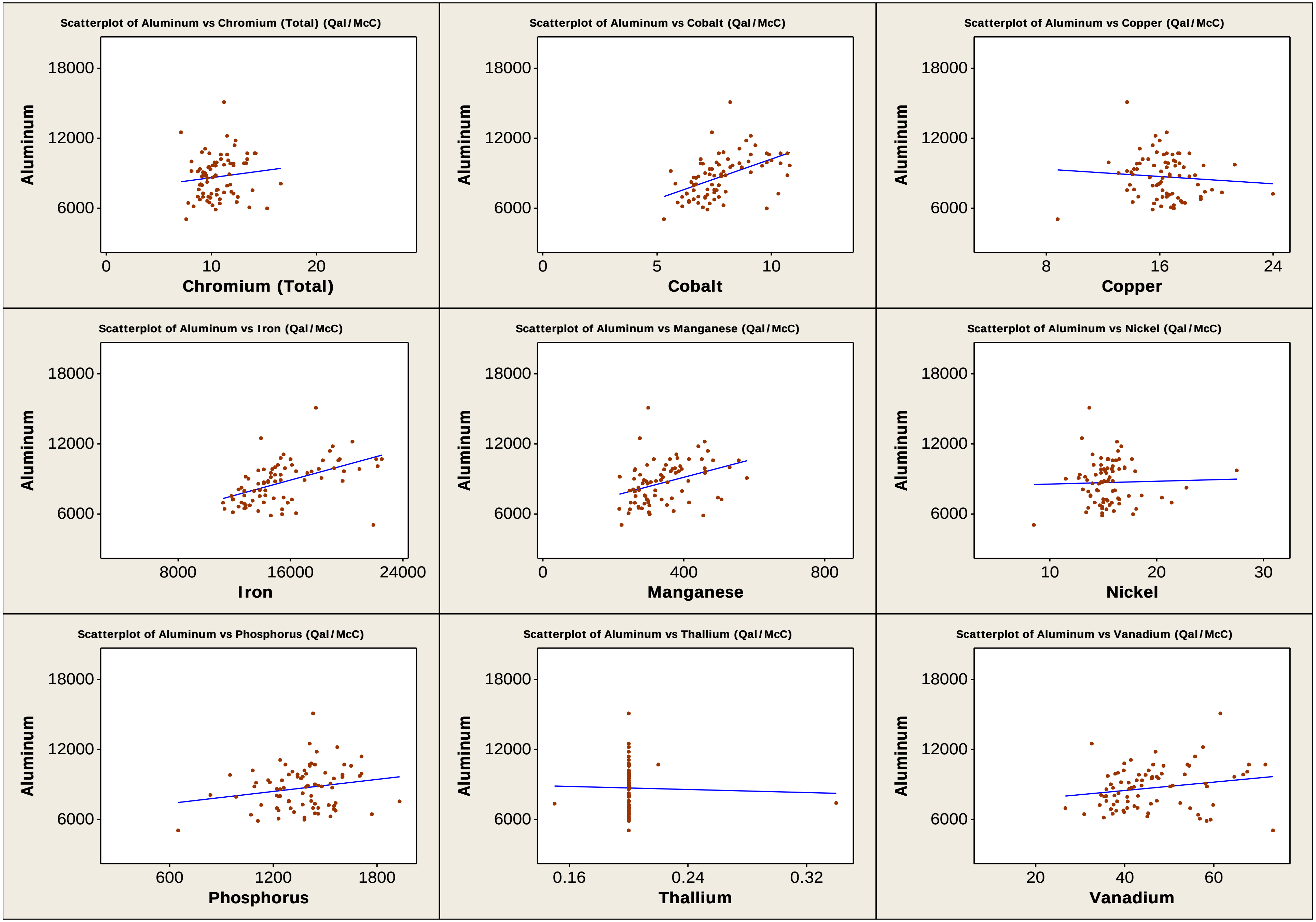




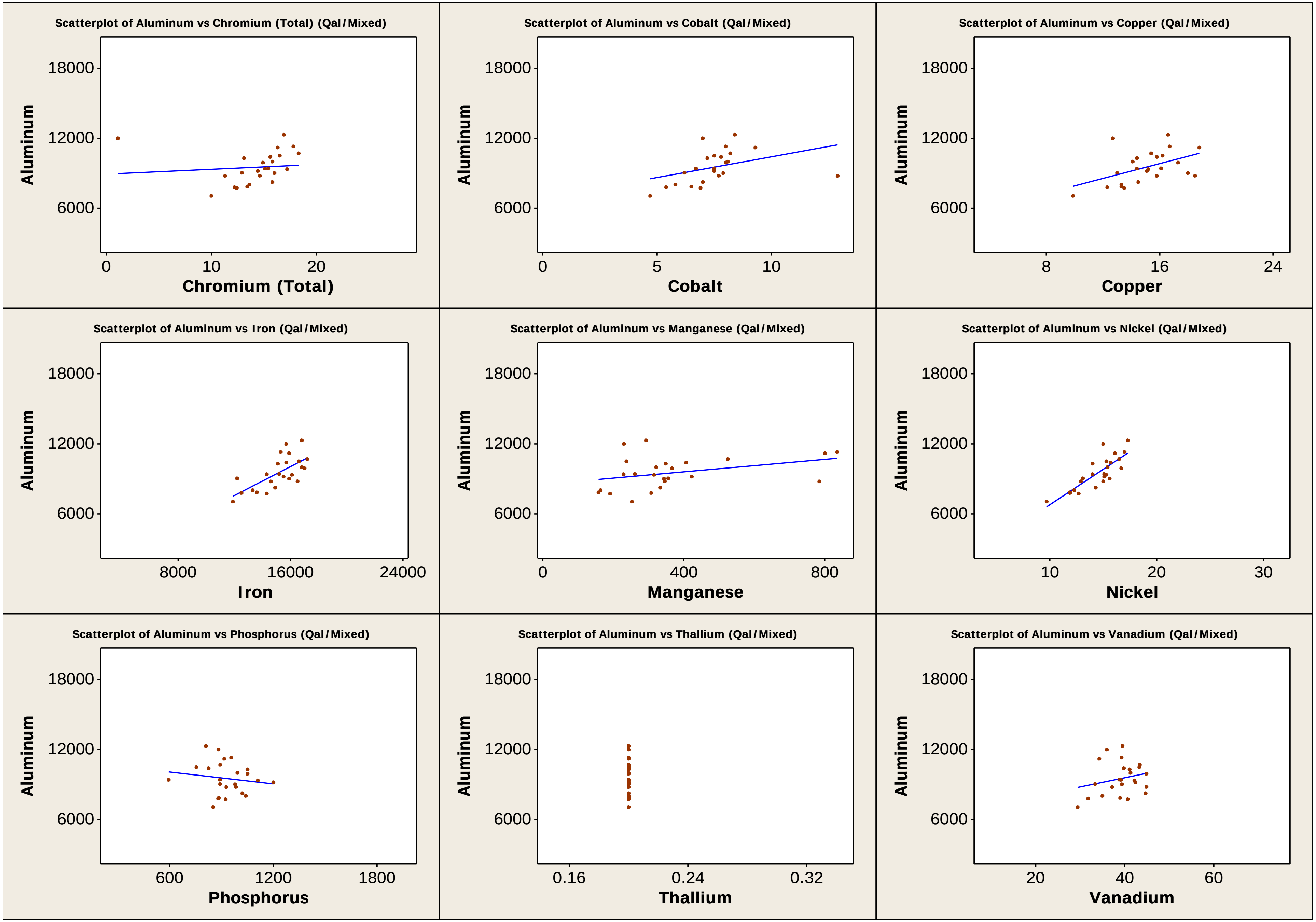
BARIUM WITH ALKALINE METALS – UMCf



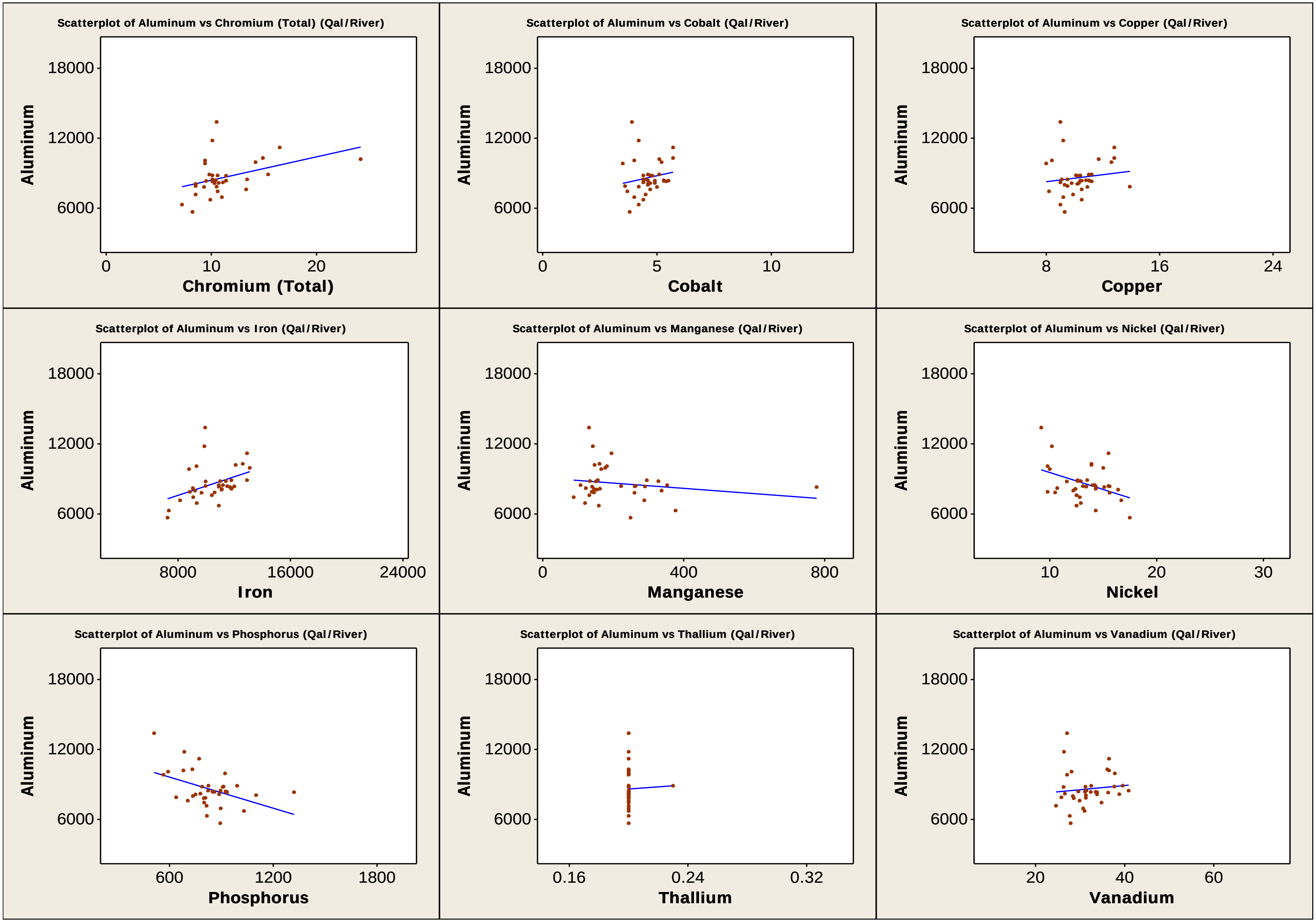
ALUMINUM AND TRACE METALS – Qal/McCULLOUGH



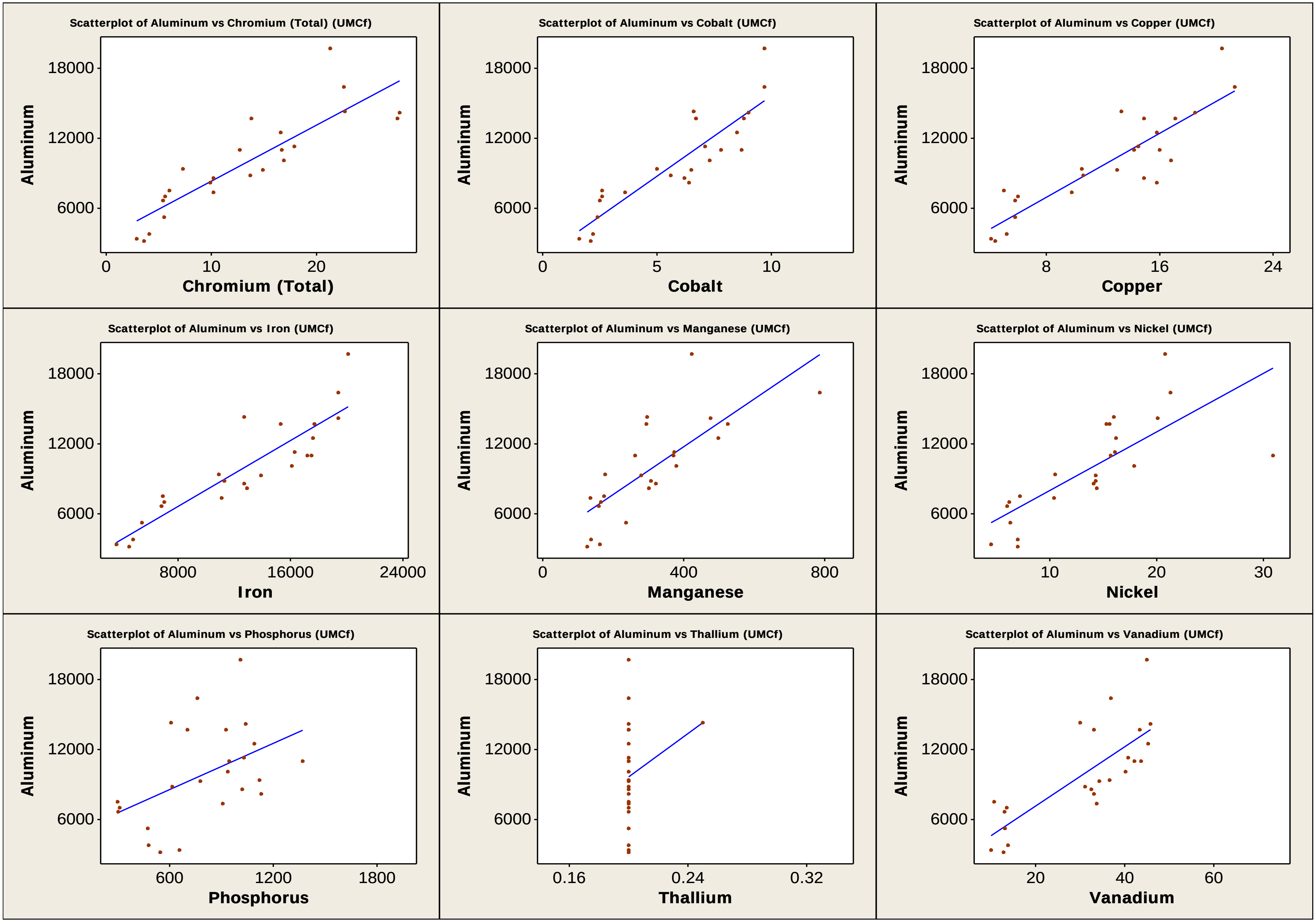
ALUMINUM AND TRACE METALS – Qal/MIXED



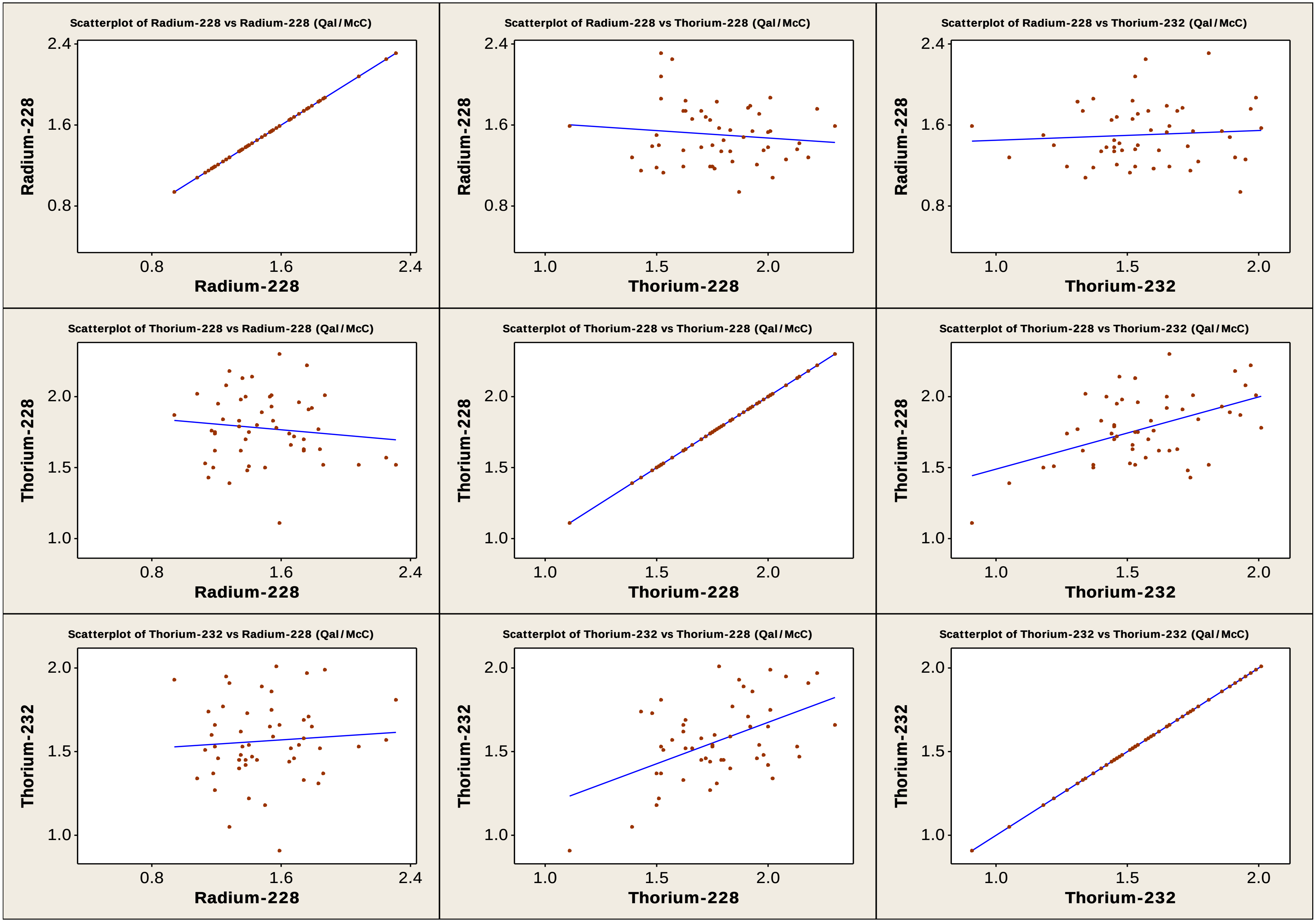
ALUMINUM AND TRACE METALS – Qal/RIVER



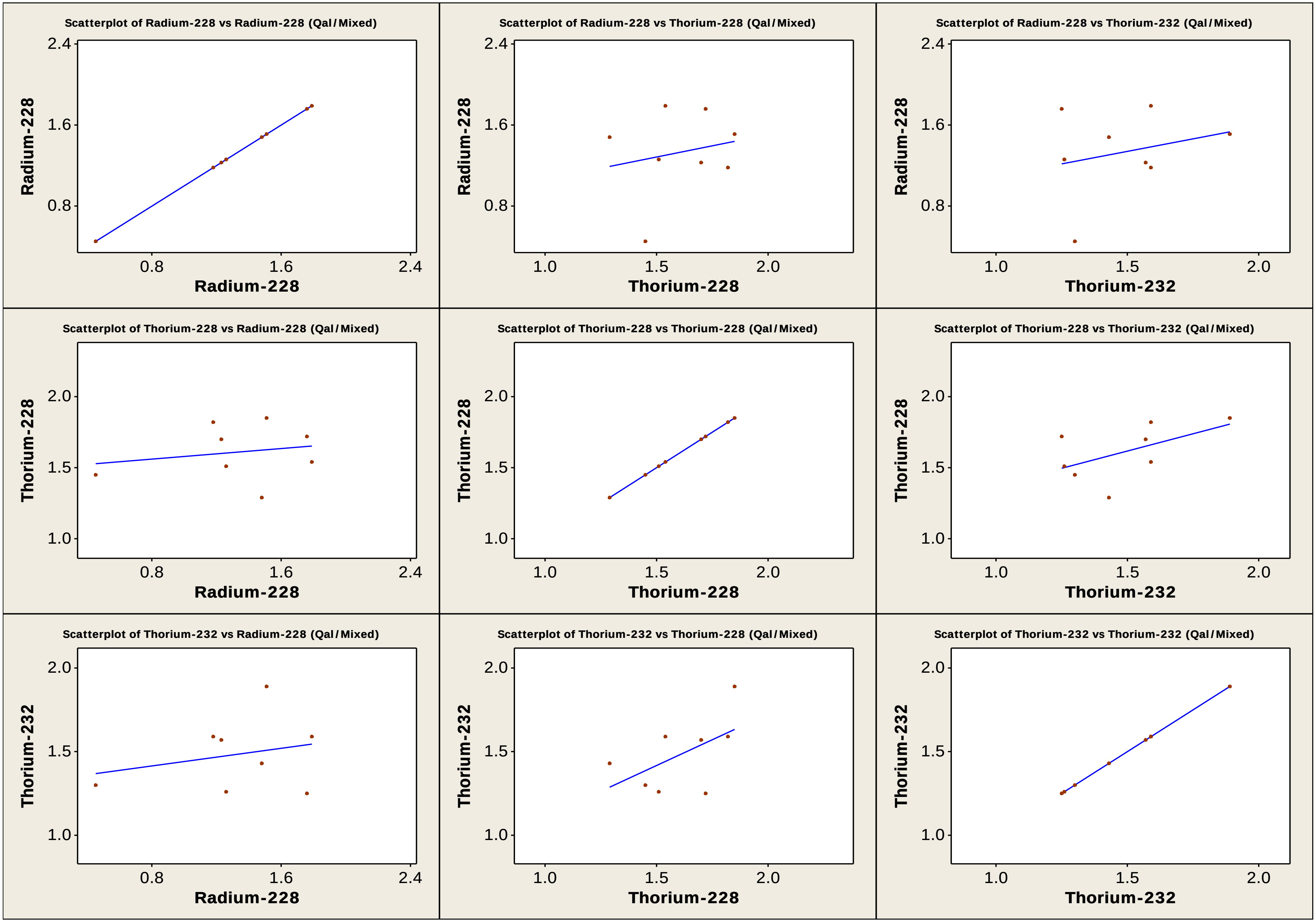
ALUMINUM AND TRACE METALS – UMCf



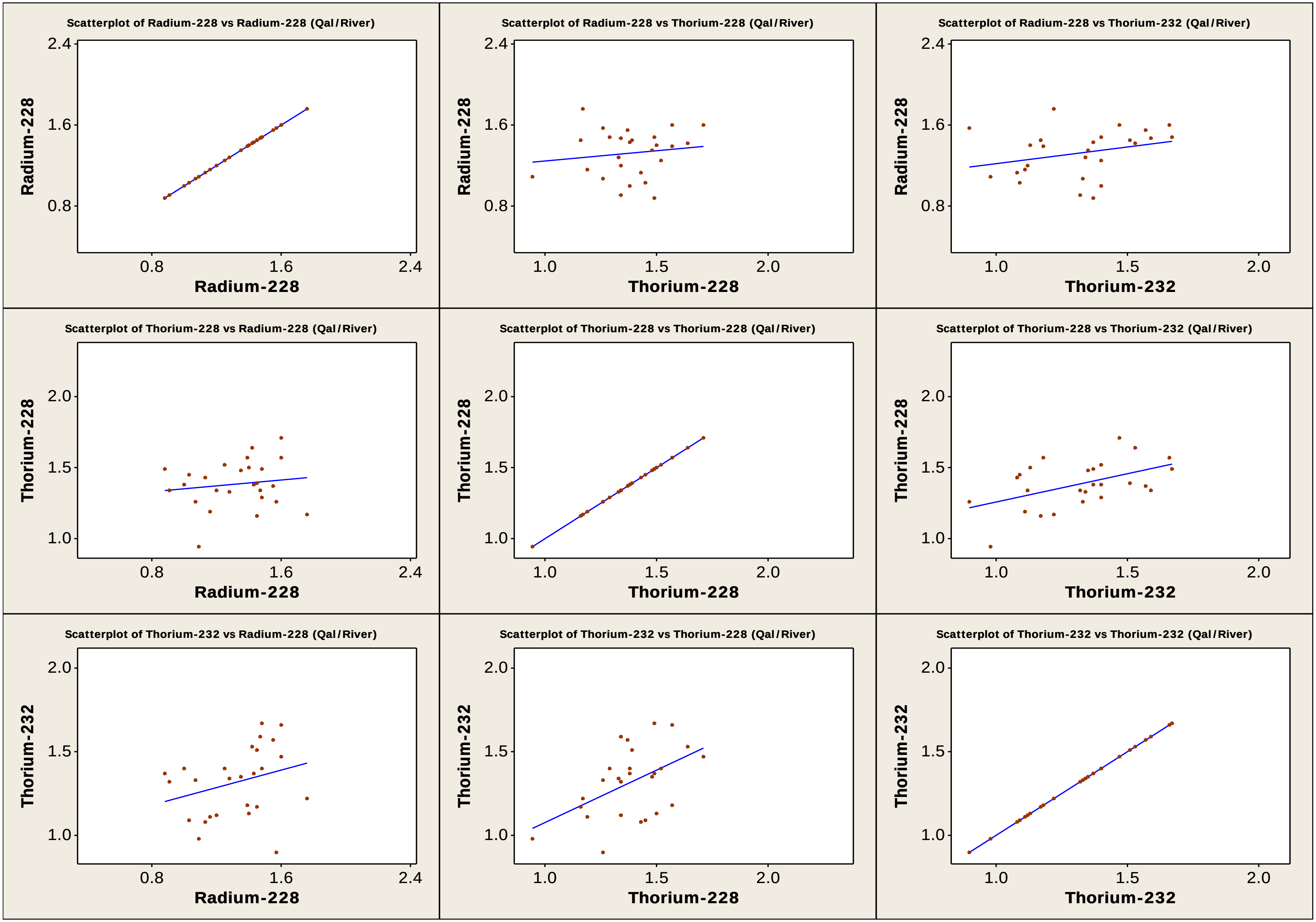
THORIUM-232 DECAY CHAIN – Qal/McCULLOUGH



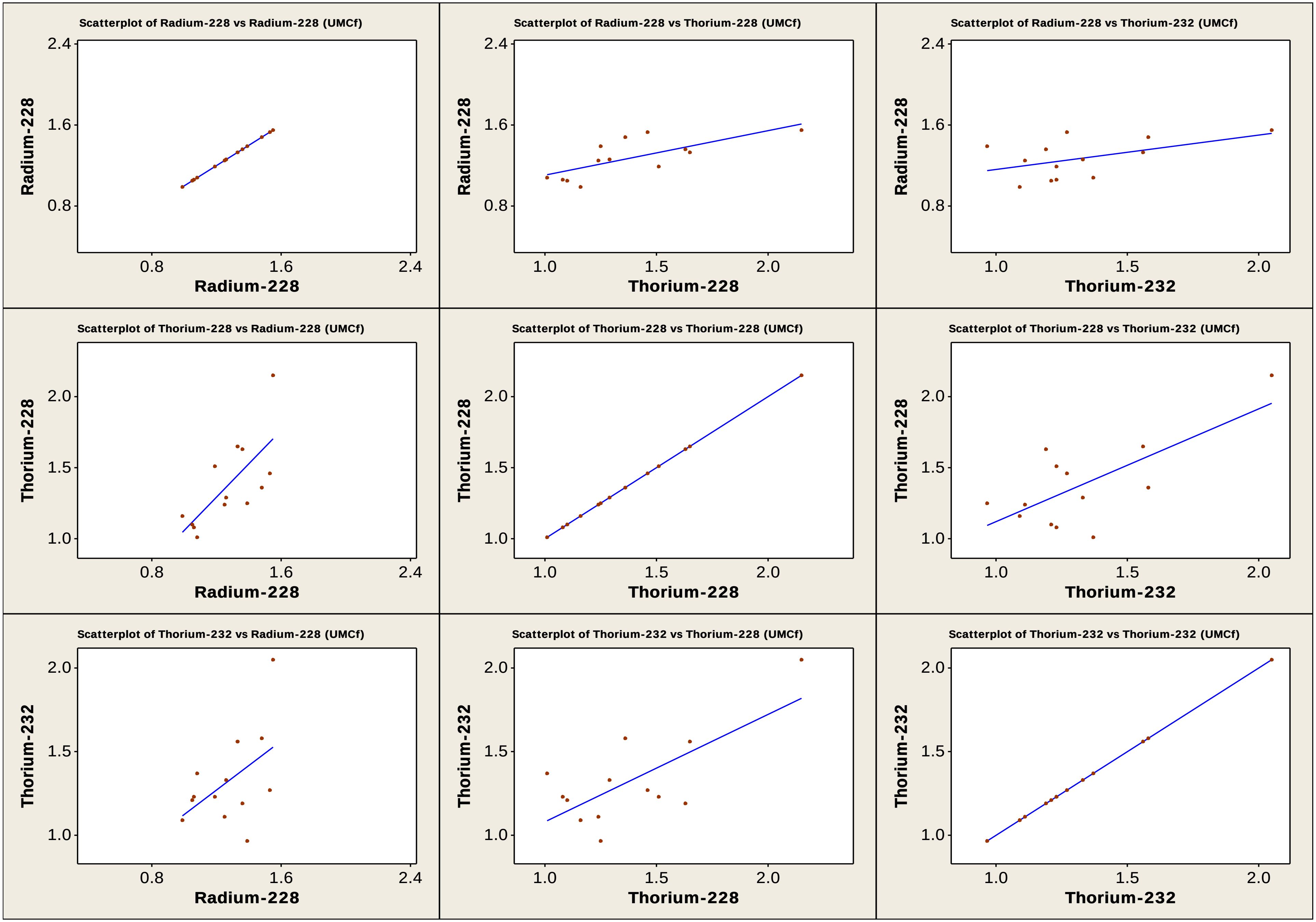
THORIUM-232 DECAY CHAIN – Qal/MIXED



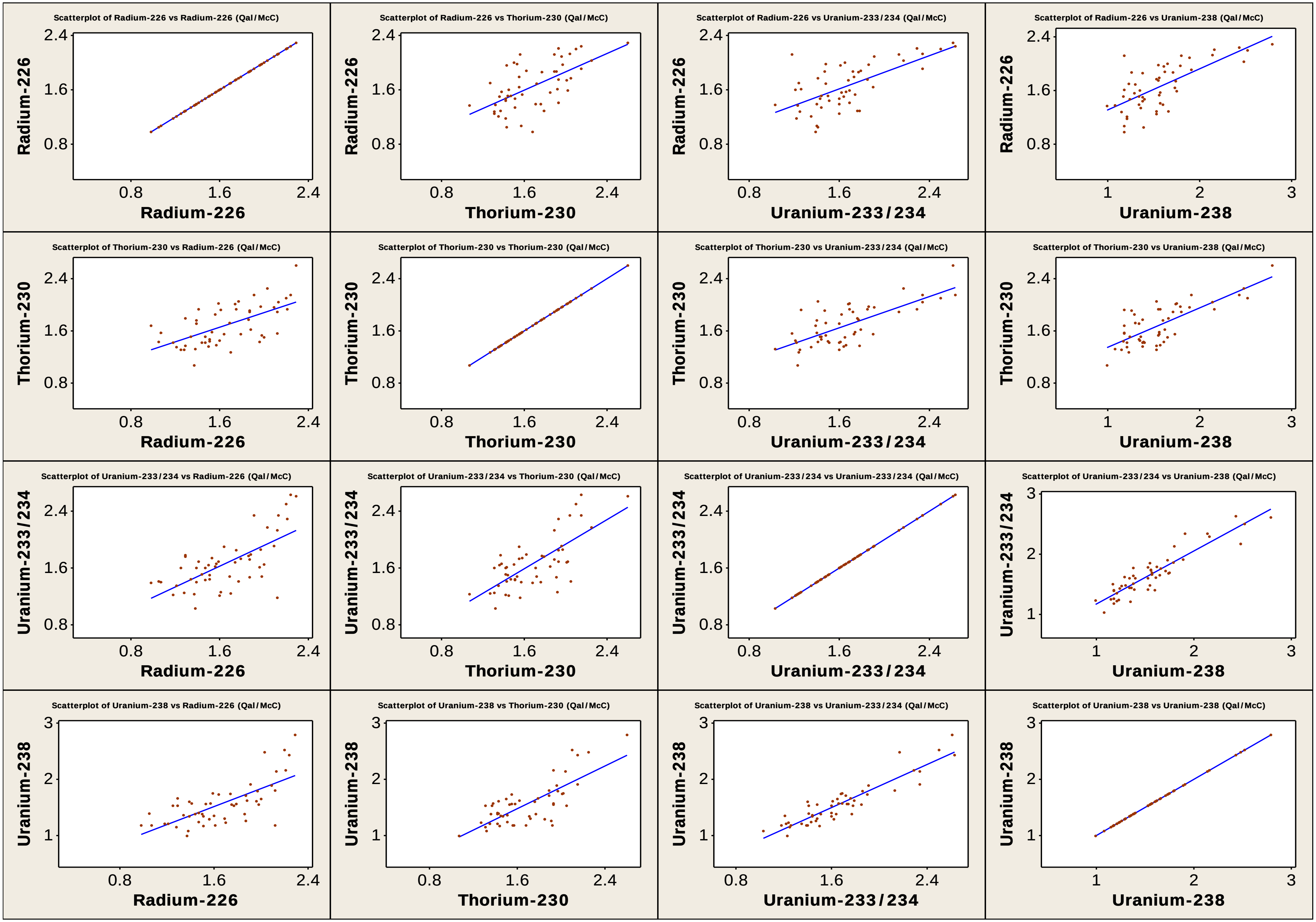
THORIUM-232 DECAY CHAIN – Qal/RIVER



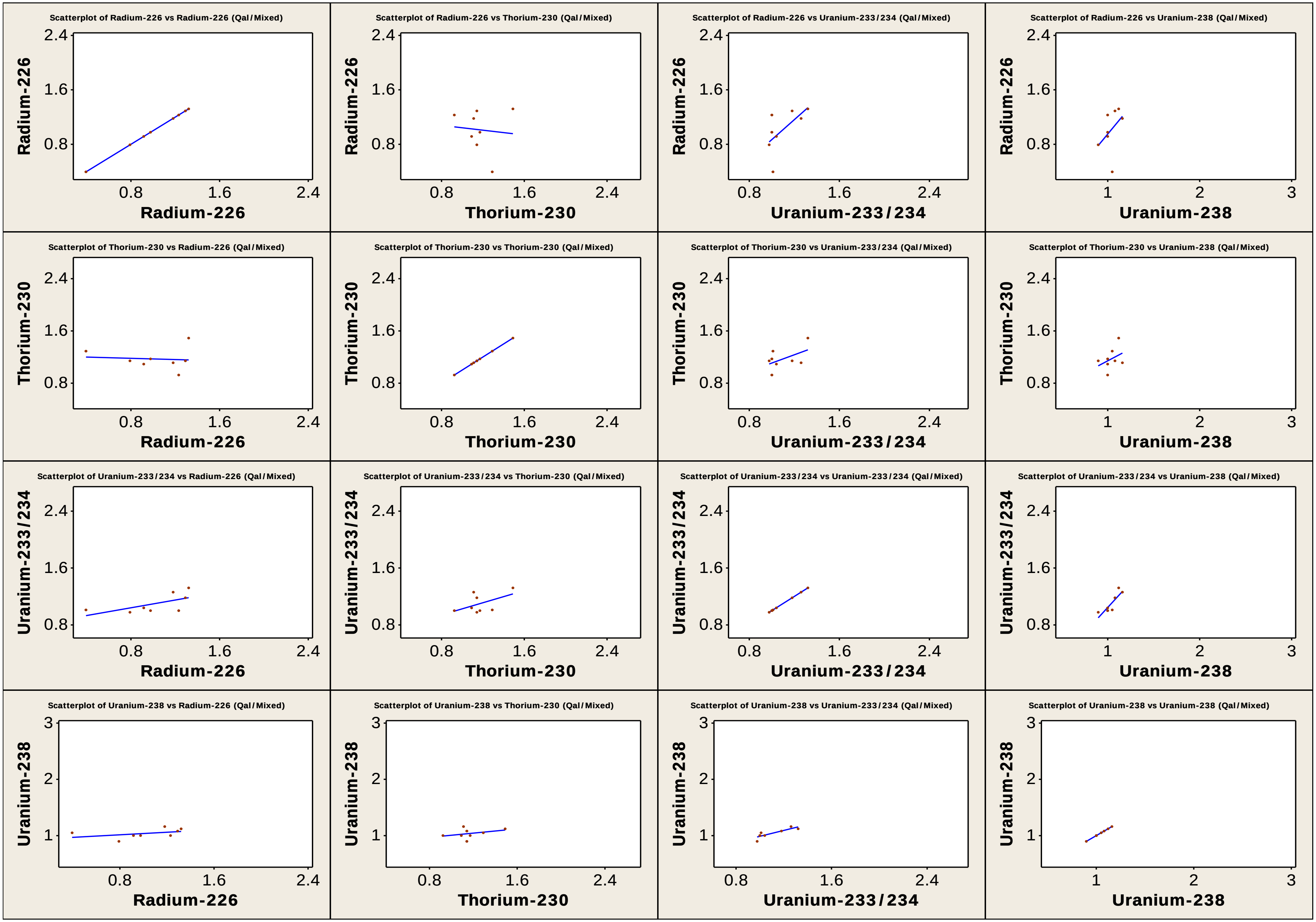
THORIUM-232 DECAY CHAIN – UMCf



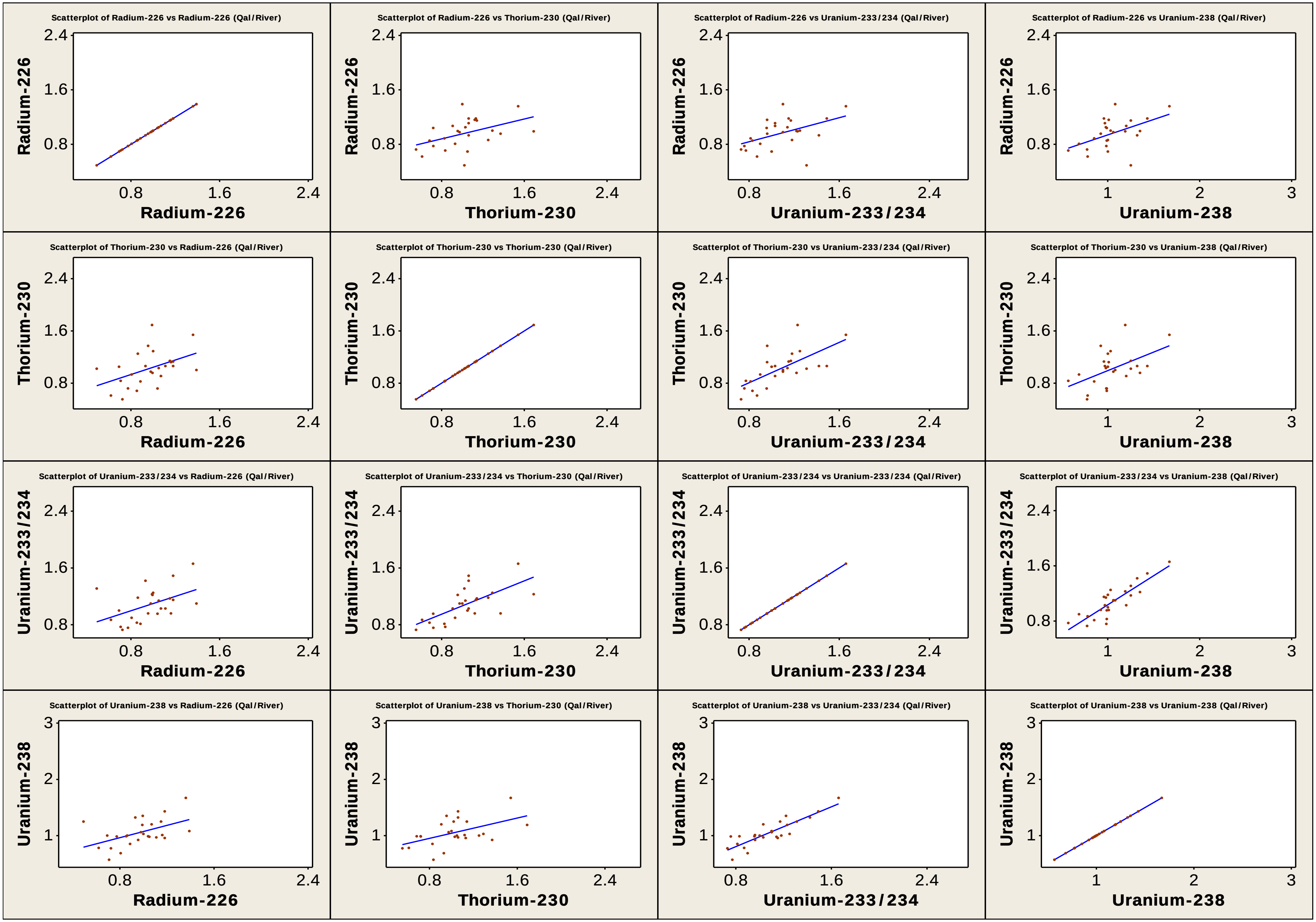
URANIUM-238 DECAY CHAIN – Qal/McCULLOUGH



URANIUM-238 DECAY CHAIN – Qal/MIXED



URANIUM-238 DECAY CHAIN – Qal/RIVER



URANIUM-238 DECAY CHAIN – UMCf