STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION
KALAMAZOO, MICHIGAN

Technical Memorandum for:

Site Specific Background Metals Evaluation (Soil and Groundwater) – Talmadge Creek
Enbridge Oil Spill Site
(Site ID # 14000017)
Marshall, Michigan

20082.012.001

March 2016

Weston Solutions of Michigan, Inc.
2501 Jolly Road, Suite 100
Okemos, Michigan 48864

TABLE OF CONTENTS

Section **Page**

1.0 INTRODUCTION 1

2.0 SOIL BACKGROUND VALUES FOR METALS - TALMADGE CREEK 1

2.1 Background Data Selection Process 1

2.2 Data Evaluation Process 2

2.3 Background Calculation Process 2

2.4 Comparison of Talmadge Creek Reaches (1 through 4) Foreground Dataset to Background Dataset 4

2.4.1 Methods 4

2.4.2 Results 5

3.0 GROUNDWATER BACKGROUND VALUES FOR METALS - TALMADGE CREEK 6

3.1 Data Selection Process 6

3.2 Background Calculation Process 7

3.3 Comparison of Reach 3 Temporary Well Groundwater Data to BTVs and Part 201 Criteria 7

4.0 REFERENCES 8

LIST OF FIGURES

FIGURE 1 Background Soil Sample Locations

FIGURE 2 Foreground Soil Sample Locations Exceeding Criteria

FIGURE 3 Background Groundwater Sample Locations

FIGURE 4 Reach 3 Temporary Well Groundwater Sample Locations Exceeding Criteria

LIST OF TABLES

TABLE 1 Background Soil Sample Data Summary Statistics

TABLE 2 Background Soil Value Comparison to Part 201 Criteria

TABLE 3 Foreground Soil Data Set Comparison to Background Values

TABLE 4 Foreground Soil Sample Locations Exceeding Part 201 Criteria

TABLE 5 Background Groundwater Sample Results

TABLE 6 Reach 3 Temporary Well Groundwater Sample Locations Exceeding Part 201 Criteria

LIST OF ATTACHMENTS

ATTACHMENT A Background Soil Sample Data Set

ATTACHMENT B Foreground Soil Sample Data Set

ATTACHMENT C ProUCL Output for Background and Foreground Data Evaluation

1.0 INTRODUCTION

A site-specific background metals evaluation was performed for soil and groundwater in the vicinity of Talmadge Creek in Marshall, Michigan. The background evaluation was conducted to assess whether the July 2010 crude oil release from the pipeline south of Marshall, Michigan (Line 6B) owned by Enbridge Energy, Limited Partnership (Enbridge) impacted these media. Four target metals (i.e., beryllium, molybdenum, nickel, and vanadium) have been identified as chemicals of concern based on information regarding the original crude oil. These metals have been included in the majority of soil and water sample analyses since December 2010. These metals are also naturally occurring and may be present even where there is no contribution from the Line 6B release. This background evaluation was performed for the Michigan Department of Environmental Quality (MDEQ) to establish site-specific background concentrations for these metals in soil and groundwater. These background concentrations were used to assess whether soil and groundwater in the vicinity of Talmadge Creek have been impacted by comparing site concentrations to site-specific background. Sources consulted during preparation of this document include:

- MDEQ Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria (S^3TM; MDEQ, 2002).
- Michigan Background Soil Survey (MDEQ Hazardous Waste Technical Support Unit, Hazardous Waste Section, Waste and Hazardous Materials Division, 2015).
- ProUCL Version 5.0.00, Technical Guide, Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations ProUCL (EPA/600/R-07/041, September 2013).
- Guidance from the MDEQ Soil Background Technical and Program Support (TAPS) Team.

2.0 SOIL BACKGROUND VALUES FOR METALS - TALMADGE CREEK

Background values were developed for beryllium (Be), molybdenum (Mo), nickel (Ni), and vanadium (V) in soil in the vicinity of Talmadge Creek. This section presents the methods used to derive background values and the recommended background values.

2.1 Background Data Selection Process

All available unsaturated soil data for Talmadge Creek (TC) Reaches (Reaches 1 through 4) for Be, Mo, Ni, and V was assembled into a soil dataset. Sources of the data included the SCRIBE database and Remedial Investigation (RI) report tables submitted to MDEQ by Enbridge including data gap samples. The selected background sample locations are presented in **Figure 1** and sample data and location information are provided in **Attachment A**. The soil dataset includes samples collected from un-impacted locations, not known to have been impacted by the crude oil release and not having indications of historical anthropogenic impact. The following samples were screened out from the background dataset: samples with volatile organic compound (VOC) or polynuclear aromatic

hydrocarbon (PNA) detections (including the entire soil core); samples noted as "impacted" having visual, ultraviolet (UV), odor, or other field-screening indications of oil or anthropogenic impact; water-saturated samples (collected below the static water table), and excavated samples, that are no longer representative of site conditions. The majority of samples were collected at depths of 0 to 4 feet below ground surface (ft bgs), with most samples collected at 0-1 ft bgs, corresponding to the depth intervals and soil types sampled in potentially impacted areas. A total of 1,544 samples (including duplicates and splits) were considered un-impacted and retained in the background dataset. The background dataset was grouped by the following Unified Soil Classification System (USCS) soil types in order to evaluate variations in metal concentrations associated with grain size or soil composition:

CH = clay of high plasticity	PT = peat
CL = clay of low plasticity	SC = clayey sand
GW = well-graded gravel	SM = silty sand
ML = silt	SP = poorly graded sand
OH = organic clay	SW = well-graded sand
OL = organic silt	Unknown = no USCS soil type given

Split sample and duplicate sample results were available for numerous sample locations. These results were considered along with the original sample, though only one sample was selected to represent a sample location result. The sample with the higher overall validated results of the sample/duplicate/split were used to represent the metal concentrations in the statistical evaluation. The sample/duplicate/split with the highest overall metal concentrations was selected for inclusion in the dataset or else the sample with highest V concentration was selected. Four samples were only analyzed for molybdenum (Mo) and two of the results (SBTC0125R509 and SBTC0125R510) were nondetect and not included in the data set. The two samples with positive Mo results were retained in the dataset.

2.2 Data Evaluation Process

A basic statistical analysis was performed to evaluate the data distribution of each data set for each metal in each soil type using the EPA's ProUCL version 5.0.00 statistical program. The percentage of nondetect values was determined for each metal, followed by analysis of the distribution of the data. For simplicity, only normal or lognormal distributions were analyzed using the Shapiro-Wilk Goodness-of-Fit tests provided in ProUCL. Outlier testing was also performed using Dixon's outlier test, though no potential statistical outliers were excluded from the background dataset. The split sample of SBTC0175R026 was considered to be an outlier and excluded because the split concentrations were up to an order of magnitude greater than the investigative sample; the investigative sample was retained in the dataset. The original sample result was used in place of the split sample result at this location. Summary statistics, including the mean or median, standard deviation and range of concentrations for a metal were calculated with normal, lognormal, or nonparametric methods as appropriate.

2.3 Background Calculation Process

Soil background threshold values (BTV) were calculated for each soil type based on the percentages of nondetect values and the distribution of the dataset assuming a minimum of 8 samples per data set in accordance with MDEQ guidance as follows (MDEQ, 2002; MDEQ, 2015; EPA ProUCL Guidance, 2013):

0% to <50% nondetects (ND) and normal or lognormal distribution

- For a normally distributed dataset of 8 or more: BTV = arithmetic mean + 2 standard deviations (SD; MDEQ, 2015).
- For a lognormally distributed dataset of 8 or more: BTV = geometric mean x geometric $SD^{1.96}$ (MDEQ, 2015).
- One-half the detection limit (DL) was substituted for nondetect values.

≥50% - ≤80% ND and normal or lognormal distribution

- ProUCL version 5.0.00 was used to determine parametric 95% Kaplan Meier (KM) upper prediction limit (UPL) as BTV for normal distribution and the 95% upper prediction limit using Robust Regression on Order Statistics (ROS) estimates of ND for lognormal distribution.
- Values for nondetects were computed by ProUCL using either the Kaplan-Meier (KM) technique for normal distribution or the Robust Regression on Order Statistics (ROS) technique for lognormal distribution.

>50% - ≤80% ND and/or not discernable distribution (nonparametric)

- ProUCL is used to determine nonparametric 95% UPL as BTV (EPA, 2013).

>80% - <100% ND

- If the number of nondetect results was between 80% and 100%, the maximum value is used as the BTV.

<8 Samples in the Data Set

- If less than 8 background samples were in a soil type dataset, the maximum value is used as the BTV.

100% ND in the Data Set

- If the dataset is 100% ND, the detection limit is used as the BTV.

The background dataset summary statistics are provided in **Table 1**. The background values are compared to MDEQ Part 201 Criteria and statewide background concentrations in **Table 2.** The site-specific background values for Be range from 0.43 mg/kg to 1.2 mg/kg for the various soil types based primarily on the reporting limit for nondetect samples or the maximum detected concentration. These values are below the statewide background concentrations and Part 201 Drinking Water Protection (DWP) Criteria for Be. The site-specific background values for Ni range from 7.2 mg/kg to 24.6 mg/kg for

the various soil types with values for some soil types slightly above the statewide default background value of 20 mg/kg. The site-specific background values for Ni in soil are below the Part 201 DWP Criteria of 100 mg/kg. The site-specific background values for Mo range from the reporting limit of 1 mg/kg to 17.5 mg/kg. The site specific background values for Mo exceed the Part 201 DWP Criteria of 1.5 mg/kg for all but three soil types (CH, SC, and GC), which were represented by only one or two nondetect samples. The site-specific background values for V range from 11 mg/kg to 40.8 mg/kg. The site-specific background values for V are well below the Part 201 DWP of 72 mg/kg. Based on the comparison of calculated background values and Part 201 Criteria, site-specific criteria are not necessary for Be, Ni, and V in soil which have site-specific background values below the Part 201 Criteria. The maximum calculated background value for Mo in soil is significantly higher than the existing Part 201 DWP criteria (1.5 mg/kg versus 17.4 mg/kg). The background values for soil types shown in **Table 2,** with Mo concentrations that exceed the Part 201 DWP Criteria, may be used as a site-specific DWP criterion under Part 201 regulations (Section 324.20120a(10)).

2.4 Comparison of Talmadge Creek (Reaches 1 through 4) Foreground Dataset to Background Dataset

Following completion of calculation of the BTVs, a comparison of the foreground soil data to the BTVs and the background data distributions for each soil type data set was conducted. A total of 275 samples were retained in the foreground dataset as included in **Attachment B**. Soil samples from Reaches 1 through 4 (i.e., foreground dataset) representing impacted locations were compiled and included soil samples with known USCS soil type codes; unsaturated soil samples; and impacted soil samples that had not been excavated (included areas where the excavation did not extend to the sample depth for samples within excavations or sample was located outside of excavation area).

2.4.1 Methods

Initially, maximum concentrations of the foreground data set for each soil type were compared to BTVs, as shown in **Table 3**. If the maximum foreground concentration was less than the BTV for a particular metal and soil type, then it is concluded that the foreground data set does not represent an impacted soil population and no further evaluation was necessary. If the maximum foreground concentration exceeded the BTV, then two sample hypothesis testing was performed to determine if the distribution of metal concentrations in the background and foreground datasets are significantly different. It is possible that while individual results of the foreground data set may exceed the BTV, the population of the data set as a whole may be representative of background conditions and thus not indicate a significant impact to site soils. The distribution of results in the foreground and background datasets was evaluated using goodness of fit function excluding nondetects using ProUCL version 5.0.00. Two sample hypotheses testing was conducted using ProUCL Version 5.0.00 to compare the parameters and distributions of the two populations (e.g., Background vs. Foreground) based upon data sets collected from those populations. Non-parametric Gehan, Tarone-Ware, and Wilcoxon-Mann-Whitney tests of population distributions were performed for datasets with nondetects. The parametric t-test of the means and the nonparametric Wilcoxon-Mann-Whitney test of the population distributions were performed for datasets without nondetects. The selected null hypothesis was: foreground mean and/or median ≤ background mean and/or median. The alternative hypothesis was: foreground mean and/or median > background mean and/or median.

2.4.2 Results

Results of the comparison of foreground data to the BTVs and the two sample hypotheses tests are summarized in **Table 3** and the primary results are described below. Discrete soil sample locations that exceed Part 201 Criteria and/or BTVs are listed in **Table 4** and shown on **Figure 2**. The statistical output is provided in **Attachment C**.

- For Be, none of the maximum detected foreground concentrations exceeded the BTVs. This indicates that the foreground samples do not represent impacted soil, and are not distinguishable from the background data set.

- The maximum foreground Mo concentrations exceed BTVs for the OL, SM, and Unknown soil type data sets. Two sample hypotheses tests were completed for the OL and Unknown soil types. Due to the low number of samples and high percentage of nondetects in the SM data set, the two sample hypothesis test was not performed and instead, maximum values were compared. For the SM soils, the maximum value of Mo in the foreground data set is less than the maximum background value, and is not considered to be significantly different than the background data set.

- For the Unknown soil type, the foreground mean concentration of Mo was not significantly different than the background mean concentration; and the maximum background value greatly exceeded the maximum foreground value. This indicates that no significant impact for Mo in soil is evident in the foreground data set for this group of samples.

- The maximum foreground Mo concentration for OL soil is greater than the BTV. However, the maximum background concentration is greater than the maximum foreground concentration. In addition, the foreground concentrations are well within the range of the background concentrations and 97.8 percent (87 out of 89 samples) of the foreground concentrations are below the BTV. Results of the two sample hypothesis testing showed that the foreground mean and median concentrations are considered higher than the background mean and median concentrations. However, considering that only two samples exceed the BTV with concentrations less than two times the BTV, the significance of the statistical difference between the data sets identified by these tests remains uncertain. Data is insufficient to conclude that the foreground data set is impacted relative to the background data set. Further, results from synthetic precipitation leaching procedure (SPLP) tests on the two samples that exceeded the BTV showed no detectable concentrations of Mo in the leachate test, which suggests that the likelihood of groundwater impact from detected Mo concentrations is low.

- The maximum foreground Ni concentrations are greater than BTVs for the OL and Unknown soil types. The maximum foreground concentration for OL soils is slightly greater than the maximum background concentration. The maximum Ni concentration in the foreground Unknown soil type samples is significantly less than the maximum background concentration. Results from the two sample hypothesis testing shows that the foreground mean concentrations are not significantly different than the background mean concentrations for these soil types.

This evaluation indicates that no significant impact for Ni in soil is evident in any of the foreground data sets, although individual samples may exceed BTVs.

- The maximum foreground V concentration is greater than the BTV for only the OL soil type. The maximum background V concentration is slightly higher than the foreground maximum concentration. However, the foreground mean concentration is not significantly different than the background mean concentration. This evaluation indicates that no significant impact for V in soil is evident in any of the foreground data sets.

Based on the statistical evaluation of background values and a comparison of background and foreground data sets for each soil type, the distribution of metal concentrations observed for each soil type are interpreted to be indistinguishable from the background data, with the exception of Mo in OL soil. For Mo in OL soil, although the mean and median concentrations of the foreground data set are higher than the background data set and two sample hypothesis test results indicate a difference between these data sets, the foreground data set lies well within the range of the background data and therefore, the significance of this difference is uncertain. Data is insufficient to conclude that the foreground data set is impacted relative to the background data set. While numerous individual sample results listed in **Table 4** exceed site-specific BTVs, the overall data distribution for foreground data does not indicate significant impacts relative to background for Be, Ni, Mo, and V in soil along Reaches 1 through 5 of Talmadge Creek.

3.0 GROUNDWATER BACKGROUND VALUES FOR METALS - TALMADGE CREEK

Background values were developed for beryllium, molybdenum, nickel, and vanadium in groundwater in the vicinity of Talmadge Creek. This section presents the methods used to derive background values and the recommended background values.

3.1 Data Selection Process

All available permanent well data from Talmadge Creek Reaches 1 through 4 for Be, Mo, Ni, and V was assembled into a groundwater dataset. Sources of the data included the SCRIBE database/Quarterly Groundwater Monitoring Reports. Information on coordinates, analytical results, stabilization parameters and well construction was included for each well. From this information, 17 permanent wells from apparent "up-gradient" locations within the Talmadge Creek reaches were selected for inclusion in the background groundwater dataset. The selected wells are presented in **Figure 3.** The final background groundwater dataset included analytical results for 108 samples collected over multiple sample rounds from October 2013 through September 2014 from 17 permanent wells as listed in **Table 5**.

3.2 Background Calculation Process

In accordance with MDEQ Part 201 guidance, the groundwater background numbers were calculated in the following manner (MDEQ, 2002):

- For data sets with 100% nondetect results, background is set at the detection limit (DL).
    - Beryllium was not detected in any of the samples analyzed, and the background concentration is set at the DL of 0.001 mg/L.
    - Nickel was not detected in any of the samples analyzed, and the background is set at the DL of 0.02 mg/L.
- For datasets with one or more positive detections, background is set at the higher of the observed concentration(s) or the detection limit.
    - Molybdenum was detected in one of 108 samples (MWSA0003S) at an estimated concentration below the DL, and the background is set at the DL of 0.05 mg/L.
    - Vanadium was detected in one of 108 samples (MWTC0000R04) at a concentration above the DL. However, four quarters of nondetect concentrations have been measured at this location since this detection. Because the detection did not recur, background is set at the DL of 0.004 mg/L.

The calculated groundwater background threshold values based on the existing Site data set are less than the most restrictive applicable Part 201 criteria for all four metals. As a result, site-specific background values would not replace the existing Part 201 Criteria for evaluating impacts at the site under Part 201 regulations (Section 324.20120a(10)).

3.3 Comparison of Reach 3 Temporary Well Groundwater Data to BTVs and Part 201 Criteria

Following completion of calculation of the groundwater BTVs, a comparison of the Reach 3 groundwater data to the BTVs and applicable Part 201 Criteria was conducted. Reach 3 was selected as a representative reach of Talmadge Creek for the purpose of assessing the potential impact of metals to groundwater and surface water along the stream. Reach 3 groundwater sample data was compiled from 25 temporary wells. Results represent unfiltered groundwater samples. Because the BTVs for Be, Ni, Mo, and V are below the most restrictive Part 201 Criteria, only the existing Part 201 Criteria are used for assessing potential impacts at the Site as shown in **Table 6**. **Figure 4** and **Table 6** present the groundwater sample locations that have at least one metal that exceeds Part 201 criteria. **Table 6** lists the most restrictive Part 201 Criteria and site-specific background value for each metal. Results show that V is the only metal of the four metals evaluated that exceeds its Part 201 Criterion of 4.5 ug/L at all 25 locations, with concentrations of V up to 150 ug/L. Nickel exceeded the Part 201 Criterion of 100 ug/L at one location (SBTC0100R515). The observed sample turbidity exceeded 1,000 NTU at that location. Based on these results, potential impacts due to V may exist at the site. However, the comparison of results from temporary wells with those from permanent wells used to assess background conditions may be insufficient to evaluate site conditions, if the temporary well samples are

not representative of groundwater conditions due to elevated turbidity related to sampling procedures or well construction as discussed below.

Turbidity values recorded for eleven of these samples are shown in **Table 6**. Results for samples exceeding criteria show elevated turbidity values for all but two of the measured samples. There does not appear to be a direct correlation between the magnitude of the V concentrations and the magnitude of the turbidity values. Turbidity can be naturally occurring, the result of contaminants, or induced during sampling activities. Samples that contain suspended soil particles may not be representative of natural groundwater conditions, and result in an overestimation of dissolved groundwater metal concentrations. Visual observations during field sampling; evaluation of results from filtered samples and/or properly constructed monitoring wells (permanent wells) are necessary to evaluate the source of the turbidity detected in samples and the relationship between turbidity and metal concentrations in groundwater.

4.0 REFERENCES

MDEQ, 2002. Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria. August.

MDEQ, 2015. Michigan Background Soil Survey 2005 (Updated 2015).

U. S. EPA, 2013. ProUCL Version 5.0.00, Technical Guide, Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations ProUCL. EPA/600/R-07/041. September.

FIGURES

LEGEND

- Soil Core Locations for Background Metals Study
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons
- Reach Boundaries

N

0 50 100 Feet

Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

BACKGROUND SOIL SAMPLE LOCATIONS
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:600	SS/KRB	3/25/2016		**Figure 1** (Page 1 of 12)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig1_TC_Bkgr_Metals_Soil_Sample_Locations_Final_20160325.mxd, 3/25/2016 1:46:41 PM, BROWNK

LEGEND

- Soil Core Locations for Background Metals Study
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons
- Reach Boundaries

N

0 50 100 Feet

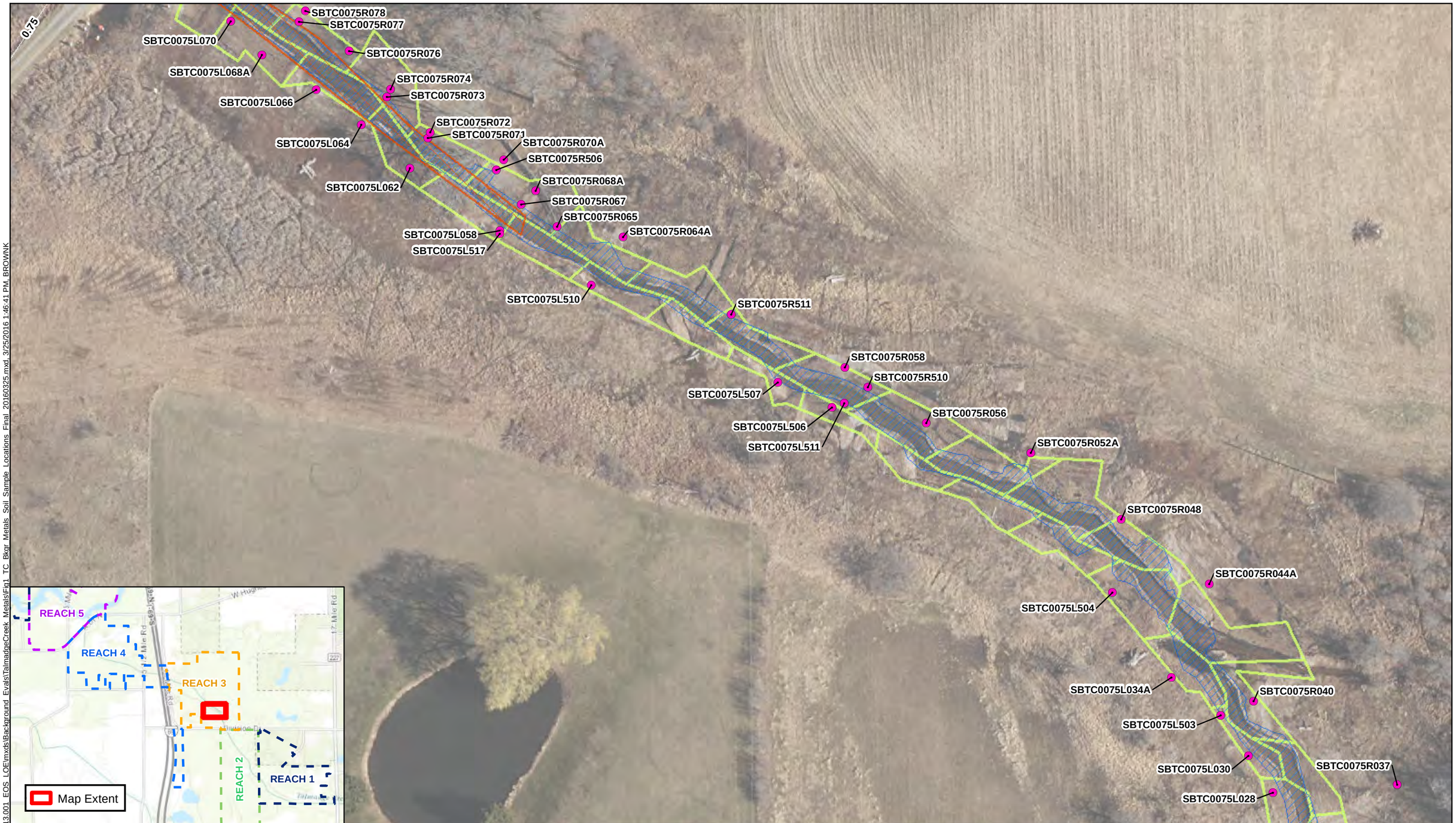
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

BACKGROUND SOIL SAMPLE LOCATIONS
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:600	SS/KRB	3/25/2016		**Figure 1** (Page 2 of 12)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig1_TC_Bkgr_Metals_Soil_Sample_Locations_Final_20160325.mxd, 3/25/2016 1:46:41 PM, BROWNK



LEGEND

- Soil Core Locations for Background Metals Study
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons
- Reach Boundaries

N

0 50 100 Feet

Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

BACKGROUND SOIL SAMPLE LOCATIONS
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:600	SS/KRB	3/25/2016		**Figure 1** (Page 3 of 12)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_MetalsFig1_TC_Bkgr_Metals_Soil_Sample_Locations_Final_20160325.mxd, 3/25/2016 1:46:41 PM, BROWNK

LEGEND

- Soil Core Locations for Background Metals Study
- Reach Boundaries
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons

N

0 50 100 Feet

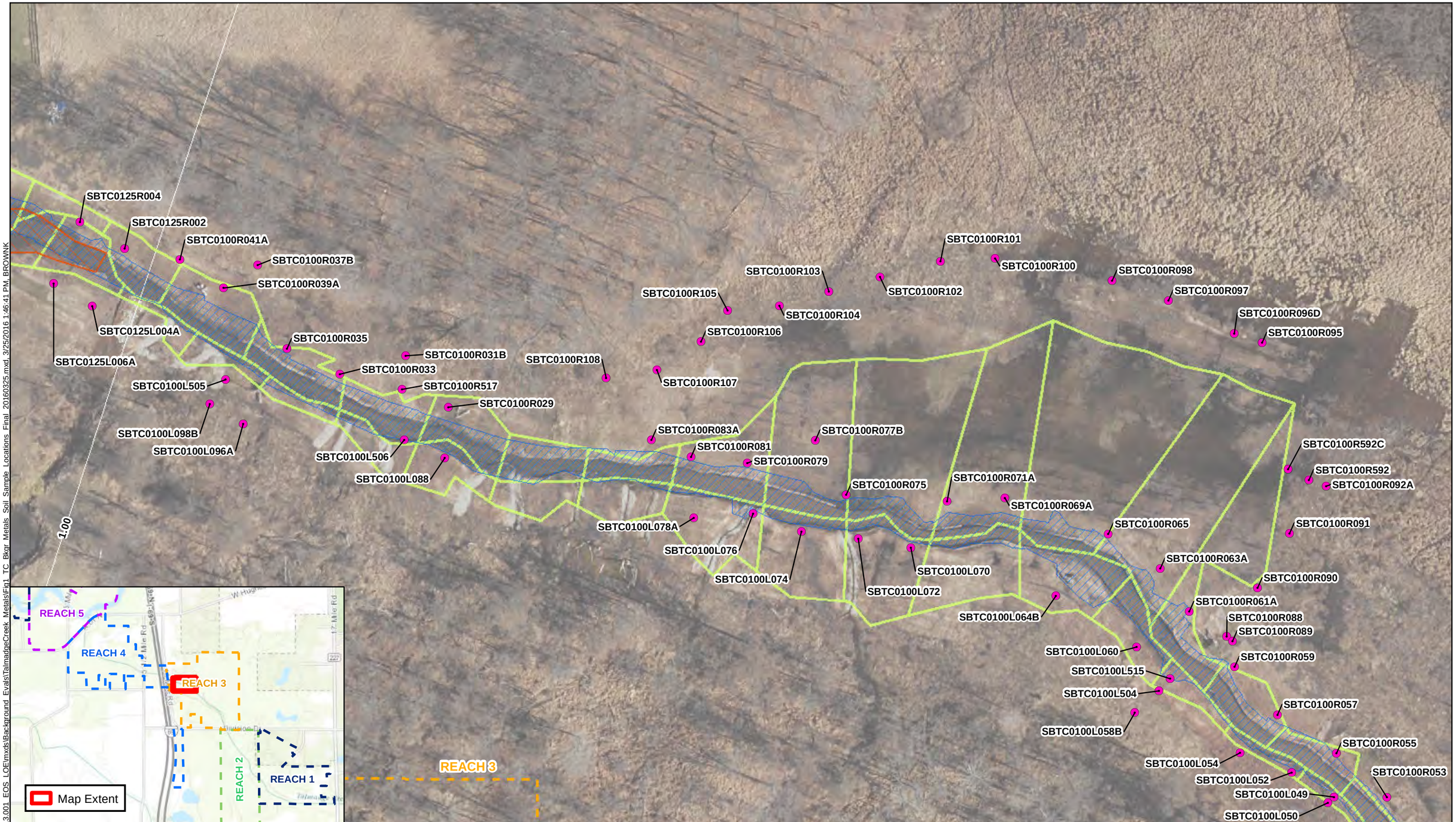
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

BACKGROUND SOIL SAMPLE LOCATIONS
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:600	SS/KRB	3/25/2016		**Figure 1** (Page 4 of 12)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig1_TC_Bkgr_Metals_Soil_Sample_Locations_Final_20160325.mxd, 3/25/2016 1:46:41 PM, BROWNK



LEGEND

- Soil Core Locations for Background Metals Study
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons
- Reach Boundaries

N

0 50 100 Feet

Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

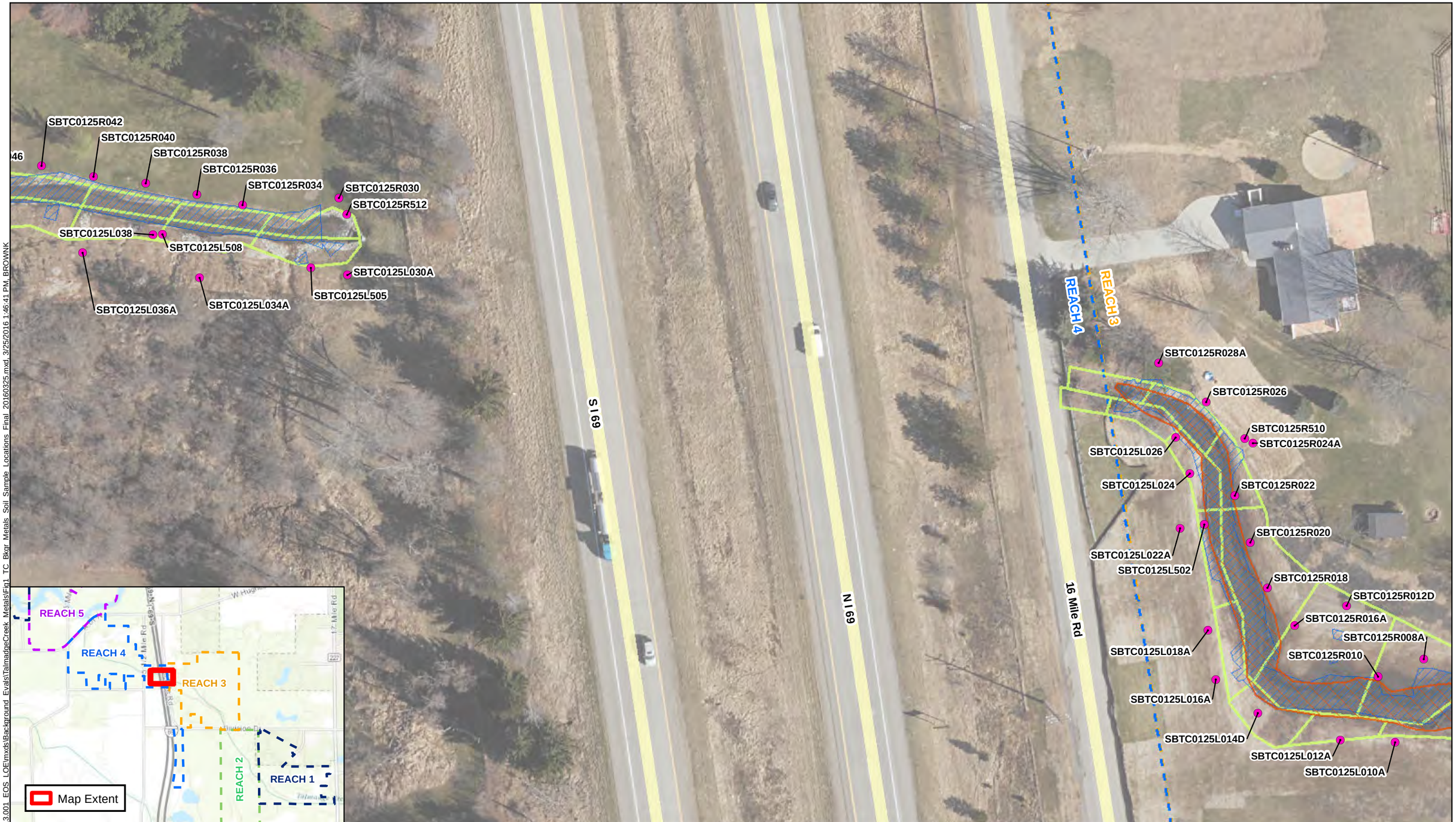
Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

BACKGROUND SOIL SAMPLE LOCATIONS
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:
1:600	SS/KRB	3/25/2016	

Figure 1 (Page 5 of 12)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig1_TC_Bkgr_Metals_Soil_Sample_Locations_Final_20160325.mxd, 3/25/2016 1:46:41 PM, BROWNK



LEGEND

- Soil Core Locations for Background Metals Study
- Reach Boundaries
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons

N

0 50 100 Feet

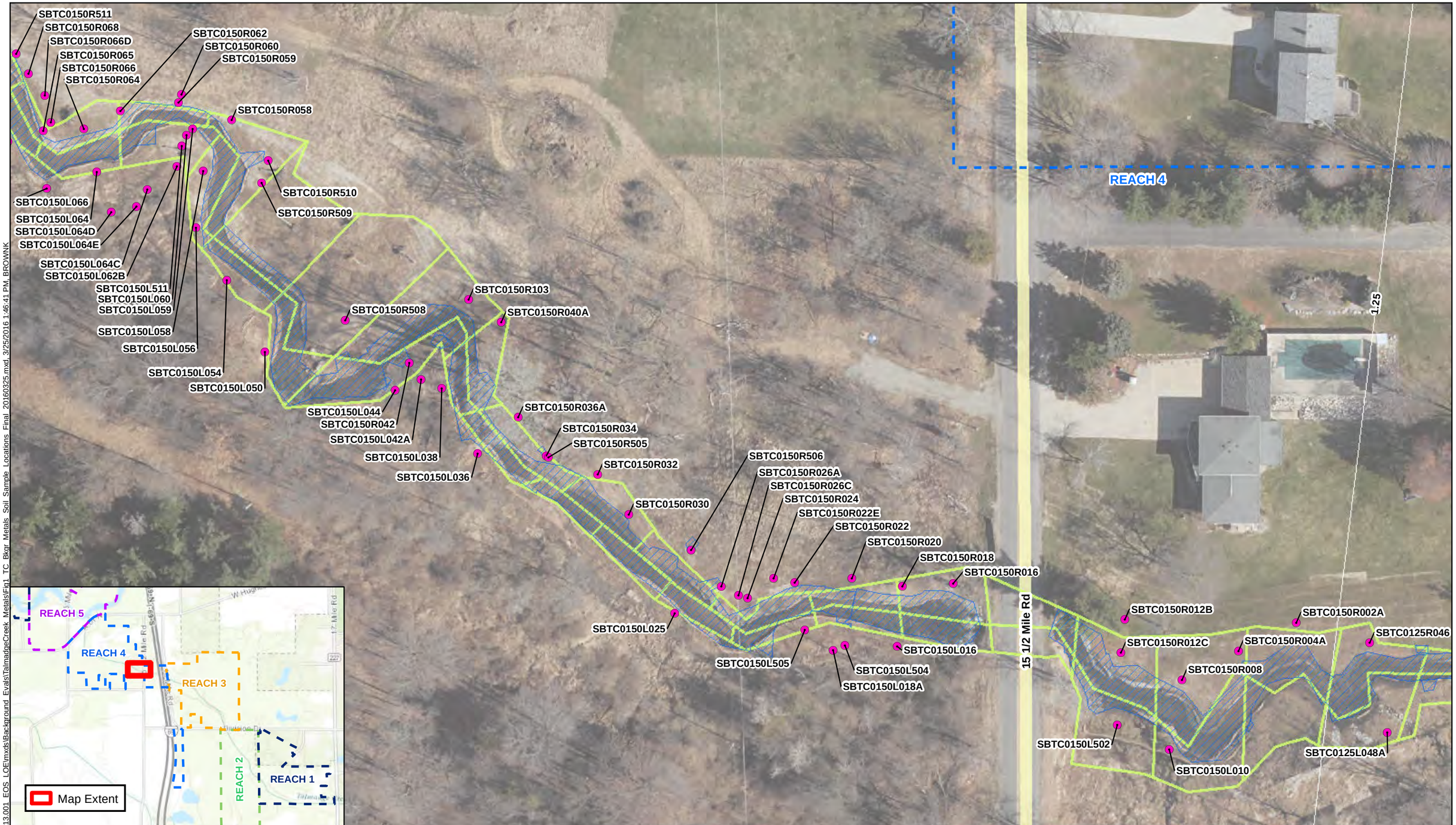
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

BACKGROUND SOIL SAMPLE LOCATIONS
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:600	SS/KRB	3/25/2016		**Figure 1** (Page 6 of 12)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_MetalsFig1_TC_Bkgr_Metals_Soil_Sample_Locations_Final_20160325.mxd, 3/25/2016 1:46:41 PM, BROWNK



LEGEND

- Soil Core Locations for Background Metals Study
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons
- Reach Boundaries

N

0 50 100 Feet

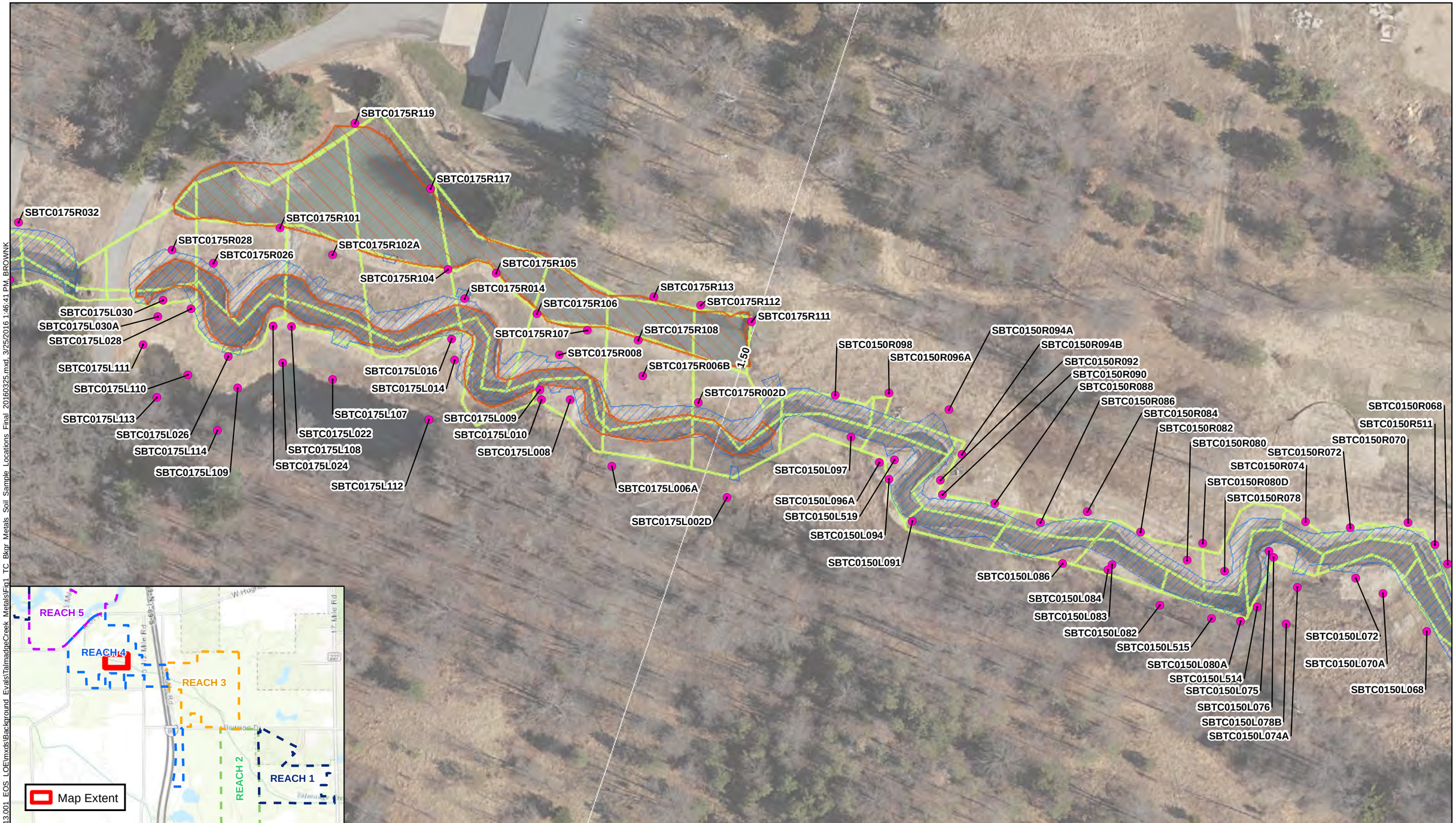
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

BACKGROUND SOIL SAMPLE LOCATIONS
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:600	SS/KRB	3/25/2016		**Figure 1** (Page 7 of 12)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_MetalsFig1_TC_Bkgr_Metals_Soil_Sample_Locations_Final_20160325.mxd, 3/25/2016 1:46:41 PM, BROWNK



LEGEND

- Soil Core Locations for Background Metals Study
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons
- Reach Boundaries

N

0 50 100 Feet

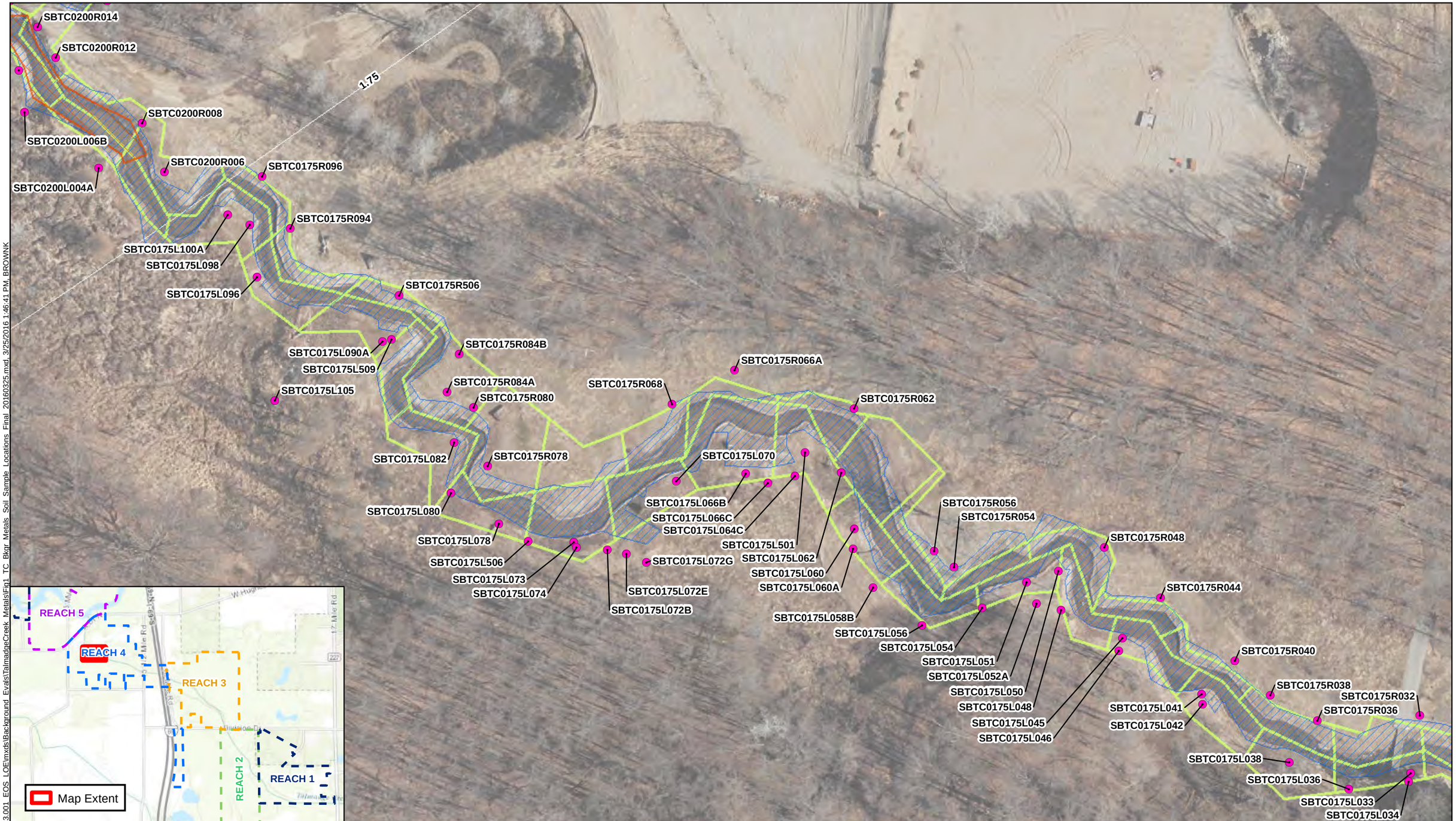
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

BACKGROUND SOIL SAMPLE LOCATIONS
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:602	SS/KRB	3/25/2016		**Figure 1** (Page 8 of 12)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig1_TC_Bkgr_Metals_Soil_Sample_Locations_Final_20160325.mxd, 3/25/2016 1:46:41 PM, BROWNK



LEGEND

- Soil Core Locations for Background Metals Study
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons
- Reach Boundaries

N

0 50 100 Feet

Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

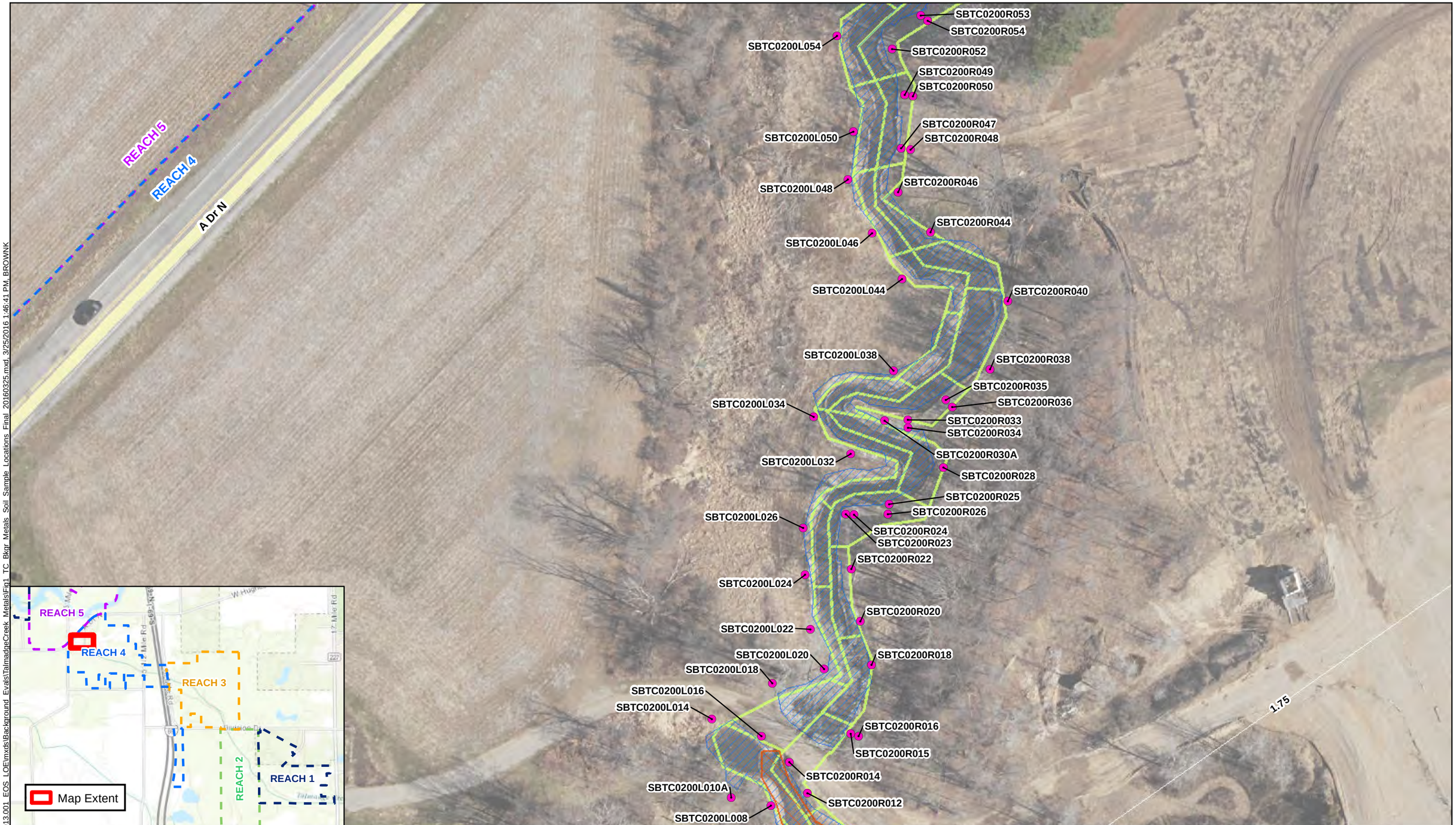
Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

BACKGROUND SOIL SAMPLE LOCATIONS
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:
1:600	SS/KRB	3/25/2016	

Figure 1 (Page 9 of 12)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig1_TC_Bkgr_Metals_Soil_Sample_Locations_Final_20160325.mxd, 3/25/2016 1:46:41 PM, BROWNK



LEGEND

- Soil Core Locations for Background Metals Study
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons
- Reach Boundaries

N

0 50 100 Feet

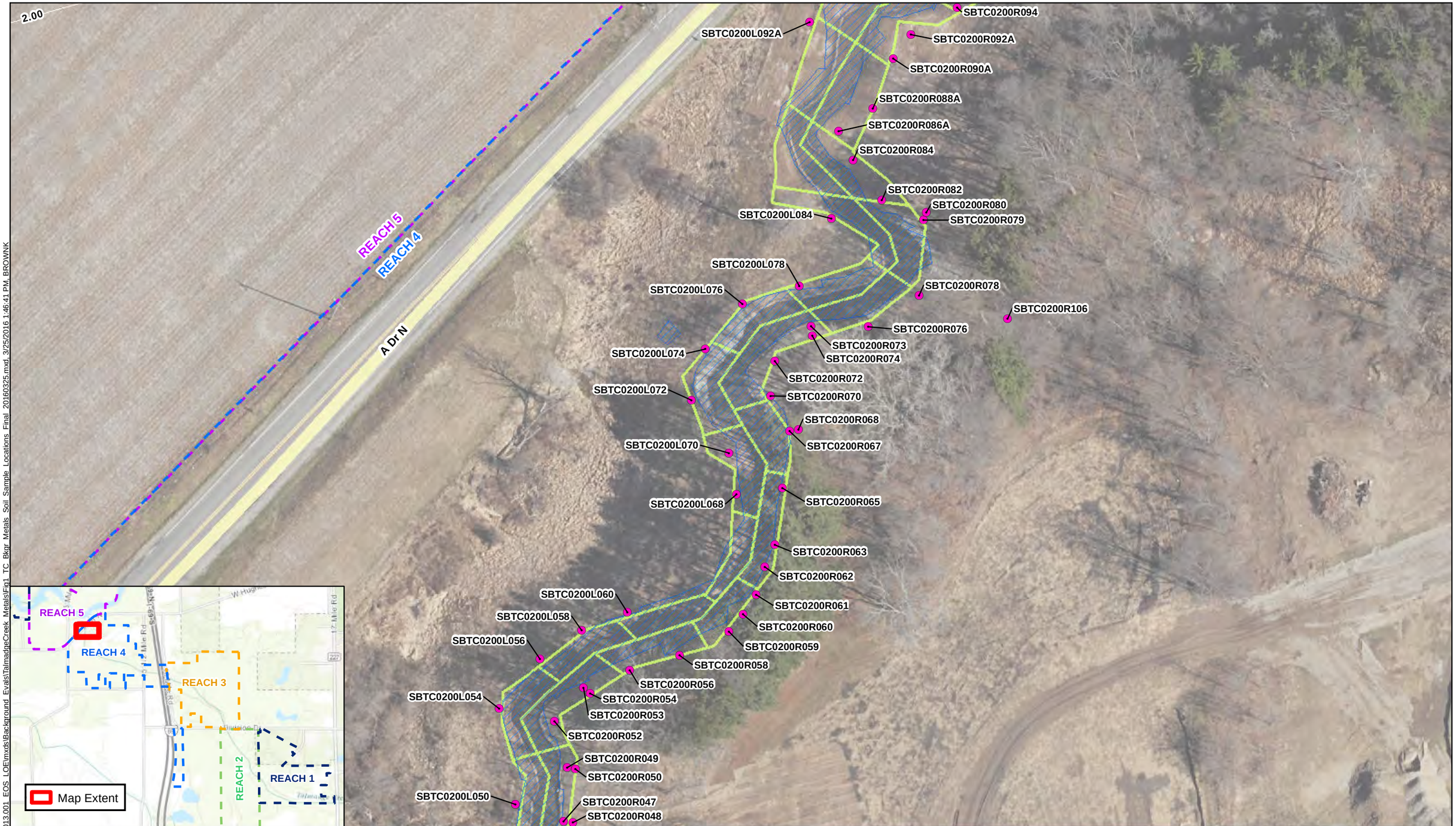
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

BACKGROUND SOIL SAMPLE LOCATIONS
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:602	SS/KRB	3/25/2016		**Figure 1** (Page 10 of 12)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig1_TC_Bkgr_Metals_Soil_Sample_Locations_Final_20160325.mxd, 3/25/2016 1:46:41 PM, BROWNK



LEGEND

- Soil Core Locations for Background Metals Study
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons
- Reach Boundaries

N

0 50 100 Feet

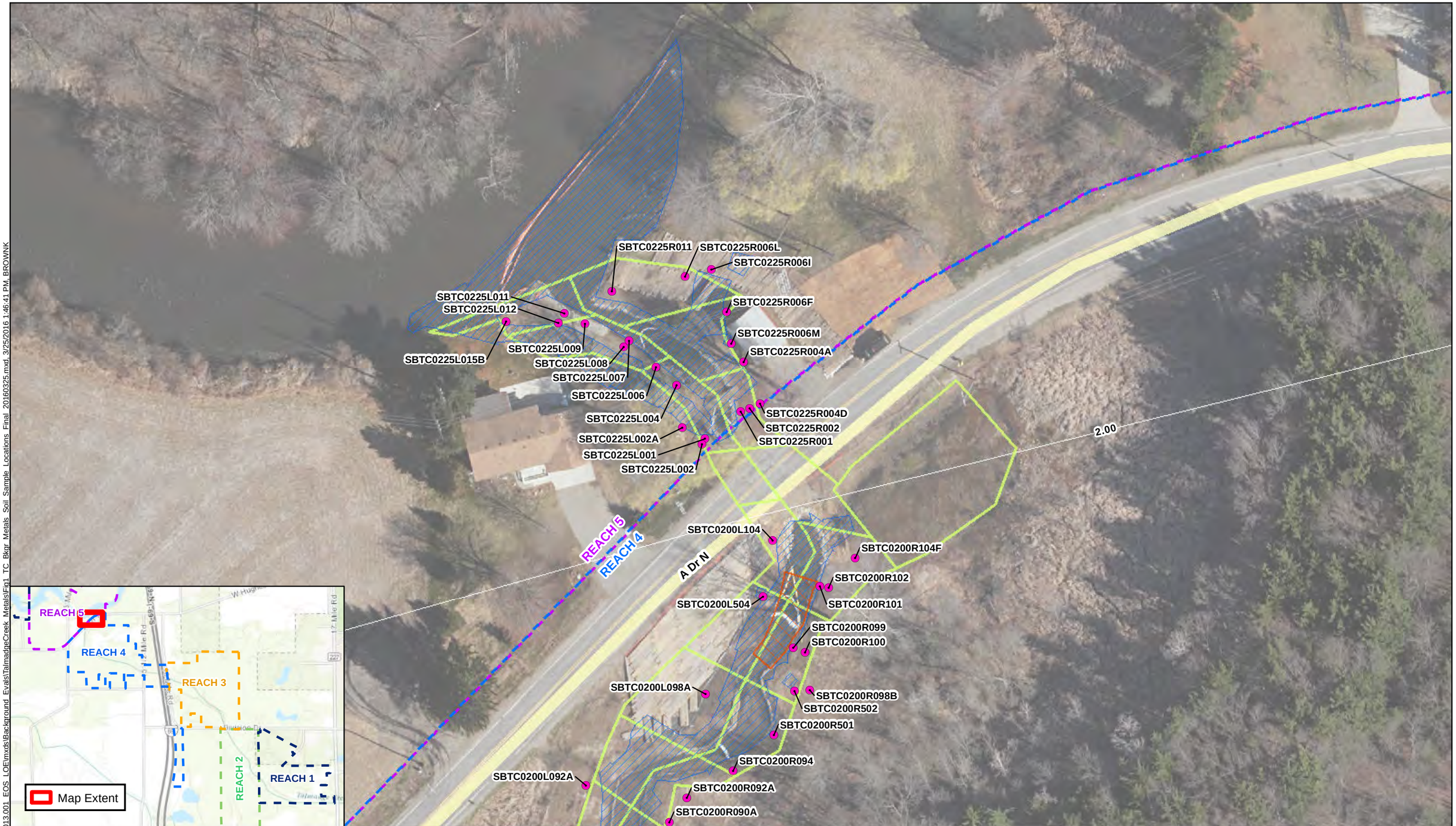
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

BACKGROUND SOIL SAMPLE LOCATIONS
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:600	SS/KRB	3/25/2016		**Figure 1** (Page 11 of 12)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig1_TC_Bkgr_Metals_Soil_Sample_Locations_Final_20160325.mxd, 3/25/2016 1:46:41 PM, BROWNK



LEGEND

- Soil Core Locations for Background Metals Study
- Reach Boundaries
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons

N

0 50 100 Feet

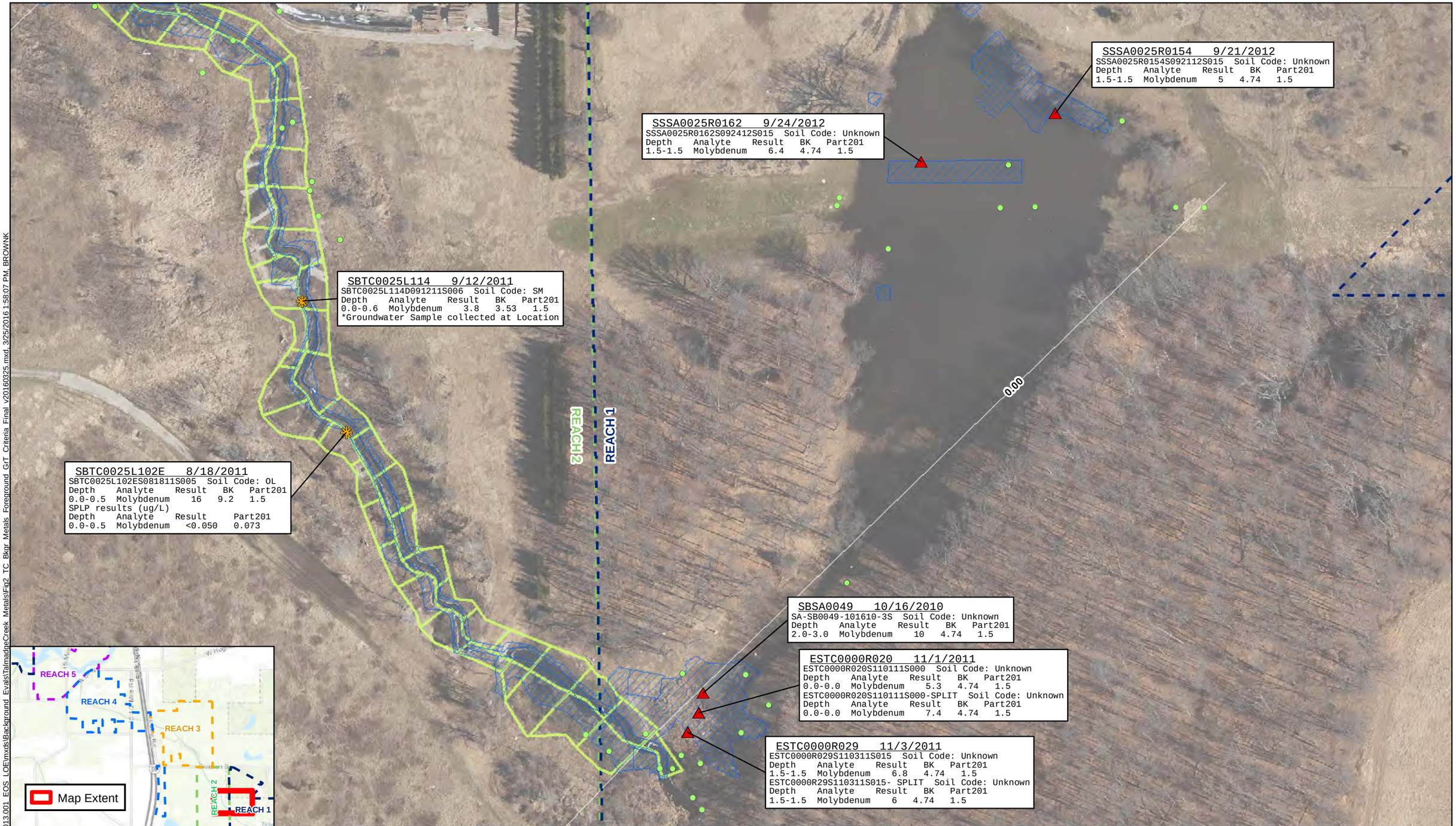
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

BACKGROUND SOIL SAMPLE LOCATIONS
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:602	SS/KRB	3/25/2016		**Figure 1** (Page 12 of 12)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig1_TC_Bkgr_Metals_Soil_Sample_Locations_Final_20160325.mxd, 3/25/2016 1:46:41 PM, BROWNK



Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig2_TC_Bkgr_Metals_Foreground_GrT_Criteria_Final_v20160325.mxd, 3/25/2016 1:58:07 PM, BROWNK

- Samples exceed background but do not represent a risk to groundwater based on SPLP or groundwater data
- Sample exceeds Background and Part 201 for Molybdenum (No groundwater/SPLP)
- Sample does not exceed Background/Criteria
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons
- Reach Boundaries

Notes:
1) Criteria is defined as MDEQ Part 201 Residential Drinking Water Protection Criteria
2) All results are reported in mg/kg

N

0 100 200 Feet

Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

FOREGROUND SOIL SAMPLE LOCATIONS EXCEEDING CRITERIA
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:1,200	SS/KRB	3/25/2016		**Figure 2** (Page 1 of 6)

Samples exceed background but do not represent a risk to groundwater based on SPLP or groundwater data

Sample exceeds Background and Part 201 for Molybdenum (No groundwater/SPLP)

Sample does not exceed Background/Criteria

Talmadge In Channel Excavation

Excavations - Comprehensive

Environmental Clearance Polygons

Reach Boundaries

Notes:

1) Criteria is defined as MDEQ Part 201 Residential Drinking Water Protection Criteria

2) All results are reported in mg/kg

N

0 75 150 Feet

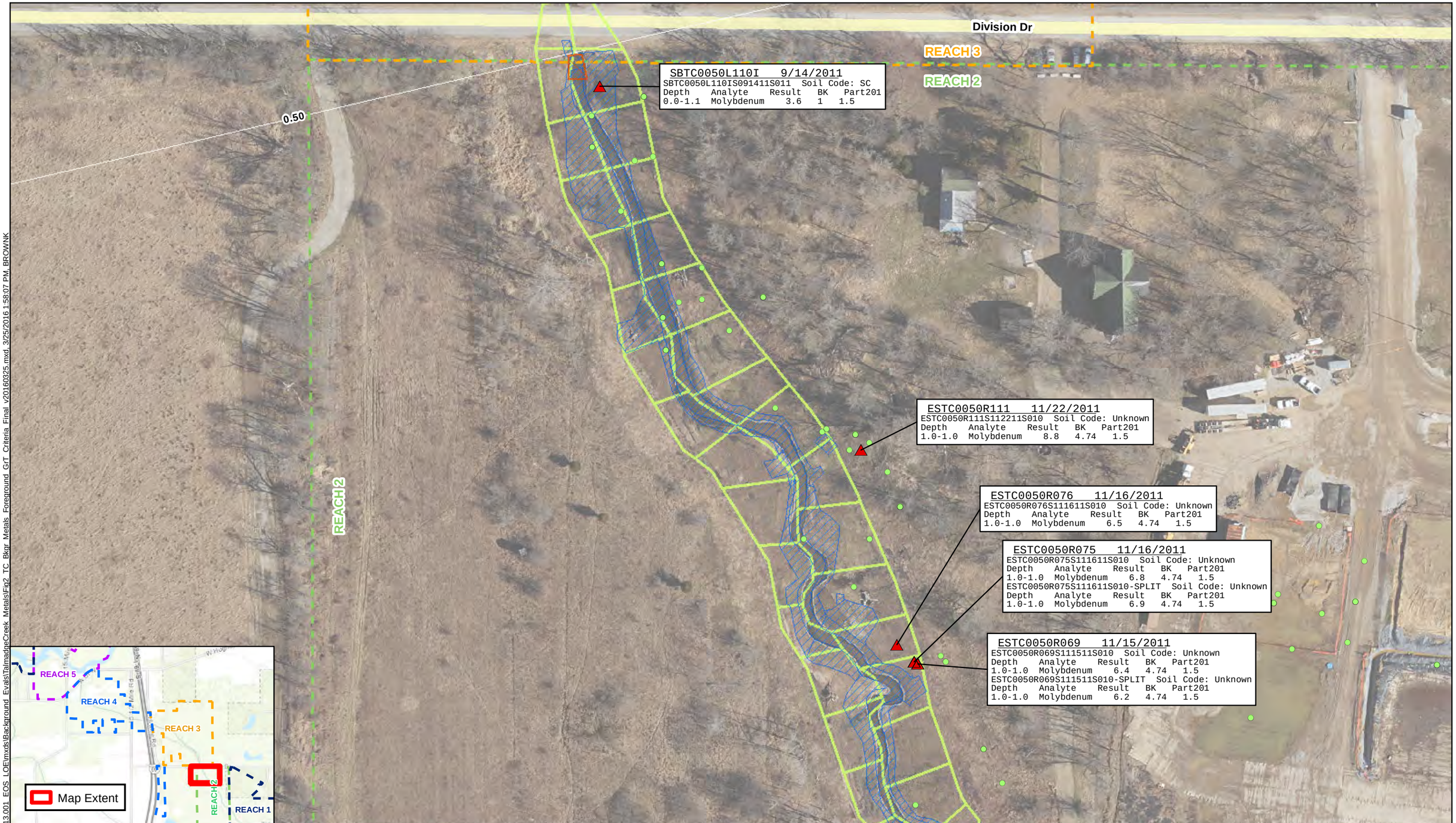
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

FOREGROUND SOIL SAMPLE LOCATIONS EXCEEDING CRITERIA
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:900	SS/KRB	3/25/2016		**Figure 2** (Page 2 of 6)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig2_TC_Bkgr_Metals_Foreground_GrT_Criteria_Final_v20160325.mxd, 3/25/2016 1:58:07 PM, BROWNK



Samples exceed background but do not represent a risk to groundwater based on SPLP or groundwater data

Sample exceeds Background and Part 201 for Molybdenum (No groundwater/SPLP)

Sample does not exceed Background/Criteria

Talmadge In Channel Excavation

Excavations - Comprehensive

Environmental Clearance Polygons

Reach Boundaries

Notes:

1) Criteria is defined as MDEQ Part 201 Residential Drinking Water Protection Criteria

2) All results are reported in mg/kg

0 75 150 Feet

Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

FOREGROUND SOIL SAMPLE LOCATIONS EXCEEDING CRITERIA
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:900	SS/KRB	3/25/2016		**Figure 2** (Page 3 of 6)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig2_TC_Bkgr_Metals_Foreground_GrT_Criteria_Final_v20160325.mxd, 3/25/2016 1:58:07 PM, BROWNK

Path: K:\Temp GIS\20176.013.001 EOS LOE\mxds\Background Evals\TalmadgeCreek Metals\Fig2 TC Bkgr Metals Foreground GrT Criteria Final v20160325.mxd, 3/25/2016 1:58:07 PM, BROWNK

- Samples exceed background but do not represent a risk to groundwater based on SPLP or groundwater data
- Sample exceeds Background and Part 201 for Molybdenum (No groundwater/SPLP)
- Sample does not exceed Background/Criteria
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons
- Reach Boundaries

Notes:
1) Criteria is defined as MDEQ Part 201 Residential Drinking Water Protection Criteria
2) All results are reported in mg/kg

N

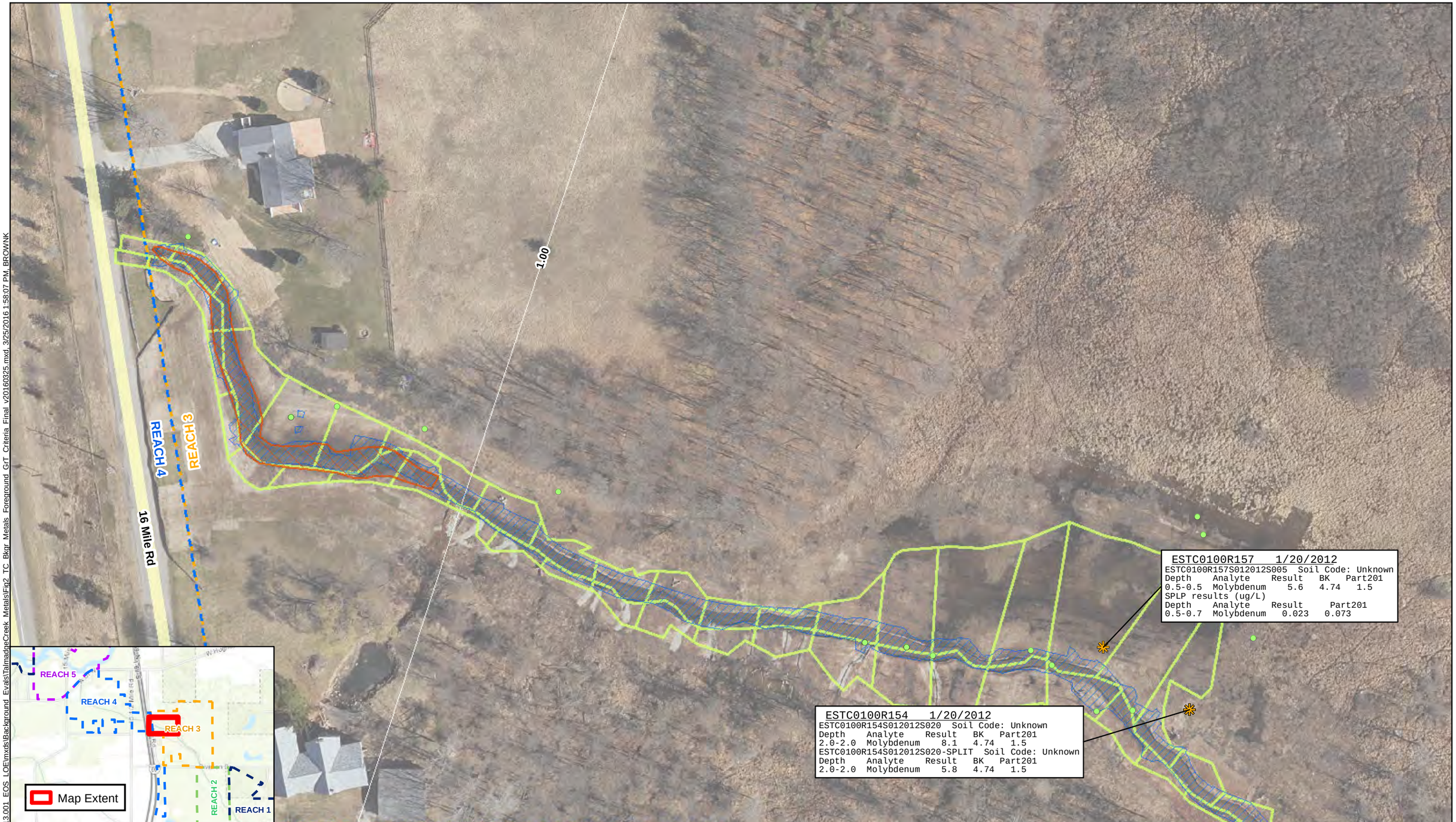
0 75 150 Feet

Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

FOREGROUND SOIL SAMPLE LOCATIONS EXCEEDING CRITERIA
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:900	SS/KRB	3/25/2016		**Figure 2** (Page 4 of 6)



Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig2_TC_Bkgr_Metals_Foreground_GrT_Criteria_Final_v20160325.mxd, 3/25/2016 1:58:07 PM, BROWNK

- Samples exceed background but do not represent a risk to groundwater based on SPLP or groundwater data
- Sample exceeds Background and Part 201 for Molybdenum (No groundwater/SPLP)
- Sample does not exceed Background/Criteria
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons
- Reach Boundaries

Notes:
1) Criteria is defined as MDEQ Part 201 Residential Drinking Water Protection Criteria
2) All results are reported in mg/kg

N

0 75 150 Feet

Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

FOREGROUND SOIL SAMPLE LOCATIONS EXCEEDING CRITERIA
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:900	SS/KRB	3/25/2016		**Figure 2** (Page 5 of 6)

Samples exceed background but do not represent a risk to groundwater based on SPLP or groundwater data

Sample exceeds Background and Part 201 for Molybdenum (No groundwater/SPLP)

Sample does not exceed Background/Criteria

Talmadge In Channel Excavation

Excavations - Comprehensive

Environmental Clearance Polygons

Reach Boundaries

Notes:

1) Criteria is defined as MDEQ Part 201 Residential Drinking Water Protection Criteria

2) All results are reported in mg/kg

N

0 75 150 Feet

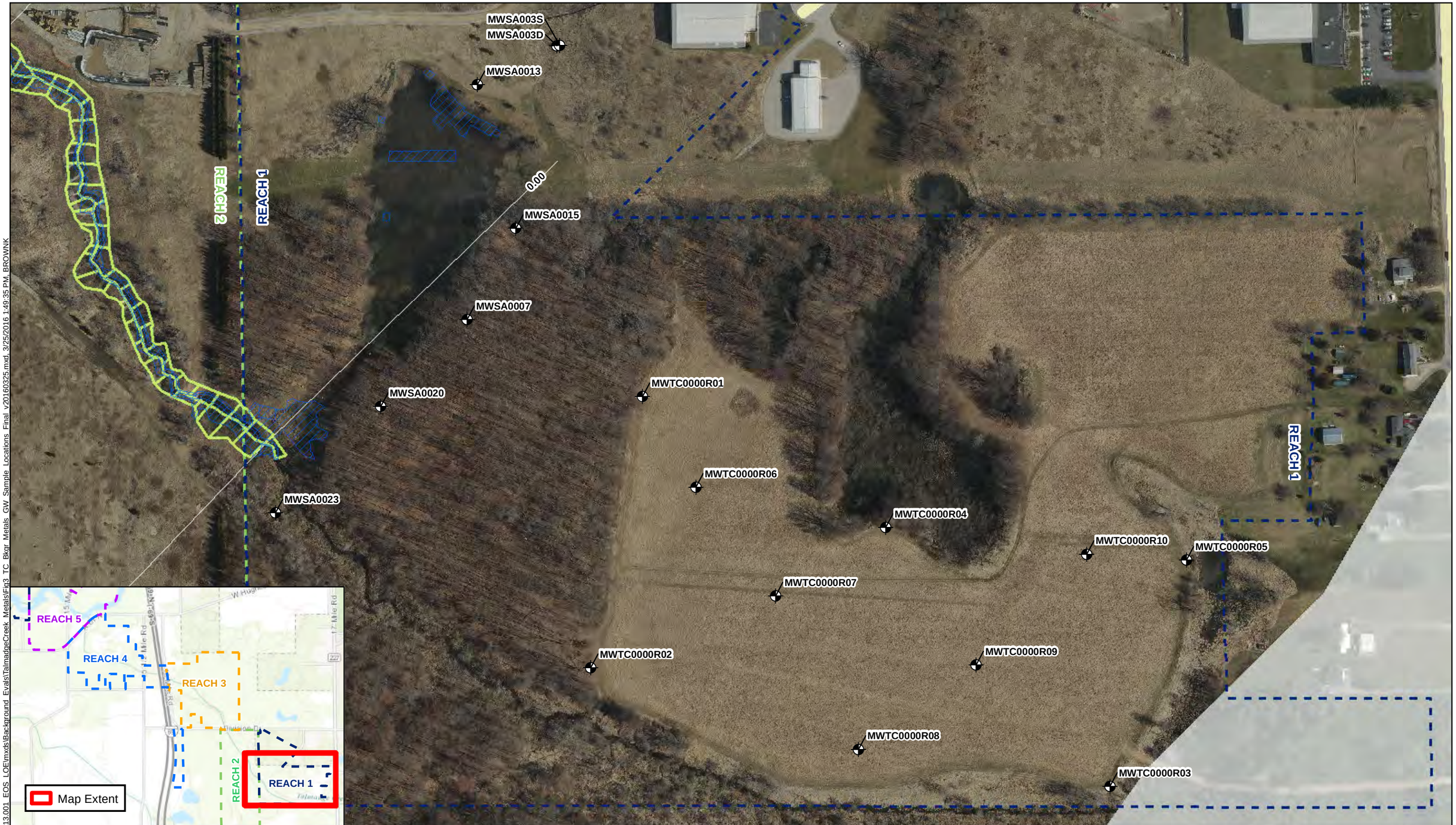
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

FOREGROUND SOIL SAMPLE LOCATIONS EXCEEDING CRITERIA
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:900	SS/KRB	3/25/2016		**Figure 2** (Page 6 of 6)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig2_TC_Bkgr_Metals_Foreground_GrT_Criteria_Final_v20160325.mxd, 3/25/2016 1:58:07 PM, BROWNK



LEGEND

- Monitoring Well Locations for Background Metals Study
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- Environmental Clearance Polygons
- Reach Boundaries

N

0 200 400 Feet

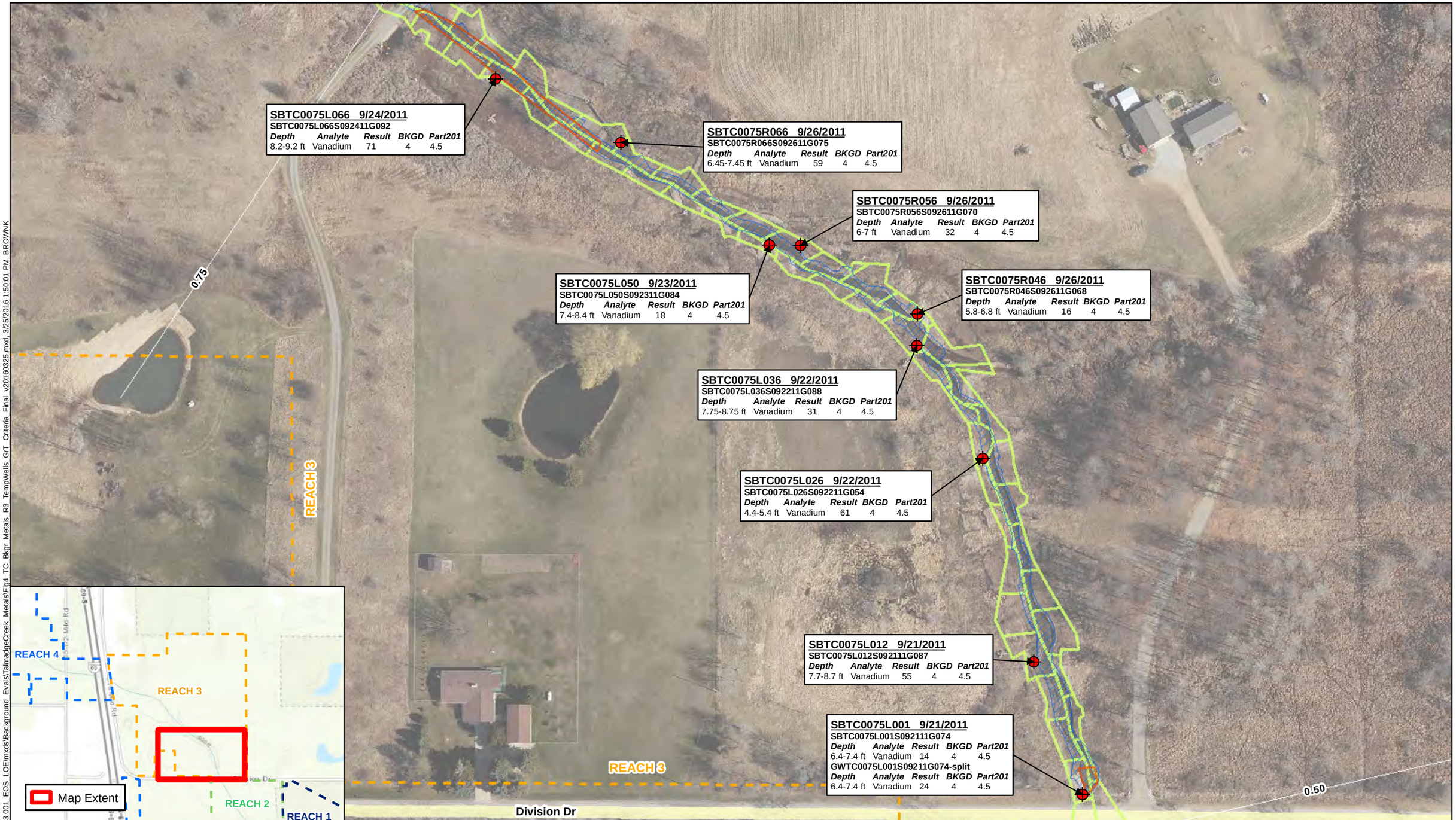
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

BACKGROUND GROUNDWATER SAMPLE LOCATIONS
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:2,400	SS/KRB	3/25/2016		**Figure 3**

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_MetalsFig3_TC_Bkgr_Metals_GW_Sample_Locations_Final_v20160325.mxd, 3/25/2016 1:49:35 PM, BROWNK



LEGEND

- Temporary Well Sample Result Exceeds Site Specific Background Value and MDEQ Part 201 Residential Drinking Water Criteria (12/30/2013)
- Reach Boundaries
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- 2010 USEPA Clearance Polygons

Notes:
1) All Results are reported in ug/L unless otherwise noted
2) Background values calculated by WESTON/MDEQ

N

0 50 100 Feet

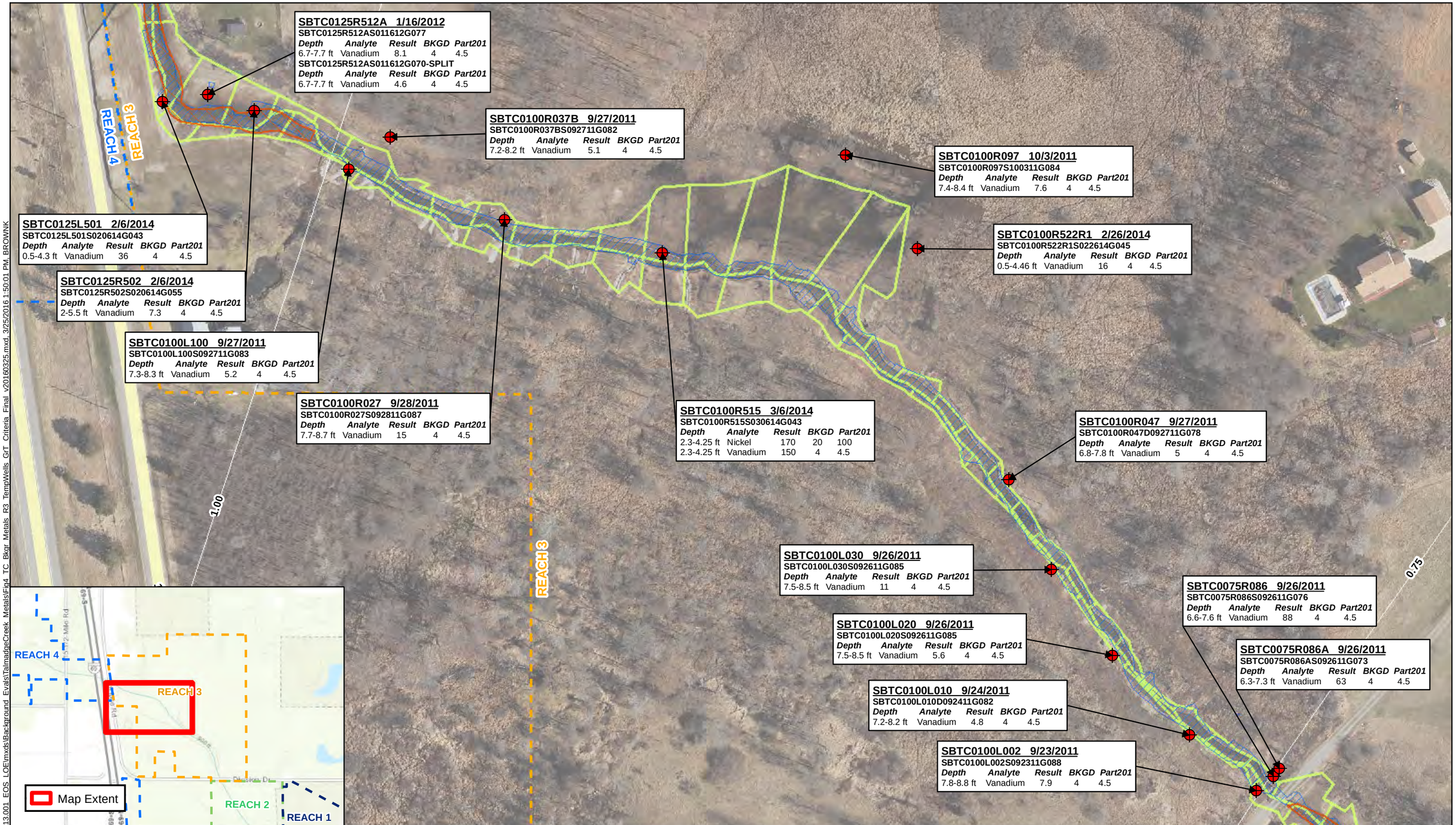
Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

REACH 3 TEMPORARY WELL GROUNDWATER SAMPLE LOCATIONS EXCEEDING CRITERIA
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:1,200	SS/KRB	3/25/2016		**Figure 4** (Page 1 of 2)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig4_TC_Bkgr_Metals_R3_TempWells_GrT_Criteria_Final_v20160325.mxd, 3/25/2016 1:50:01 PM, BROWNK



LEGEND

- Temporary Well Sample Result Exceeds Site Specific Background Value and MDEQ Part 201 Residential Drinking Water Criteria (12/30/2013)
- Reach Boundaries
- Talmadge In Channel Excavation
- Excavations - Comprehensive
- 2010 USEPA Clearance Polygons

Notes:
1) All Results are reported in ug/L unless otherwise noted
2) Background values calculated by WESTON/MDEQ

N

0 50 100 Feet

Prepared for:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION

Prepared by:
WESTON SOLUTIONS, INC.
2501 Jolly Road, Suite 100
Okemos, Michigan

REACH 3 TEMPORARY WELL GROUNDWATER SAMPLE LOCATIONS EXCEEDING CRITERIA
TALMADGE CREEK BACKGROUND METALS EVALUATION
ENBRIDGE OIL SPILL
MARSHALL, MICHIGAN

SCALE:	DRAWN:	DATE:	CHECKED BY:	
1:1,200	SS/KRB	3/25/2016		**Figure 4** (Page 2 of 2)

Path: K:\Temp_GIS\20176.013.001_EOS_LOE\mxds\Background_Evals\TalmadgeCreek_Metals\Fig4_TC_Bkgr_Metals_R3_TempWells_GrT_Criteria_Final_v20160325.mxd, 3/25/2016 1:50:01 PM, BROWNK

TABLES

Table 1
Background Soil Sample Data Summary Statistics
Talmadge Creek, Marshall, Michigan

Metal (USCS code)	Background Number of Samples	Background Percent Nondetect	Assumed Distribution of Background Data	Minimum Background Detection (mg/kg)	Maximum Background Detection (mg/kg)	Mean Background (mg/kg) [a]	Standard Deviation Background (mg/kg) [b]	Background Value (mg/kg)	Statistic	Basis
Be (ch)	1	100.00%	--	N/A	N/A	N/A	--	0.5	RL	100%ND
Be (cl)	58	74.14%	None	0.25	0.92	0.56	--	0.69	nonparametric 95% UPL	≥50% - ≤80% ND
Be (gc)	1	100.00%	--	N/A	N/A	N/A	--	0.5	RL	100%ND
Be (gm)	1	100.00%	--	N/A	N/A	N/A	--	0.5	RL	100%ND
Be (gw)	2	100.00%	--	N/A	N/A	N/A	--	0.5	RL	100%ND
Be (ml)	82	92.68%	None	0.32	0.93	0.27	0.11	0.93	Max	>80% ND
Be (oh)	3	66.67%	--	0.71	0.71	0.71	--	0.71	Max	<8 samples
Be (ol)	554	81.95%	None	0.24	0.88	0.50	--	0.88	Max	>80% ND
Be (pt)	8	100.00%	--	N/A	N/A	N/A	--	0.5-1.2	RL	100%ND
Be (sc)	2	100.00%	--	N/A	N/A	N/A	--	0.5	RL	100%ND
Be (sm)	36	88.89%	None	0.33	0.93	0.28	0.12	0.93	Max	>80% ND
Be (sp)	27	100.00%	--	N/A	N/A	N/A	--	0.5	RL	100%ND
Be (sw)	15	86.67%	None	0.22	0.43	0.25	0.06	0.43	Max	>80% ND
Be (unknown)	257	85.60%	None	0.22	0.9	0.40	0.77	0.9	Max	>80% ND
Mo (ch)	1	0.00%	--	1.4	1.4	N/A	--	1.4	Max	<8 samples
Mo (cl)	58	15.52%	Lognormal	1	26	1.7	2.2	8.1	GM x $SD^{1.96}$	<50% ND; 1/2DL
Mo (gc)	1	100.00%	--	N/A	N/A	N/A	--	1.0	RL	100%ND
Mo (gm)	1	0.00%	--	4.3	4.3	N/A	--	4.3	Max	<8 samples
Mo (gw)	2	50.00%	--	4.3	4.3	N/A	--	4.3	Max	<8 samples
Mo (ml)	82	34.15%	Lognormal	1	13	1.3	2.2	6.3	GM x $SD^{1.96}$	<50% ND; 1/2DL
Mo (oh)	3	33.33%	--	1	2.7	N/A	--	2.7	Max	<8 samples
Mo (ol)	557	9.34%	Lognormal	1	67	2.2	2.1	9.2	GM x $SD^{1.96}$	<50% ND; 1/2DL
Mo (pt)	8	0.00%	Lognormal	1.7	20	3.8	2.2	17	GM x $SD^{1.96}$	0% ND
Mo (sc)	2	100.00%	--	N/A	N/A	N/A	--	1.0	RL	100%ND
Mo (sm)	37	67.57%	None	1.1	11	1.6	--	3.5	nonparametric 95% UPL	≥50% - ≤80% ND
Mo (sp)	28	71.43%	None	1	4	1.9	--	4.0	nonparametric 95% UPL	≥50% - ≤80% ND
Mo (sw)	16	43.75%	Normal	1.2	2.7	1.2	0.7	2.5	mean + 2SD	<50% ND; 1/2DL
Mo (unknown)	330	61.82%	None	1	53	2.2	--	4.7	nonparametric 95% UPL	≥50% - ≤80% ND
Ni (ch)	1	0.00%	--	12	12	N/A	--	12	Max	<8 samples
Ni (cl)	58	0.00%	Normal	4.2	33	12.7	5.0	23	mean + 2SD	0% ND
Ni (gc)	1	0.00%	--	7.2	7.2	N/A	--	7.2	Max	<8 samples
Ni(gm)	1	0.00%	--	13	13	N/A	--	13	Max	<8 samples
Ni (gw)	2	0.00%	--	7.2	13	N/A	--	13	Max	<8 samples
Ni (ml)	82	0.00%	Lognormal	4.6	35	9.9	1.5	21	GM x $SD^{1.96}$	0% ND
Ni (oh)	3	0.00%	--	8.9	20	N/A	--	20	Max	<8 samples
Ni (ol)	554	0.00%	Lognormal	2.9	35	10.3	1.4	20	GM x $SD^{1.96}$	0% ND
Ni (pt)	8	0.00%	Lognormal	8.2	27	11.6	1.5	25	GM x $SD^{1.96}$	0% ND
Ni (sc)	2	0.00%	--	8.6	11	N/A	--	11	Max	<8 samples

Table 1
Background Soil Sample Data Summary Statistics
Talmadge Creek, Marshall, Michigan

Metal (USCS code)	Background Number of Samples	Background Percent Nondetect	Assumed Distribution of Background Data	Minimum Background Detection (mg/kg)	Maximum Background Detection (mg/kg)	Mean Background (mg/kg) [a]	Standard Deviation Background (mg/kg) [b]	Background Value (mg/kg)	Statistic	Basis
Ni (sm)	36	0.00%	Lognormal	3.9	23	8.3	1.5	19	GM x $SD^{1.96}$	0% ND
Ni (sp)	27	0.00%	Normal	2.6	17	7.9	3.1	14	mean + 2SD	0% ND
Ni (sw)	15	0.00%	Normal	5	19	9.6	3.7	17	mean + 2SD	0% ND
Ni (unknown)	352	0.00%	Lognormal	2.6	40	9.2	1.6	22	GM x $SD^{1.96}$	0% ND
V (ch)	1	0.00%	--	22	22	N/A	--	22	Max	<8 samples
V (cl)	58	0.00%	Lognormal	7	54	19.0	1.5	41	GM x $SD^{1.96}$	0% ND
V (gc)	1	0.00%	--	9.8	9.8	N/A	--	9.8	Max	<8 samples
V (gm)	1	0.00%	--	11	11	N/A	--	11	Max	<8 samples
V (gw)	2	0.00%	--	9.8	11	N/A	--	11	Max	<8 samples
V (ml)	82	0.00%	Lognormal	6.3	42	15.7	1.4	30	GM x $SD^{1.96}$	0% ND
V (oh)	3	0.00%	--	13	24	N/A	--	24	Max	<8 samples
V (ol)	554	0.00%	Lognormal	3.4	52	15.1	1.5	33	GM x $SD^{1.96}$	0% ND
V (pt)	8	0.00%	Normal	8.1	21	14.1	4.4	23	mean + 2SD	0% ND
V (sc)	2	0.00%	--	11	17	N/A	--	17	Max	<8 samples
V (sm)	36	0.00%	None	7.6	110	14.0	--	40	nonparametric 95% UPL	0% ND
V (sp)	27	0.00%	Normal	4.3	23	13.2	4.8	23	mean + 2SD	0% ND
V (sw)	15	0.00%	Normal	5.2	28	14.1	5.9	26	mean + 2SD	0% ND
V (unknown)	372	0.00%	Lognormal	3.2	40	13.9	1.6	33	GM x $SD^{1.96}$	0% ND

Input 1/2 DL for datasets with <50% ND

All statisical analysis performed with ProUCL version 5.0.00

a For normal distributions, mean is the arithmetic mean. For lognormal distributions, mean is the geometric mean. For nonparametric distrbutions, mean is the median of detected concentrations.

b For lognormal distributions, represents the geometric standard deviation. The standard deviation is not estimated for non-parametric distributions.

RL = reporting limit DL = detection limit

Max = maximum concentration

GM = geometric mean

SD = standard deviation

UPL = upper prediction limit

ND = nondetect

Table 2
Background Soil Value Comparison to Part 201 Criteria
Talmadge Creek, Marshall, Michigan

Soil Type	Calculated Backgound Value (mg/kg)			
	Beryllium	Molybdenum	Nickel	Vanadium
CH	0.5	1.4	12	22
CL	0.69	8.1	23	41
GC	0.5	1.0	7.2	9.8
GM	0.5	4.3	13	11
GW	0.5	4.3	13	11
ML	0.93	6.3	21	30
OH	0.71	2.7	20	24
OL	0.88	9.2	20	33
PT	0.5-1.2	17.4	25	23
SC	0.5	1.0	11	17
SM	0.93	3.5	19	40
SP	0.5	4.0	14	23
SW	0.43	2.5	17	26
Unknown	0.9	4.7	22	33
Part 201 Drinking Water Protection Criteria	51	1.5	100	72
Part 201 Groundwater Surface Water Protection Criteria	250	64	NA	430
Part 201 Direct Contact Criteria	410	260	40000	750
Statewide Background Concentrations	< 0.09 - 1.0[2]	< 0.25 - 5.0[2]	20[1]	9.9[2] (1.6-59.6)

Notes:

Background Values Exceeding Part 201 Criteria are Highlighted.

1. Statewide Default Background Value

2. Michigan Background Soil Survey (2015), Statewide mean concentration and range of concentrations shown for comparison

Table 3
Foreground Soil Data Set Comparison to Background Values
Talmadge Creek, Marshall, Michigan

Metal (USCS code)	Background Percent Nondetect	Maximum Background Detection (mg/kg)	Background Value (mg/kg)	Foreground Percent Nondetect	Foreground Maximum Detection (mg/kg)	Foreground Maximum > Background Value?	2 Sample Hypothesis Test[a]
Be (ch)	100.0%	N/A	0.5	87.5%	0.35	No	--
Be (cl)	74.1%	0.92	0.69	--	--	--	--
Be (gc)	100.0%	N/A	0.5	--	--	--	--
Be (gm)	100.0%	N/A	0.5	--	--	--	--
Be (gw)	100.0%	N/A	0.5	--	--	--	--
Be (ml)	92.7%	0.93	0.93	80.0%	0.59	No	--
Be (oh)	66.7%	0.71	0.71	100.0%	N/A	N/A	--
Be (ol)	82.0%	0.88	0.88	86.5%	0.69	No	--
Be (pt)	100.0%	N/A	0.5-1.2	100.0%	N/A	N/A	--
Be (sc)	100.0%	N/A	0.5	100.0%	N/A	N/A	--
Be (sm)	88.9%	0.93	0.93	100.0%	N/A	N/A	--
Be (sp)	100.0%	N/A	0.5	100.0%	N/A	N/A	--
Be (sw)	86.7%	0.43	0.43	100.0%	N/A	N/A	--
Be (unknown)	85.6%	0.9	0.9	91.8%	0.51	No	--
Mo (ch)	0.0%	1.4	1.4	--	--	--	--
Mo (cl)	15.5%	26	8.1	0.0%	4.5	No	--
Mo (gc)	100.0%	N/A	1.0	--	--	--	--
Mo (gm)	0.0%	4.3	4.3	--	--	--	--
Mo (gw)	50.0%	4.3	4.3	--	--	--	--
Mo (ml)	34.2%	13	6.3	40.0%	6.3	No	--
Mo (oh)	33.3%	2.7	2.7	0.0%	2.5	No	--
Mo (ol)	9.3%	67	9.2	11.2%	16	>BKG	SD (t-test; Gehan; TW; WMW)
Mo (pt)	0.0%	20	17	20.0%	6.1	No	--
Mo (sc)	100.0%	N/A	1.0	100.0%	N/A	N/A	--
Mo (sm)	67.6%	11	3.5	0.0%	6.8	>BKG	NT; Max B > Max F
Mo (sp)	71.4%	4	4.0	75.0%	1.6	No	--
Mo (sw)	43.8%	2.7	2.5	100.0%	N/A	N/A	--
Mo (unknown)	61.8%	53	4.7	57.3%	6.4	>BKG	NSD (Gehan; TW)

Table 3
Foreground Soil Data Set Comparison to Background Values
Talmadge Creek, Marshall, Michigan

Metal (USCS code)	Background Percent Nondetect	Maximum Background Detection (mg/kg)	Background Value (mg/kg)	Foreground Percent Nondetect	Foreground Maximum Detection (mg/kg)	Foreground Maximum > Background Value?	2 Sample Hypothesis Test[a]
Ni (ch)	0.0%	12	12	--	--	--	--
Ni (cl)	0.0%	33	23	0.0%	16	No	--
Ni (gc)	0.0%	7.2	7.2	--	--	--	--
Ni(gm)	0.0%	13	13	--	--	--	--
Ni (gw)	0.0%	13	13	--	--	--	--
Ni (ml)	0.0%	35	21	0.0%	17	No	--
Ni (oh)	0.0%	20	20	0.0%	11	No	--
Ni (ol)	0.0%	35	20	0.0%	37	>BKG	NSD (t-test; WMW)
Ni (pt)	0.0%	27	25	0.0%	10	No	--
Ni (sc)	0.0%	11	11	0.0%	5.7	No	--
Ni (sm)	0.0%	23	19	0.0%	14	No	--
Ni (sp)	0.0%	17	14	0.0%	13	No	--
Ni (sw)	0.0%	19	17	0.0%	4.9	No	--
Ni (unknown)	0.0%	40	22	0.0%	23	>BKG	NSD (t-test; WMW)
V (ch)	0.0%	22	22	--	--	--	--
V (cl)	0.0%	54	41	0.0%	25	No	--
V (gc)	0.0%	9.8	9.8	--	--	--	--
V (gm)	0.0%	11	11	--	--	--	--
V (gw)	0.0%	11	11	--	--	--	--
V (ml)	0.0%	42	30	0.0%	28	No	--
V (oh)	0.0%	24	24	0.0%	13	No	--
V (ol)	0.0%	52	33	0.0%	44	>BKG	NSD (t-test; WMW)
V (pt)	0.0%	21	23	0.0%	16	No	--
V (sc)	0.0%	17	17	0.0%	8.8	No	--
V (sm)	0.0%	110	40	0.0%	20	No	--
V (sp)	0.0%	23	23	0.0%	12	No	--
V (sw)	0.0%	28	26	0.0%	5.1	No	--
V (unknown)	0.0%	40	33	2.2%	29	No	--

Notes:

Shading indicates maximum foreground concentration also exceeds maximum background concentration.
a Non-detect function in ProUCL used for non-detects during hypothesis testing
All statisical analysis performed with ProUCL version 5.0.00
NT= not tested; foreground dataset less than 8.
WMW = Wilcoxon-Mann-Whitney two sample hypothesis test

t-test = two sample Student's t-test
TW = Tarone-Ware two sample hypothesis test
Gehan = Gehan two sample hypothesis test
NSD = not significantly different (alpha = 0.5)
SD = signficantly different (alpha = 0.5)

NA=not analyzed due to 100% nondetects in the foreground data set.

Table 4
Foreground Soil Sample Locations Exceeding Part 201 Criteria
Enbridge Oil Spill Site, Marshall, Michigan

Sample Date	Location	Sample ID	Sample Interval	Saturation Status	USCS Soil Code	Type	Metal	Result mg/kg	Criteria [1] mg/kg	Calculated Background mg/kg	Reach
11/1/2011	ESTC0000R020	ESTC0000R020S110111S000	0 - 0 ft	Unknown Saturation	Unknown	Result	Beryllium	< 0.50	51	0.9	
							Molybdenum	5.3	1.5	4.7	
							Nickel	12	100	22	
							Vanadium	15	72	33	1
11/1/2011	ESTC0000R020	ESTC0000R020S110111S000-SPLIT	0 - 0 ft	Unknown Saturation	Unknown	Split	Beryllium	0.44	51	0.9	
							Molybdenum	7.4	1.5	4.7	
							Nickel	12	100	22	
							Vanadium	17	72	33	1
11/3/2011	ESTC0000R029	ESTC0000R029S110311S015	1.5 - 1.5 ft	Unknown Saturation	Unknown	Result	Beryllium	< 0.50	51	0.9	
							Molybdenum	6.8	1.5	4.7	
							Nickel	6.3	100	22	
							Vanadium	8.4	72	33	1
11/3/2011	ESTC0000R029	ESTC0000R29S110311S015- SPLIT	1.5 - 1.5 ft	Unknown Saturation	Unknown	Split	Beryllium	< 0.2	51	0.9	
							Molybdenum	6	1.5	4.7	
							Nickel	37	100	22	
							Vanadium	11	72	33	1
10/16/2010	SBSA0049	SA-SB0049-101610-3S	2 - 3 ft	Unsaturated	Unknown	Result	Beryllium	< 1.7	51	0.9	
							Molybdenum	10	1.5	4.7	
							Nickel	---	100	22	
							Vanadium	16	72	33	1
9/21/2012	SSSA0025R0154	SSSA0025R0154S092112S015	0 - 0.6 ft	Unsaturated	Unknown	Result	Beryllium	< 1.1	51	0.9	
							Molybdenum	5	1.5	4.7	
							Nickel	19	100	22	
							Vanadium	12	72	33	1
9/24/2012	SSSA0025R0162	SSSA0025R0162S092412S015	0 - 0.6 ft	Unsaturated	Unknown	Result	Beryllium	< 1.7	51	0.9	
							Molybdenum	6.4	1.5	4.7	
							Nickel	4.3	100	22	
							Vanadium	< 2.8	72	33	1
11/15/2011	ESTC0050R069	ESTC0050R069S111511S010	1 - 1 ft	Unknown Saturation	Unknown	Result	Beryllium	< 0.50	51	0.9	
							Molybdenum	6.4	1.5	4.7	
							Nickel	8.5	100	22	
							Vanadium	13	72	33	2
11/15/2011	ESTC0050R069	ESTC0050R069S111511S010-SPLIT	1 - 1 ft	Unknown Saturation	Unknown	Split	Beryllium	0.34	51	0.9	
							Molybdenum	6.2	1.5	4.7	
							Nickel	10	100	22	
							Vanadium	13	72	33	2
11/16/2011	ESTC0050R075	ESTC0050R075S111611S010	1 - 1 ft	Unknown Saturation	Unknown	Result	Beryllium	< 0.50	51	0.9	
							Molybdenum	6.8	1.5	4.7	
							Nickel	6.8	100	22	
							Vanadium	10	72	33	2
11/16/2011	ESTC0050R075	ESTC0050R075S111611S010-SPLIT	1 - 1 ft	Unknown Saturation	Unknown	Split	Beryllium	0.38	51	0.9	
							Molybdenum	6.9	1.5	4.7	
							Nickel	9.4	100	22	
							Vanadium	14	72	33	2
11/16/2011	ESTC0050R076	ESTC0050R076S111611S010	1 - 1 ft	Unknown Saturation	Unknown	Result	Beryllium	< 0.50	51	0.9	
							Molybdenum	6.5	1.5	4.7	
							Nickel	8	100	22	
							Vanadium	13	72	33	2
11/22/2011	ESTC0050R111	ESTC0050R111S112211S010	1 - 1 ft	Unsaturated	Unknown	Result	Beryllium	< 0.53	51	0.9	
							Molybdenum	8.8	1.5	4.7	
							Nickel	8	100	22	
							Vanadium	11	72	33	2
9/14/2011	SBTC0050L110I	SBTC0050L110IS091411S011	0 - 0.6 ft	Unsaturated	SC	Result	Beryllium	0.53	51	0.5	
							Molybdenum	3.6	1.5	1.0	
							Nickel	13	100	11	
							Vanadium	21	72	17	2

Table 4
Foreground Soil Sample Locations Exceeding Part 201 Criteria
Enbridge Oil Spill Site, Marshall, Michigan

Sample Date	Location	Sample ID	Sample Interval	Saturation Status	USCS Soil Code	Type	Metal	Result mg/kg	Criteria [1] mg/kg	Calculated Background mg/kg	Reach
8/18/2011	SBTC0025L102E	SBTC0025L102ES081811S005	0 - 0.5 ft	Unsaturated	OL	Result	Beryllium	< 1.3	51	0.88	
							Molybdenum	16	1.5	9.2	
							Nickel	11	100	20	
							Vanadium	6.1	72	33	2
SPLP	SBTC0025L102E	SBTC0025L102ES081811S005	SPLP	Unsaturated	OL	Result	Molybdenum	<0.050	0.073[2]	--	2
4/3/2014	SBTC0050R505	SBTC0050R505S040314S018	0 - 0.6 ft	Unsaturated	SM	Result	Beryllium	< 0.50	51	0.93	
							Molybdenum	6.8	1.5	3.5	
							Nickel	14	100	19	
							Vanadium	20	72	40	2
11/3/2014	SBTC0050R505	SBTC0050R505S110314G050	2.0 - 5.0 ft	Groundwater	NA	Result	Molybdenum	<0.050	0.073[2]	--	2
9/12/2011	SBTC0025L114	SBTC0025L114D091211S006	0 - 0.6 ft	Unsaturated	SM	Duplicate	Beryllium	< 0.50	51	0.88	
							Molybdenum	3.8	1.5	3.5	
							Nickel	8.3	100	19	
							Vanadium	9.9	72	40	2
9/17/2011	SBTC0025L114	SBTC0025L114S091711G092	8.2-9.2	Groundwater	NA	Result	Molybdenum	<0.050	0.073[2]	--	2
9/13/2011	SBTC0075L011	SBTC0075L011S091311S010	0 - 0.6 ft	Unsaturated	SW	Result	Beryllium	< 0.50	51	0.43	
							Molybdenum	3	1.5	2.5	
							Nickel	13	100	17	
							Vanadium	14	72	26	3
2/17/2014	SBTC0075R509R1	SBTC0075R509R1S021714S007	0 - 0.6 ft	Unsaturated	OL	Result	Beryllium	< 0.50	51	0.88	
							Molybdenum	11	1.5	9.2	
							Nickel	7.2	100	20	
							Vanadium	9.5	72	33	3
SPLP	SBTC0075R509R1	SBTC0075R509R1S021714S007	SPLP	Unsaturated	OL	Result	Molybdenum	<0.050	0.073[2]	--	3
1/28/2014	SBTC0075R512	SBTC0075R512S012814S010	0 - 0.6 ft	Unsaturated	ML	Result	Beryllium	< 0.55	51	0.93	
							Molybdenum	6.3	1.5	6.3	
							Nickel	13	100	21	
							Vanadium	19	72	30	3
SPLP	SBTC0075R512	SBTC0075R512S012814S010	SPLP	Unsaturated	ML	Result	Molybdenum	0.013	0.073	--	3
1/20/2012	ESTC0100R154	ESTC0100R154S012012S020	2 - 2 ft	Unsaturated	Unknown	Result	Beryllium	< 0.50	51	0.9	
							Molybdenum	8.1	1.5	4.7	
							Nickel	8.9	100	22	
							Vanadium	11	72	33	3
1/20/2012	ESTC0100R154	ESTC0100R154S012012S020-SPLIT	2 - 2 ft	Unsaturated	Unknown	Split	Beryllium	0.29	51	0.9	
							Molybdenum	5.8	1.5	4.7	
							Nickel	8.7	100	22	
							Vanadium	15	72	33	3
SPLP	ESTC0100R154	ESTC0100R154S012012S020	SPLP	Unsaturated	Unknown	Result	Molybdenum	0.037	0.073[2]	--	3
1/20/2012	ESTC0100R157	ESTC0100R157S012012S005	0.5 - 0.5 ft	Unsaturated	Unknown	Result	Beryllium	< 0.50	51	0.9	
							Molybdenum	5.6	1.5	4.7	
							Nickel	8.2	100	22	
							Vanadium	11	72	33	3
SPLP	ESTC0100R157	ESTC0100R157S012012S005	SPLP	Unsaturated	Unknown	Result	Molybdenum	0.023	0.073[2]	--	3
3/3/2012	ESTC0200R268	ESTC0200R268S030312S010	1 - 1 ft	Unsaturated	Unknown	Result	Beryllium	< 0.50	51	0.9	
							Molybdenum	5	1.5	4.7	
							Nickel	11	100	22	
							Vanadium	15	72	33	5
SPLP	ESTC0200R268	ESTC0200R268S030312S010	SPLP	Unsaturated	Unknown	Result	Molybdenum	0.02	<0.050	--	5

Footnotes: 1 = Michigan Department of Environmental Quality (MDEQ) Generic Part 201 Soil Cleanup Criteria - Residential Drinking Water Protection Criteria.
2 = MDEQ Generic Part 201 Groundwater Cleanup Criteria - Residential and Non-Residential Drinking Water Criteria
Shaded cells indicate exceedances of Part 201 Criteria and Background values.

Table 5
Background Groundwater Sample Results
Talmadge Creek, Marshall, Michigan

Location	Samp_No	SampleDate	BERYLLIUM, TOTAL	MOLYBDENUM	NICKEL, TOTAL	VANADIUM, TOTAL
MWKR3780L03	MWKR3780L03S060914GX	09-Jun-14	< 0.0020	< 0.050	< 0.020	< 0.0050
MWSA0007	MWSA0007S103013GX	30-Oct-13	<0.001	<0.05	<0.02	<0.004
MWSA0007	MWSA0007S013114GX	31-Jan-14	<0.001	<0.05	<0.02	<0.004
MWSA0007	MWSA0007S040814GX	08-Apr-14	<0.001	<0.05	<0.02	<0.004
MWSA0007	MWSA0007S040814GX	08-Apr-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0007	MWSA0007S062614GX	26-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0007	MWSA0007D062614GX	26-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0007	MWSA0007S092414GX	24-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0013	MWSA0013D103013GX	30-Oct-13	<0.001	<0.05	<0.02	<0.004
MWSA0013	MWSA0013S103013GX	30-Oct-13	<0.001	<0.05	<0.02	<0.004
MWSA0013	MWSA0013S021014GX	10-Feb-14	<0.001	<0.05	<0.02	<0.004
MWSA0013	MWSA0013S040114GX	01-Apr-14	<0.001	<0.05	<0.02	<0.004
MWSA0013	MWSA0013S040114GX	01-Apr-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0013	MWSA0013S061914GX	19-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0013	MWSA0013D061914GX	19-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0013	MWSA0013S091614GX	16-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0015	MWSA0015S102813GX	28-Oct-13	<0.001	<0.05	<0.02	<0.004
MWSA0015	MWSA0015S013114GX	31-Jan-14	<0.001	<0.05	<0.02	<0.004
MWSA0015	MWSA0015S040814GX	08-Apr-14	<0.001	<0.05	<0.02	<0.004
MWSA0015	MWSA0015S040814GX	08-Apr-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0015	MWSA0015S062414GX	24-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0015	MWSA0015S092414GX	24-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0015	MWSA0015D092414GX	24-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0020	MWSA0020D102913GX	29-Oct-13	<0.001	<0.05	<0.02	<0.004
MWSA0020	MWSA0020S102913GX	29-Oct-13	<0.001	<0.05	<0.02	<0.004
MWSA0020	MWSA0020D021114GX	11-Feb-14	<0.001	<0.05	<0.02	<0.004
MWSA0020	MWSA0020S021114GX	11-Feb-14	<0.001	<0.05	<0.02	<0.004
MWSA0020	MWSA0020S040814GX	08-Apr-14	<0.001	<0.05	<0.02	<0.004
MWSA0020	MWSA0020S040814GX	08-Apr-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0020	MWSA0020S062614GX	26-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0020	MWSA0020S092414GX	24-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0023	MWSA0023S102913GX	29-Oct-13	<0.001	<0.05	<0.02	<0.004
MWSA0023	MWSA0023S021214GX	12-Feb-14	<0.001	<0.05	<0.02	<0.004
MWSA0023	MWSA0023S040914GX	09-Apr-14	<0.001	<0.05	<0.02	<0.004
MWSA0023	MWSA0023S040914GX	09-Apr-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0023	MWSA0023S062614GX	26-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA0023	MWSA0023S092514GX	25-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA003D	MWSA0003DS103013GX	30-Oct-13	<0.001	<0.05	<0.02	<0.004
MWSA003D	MWSA003DD021014GX	10-Feb-14	<0.001	<0.05	<0.02	<0.004
MWSA003D	MWSA003DS021014GX	10-Feb-14	<0.001	<0.05	<0.02	<0.004
MWSA003D	MWSA003DS040114GX	01-Apr-14	<0.001	<0.05	<0.02	<0.004
MWSA003D	MWSA003DS040114GX	01-Apr-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA003D	MWSA003D S061914GX	19-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA003D	MWSA003D S091614GX	16-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA003S	MWSA003SS102710GX	27-Oct-10	<0.001	0.008	-	<0.004
MWSA003S	MWSA0003SS103013GX	30-Oct-13	<0.001	<0.05	<0.02	<0.004
MWSA003S	MWSA003SS021014GX	10-Feb-14	<0.001	<0.05	<0.02	<0.004
MWSA003S	MWSA003SS040114GX	01-Apr-14	<0.001	<0.05	<0.02	<0.004
MWSA003S	MWSA003SS040114GX	01-Apr-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA003S	MWSA003S S061914GX	19-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWSA003S	MWSA003S S091614GX	16-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R01	MWTC0000R01S102813GX	28-Oct-13	<0.001	<0.05	<0.02	<0.004
MWTC0000R01	MWTC0000R01S013014GX	30-Jan-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R01	MWTC0000R01S040914GX	09-Apr-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R01	MWTC0000R01S061714GX	17-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R01	MWTC0000R01D061714GX	17-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R01	MWTC0000R01S092514GX	25-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R02	MWTC0000R02D102813GX	28-Oct-13	<0.001	<0.05	<0.02	<0.004
MWTC0000R02	MWTC0000R02S102813GX	28-Oct-13	<0.001	<0.05	<0.02	<0.004

Table 5
Background Groundwater Sample Results
Talmadge Creek, Marshall, Michigan

Location	Samp_No	SampleDate	BERYLLIUM, TOTAL	MOLYBDENUM	NICKEL, TOTAL	VANADIUM, TOTAL
MWTC0000R02	MWTC0000R02S013014GX	30-Jan-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R02	MWTC0000R02S040914GX	09-Apr-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R02	MWTC0000R02S061714GX	17-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R02	MWTC0000R02S092514GX	25-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R02	MWTC0000R02D092514GX	25-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R03	MWTC0000R03D102313GX	23-Oct-13	<0.001	<0.05	<0.02	<0.004
MWTC0000R03	MWTC0000R03S102313GX	23-Oct-13	<0.001	<0.05	<0.02	<0.004
MWTC0000R03	MWTC0000R03S013014GX	30-Jan-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R03	MWTC0000R03S040914GX	09-Apr-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R03	MWTC0000R03S061814GX	18-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R03	MWTC0000R03D061814GX	18-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R03	MWTC0000R03S092514GX	25-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R04	MWTC0000R04S102813GX	28-Oct-13	<0.001	<0.05	<0.02	0.0054
MWTC0000R04	MWTC0000R04S013114GX	31-Jan-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R04	MWTC0000R04S033114GX	31-Mar-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R04	MWTC0000R04S061714GX	17-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R04	MWTC0000R04S092514GX	25-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R05	MWTC0000R05S102313GX	23-Oct-13	<0.001	<0.05	<0.02	<0.004
MWTC0000R05	MWTC0000R05S013114GX	31-Jan-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R05	MWTC0000R05S033114GX	31-Mar-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R05	MWTC0000R05S061814GX	18-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R05	MWTC0000R05S092514GX	25-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R06	MWTC0000R06S102813GX	28-Oct-13	<0.001	<0.05	<0.02	<0.004
MWTC0000R06	MWTC0000R06D013114GX	31-Jan-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R06	MWTC0000R06S013114GX	31-Jan-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R06	MWTC0000R06S040914GX	09-Apr-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R06	MWTC0000R06S061714GX	17-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R06	MWTC0000R06S092514GX	25-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R07	MWTC0000R07S102813GX	28-Oct-13	<0.001	<0.05	<0.02	<0.004
MWTC0000R07	MWTC0000R07S013114GX	31-Jan-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R07	MWTC0000R07D040914GX	09-Apr-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R07	MWTC0000R07S040914GX	09-Apr-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R07	MWTC0000R07S061714GX	17-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R07	MWTC0000R07S092514GX	25-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R08	MWTC0000R08S102813GX	28-Oct-13	<0.001	<0.05	<0.02	<0.004
MWTC0000R08	MWTC0000R08S013114GX	31-Jan-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R08	MWTC0000R08S040914GX	09-Apr-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R08	MWTC0000R08S061814GX	18-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R08	MWTC0000R08S092514GX	25-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R09	MWTC0000R09S102813GX	28-Oct-13	<0.001	<0.05	<0.02	<0.004
MWTC0000R09	MWTC0000R09S013114GX	31-Jan-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R09	MWTC0000R09S033114GX	31-Mar-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R09	MWTC0000R09S061814GX	18-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R09	MWTC0000R09S092514GX	25-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R10	MWTC0000R10S102813GX	28-Oct-13	<0.001	<0.05	<0.02	<0.004
MWTC0000R10	MWTC0000R10S013114GX	31-Jan-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R10	MWTC0000R10S033114GX	31-Mar-14	<0.001	<0.05	<0.02	<0.004
MWTC0000R10	MWTC0000R10S061814GX	18-Jun-14	< 0.0010	< 0.050	< 0.020	< 0.0040
MWTC0000R10	MWTC0000R10S092514GX	25-Sep-14	< 0.0010	< 0.050	< 0.020	< 0.0040
		Maximum	<0.001	<0.05	<0.02	0.0054
		Minimum	<0.001	0.008	<0.02	<0.004
	Number Samples		108	108	108	108
	Number detect		0	1	0	1

Table 6
Reach 3 Temporary Well Groundwater Sample Locations Exceeding Part 201 Criteria
Enbridge Oil Spill Site
Marshall, Michigan

Sample Date	Location	Sample Interval	Sample ID	Recorded Turbidity	Metal	Result Total ug/L	[1] Criteria ug/L	Calculated Background ug/L	Exceeds Criteria	Exceeds Background
9/24/2011	SBTC0075L066	8.2-9.2 ft	SBTC0075L066S092411G092	--	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	26	100	20	No	Yes
					Vanadium	71	4.5	4	Yes	Yes
9/26/2011	SBTC0075R066	6.45-7.45 ft	SBTC0075R066S092611G075	--	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	41	100	20	No	Yes
					Vanadium	59	4.5	4	Yes	Yes
9/23/2011	SBTC0075L050	7.4-8.4 ft	SBTC0075L050S092311G084	--	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<20	100	20	No	No
					Vanadium	18	4.5	4	Yes	Yes
9/26/2011	SBTC0075R056	6-7 ft	SBTC0075R056S092611G070	1245.4	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	32	100	20	No	Yes
					Vanadium	32	4.5	4	Yes	Yes
9/26/2011	SBTC0075R046	5.8-6.8 ft	SBTC0075R046S092611G068	93.1	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<20	100	20	No	No
					Vanadium	16	4.5	4	Yes	Yes
9/22/2011	SBTC0075L036	7.75-8.75 ft	SBTC0075L036S092211G088	--	Beryllium	<2	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	27	100	20	No	Yes
					Vanadium	31	4.5	4	Yes	Yes
9/22/2011	SBTC0075L026	4.4-5.4 ft	SBTC0075L026S092211G054	--	Beryllium	<2	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	54	100	20	No	Yes
					Vanadium	61	4.5	4	Yes	Yes
9/21/2011	SBTC0075L012	7.7-8.7 ft	SBTC0075L012S092111G087	746.7	Beryllium	<2	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	99	100	20	No	Yes
					Vanadium	55	4.5	4	Yes	Yes
9/21/2011	SBTC0075L001	6.4-7.4 ft	SBTC0075L001S092111G074	89.7	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<2	100	20	No	No
					Vanadium	14	4.5	4	Yes	Yes
9/21/2011	SBTC0075L001	6.4-7.4 ft	GWTC0075L001S09211G074-split	--	Beryllium	<1	4	1	No	No
					Molybdenum	<25	73	50	No	No
					Nickel	12	100	20	No	No
					Vanadium	24	4.5	4	Yes	Yes
1/16/2012	SBTC0125R512A	6.7-7.7 ft	SBTC0125R512AS011612G077	183.0	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<20	100	20	No	No
					Vanadium	8.1	4.5	4	Yes	Yes
1/16/2012	SBTC0125R512A	6.7-7.7 ft	SBTC0125R512AS011612G070-SPLIT	--	Beryllium	<1	4	1	No	No
					Molybdenum	<25	73	50	No	No
					Nickel	3.6	100	20	No	No
					Vanadium	4.6	4.5	4	Yes	Yes
2/6/2014	SBTC0125L501	0.5-4.3 ft	SBTC0125L501S020614G043	760.0	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	24	100	20	No	Yes
					Vanadium	36	4.5	4	Yes	Yes
2/6/2014	SBTC0125R502	2-5.5 ft	SBTC0125R502S020614G055	52.0	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<20	100	20	No	No
					Vanadium	7.3	4.5	4	Yes	Yes
9/27/2011	SBTC0100R037B	7.2-8.2 ft	SBTC0100R037BS092711G082	-7.7	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<2	100	20	No	No
					Vanadium	5.1	4.5	4	Yes	Yes
9/27/2011	SBTC0100L100	7.3-8.3 ft	SBTC0100L100S092711G083	160.2	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<20	100	20	No	No
					Vanadium	5.2	4.5	4	Yes	Yes
9/28/2011	SBTC0100R027	7.7-8.7 ft	SBTC0100R027S092811G087	22.7	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<2	100	20	No	No
					Vanadium	15	4.5	4	Yes	Yes
3/6/2014	SBTC0100R515	2.3-4.25 ft	SBTC0100R515S030614G043	1000.0	Beryllium	2	4	1	No	Yes
					Molybdenum	<50	73	50	No	No
					Nickel	170	100	20	Yes	Yes
					Vanadium	150	4.5	4	Yes	Yes
10/3/2011	SBTC0100R097	7.4-8.4 ft	SBTC0100R097S100311G084	--	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<20	100	20	No	No
					Vanadium	7.6	4.5	4	Yes	Yes
2/26/2014	SBTC0100R522R1	0.5-4.46 ft	SBTC0100R522R1S022614G045	522.0	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<20	100	20	No	No
					Vanadium	16	4.5	4	Yes	Yes
9/27/2011	SBTC0100R047	6.8-7.8 ft	SBTC0100R047D092711G078	60.1	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<20	100	20	No	No
					Vanadium	5	4.5	4	Yes	Yes

Table 6
Reach 3 Temporary Well Groundwater Sample Locations Exceeding Part 201 Criteria
Enbridge Oil Spill Site
Marshall, Michigan

Sample Date	Location	Sample Interval	Sample ID	Recorded Turbidity	Metal	Result Total ug/L	[1] Criteria ug/L	Calculated Background ug/L	Exceeds Criteria	Exceeds Background
9/26/2011	SBTC0100L030	7.5-8.5 ft	SBTC0100L030S092611G085	8.7	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	47	100	20	No	Yes
					Vanadium	11	4.5	4	Yes	Yes
9/26/2011	SBTC0100L020	7.5-8.5 ft	SBTC0100L020S092611G085	75.5	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<20	100	20	No	No
					Vanadium	5.6	4.5	4	Yes	Yes
9/24/2011	SBTC0100L010	7.2-8.2 ft	SBTC0100L010D092411G082	--	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<20	100	20	No	No
					Vanadium	4.8	4.5	4	Yes	Yes
9/26/2011	SBTC0075R086	6.6-7.6 ft	SBTC0075R086S092611G076	340.6	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	26	100	20	No	Yes
					Vanadium	88	4.5	4	Yes	Yes
9/26/2011	SBTC0075R086A	6.3-7.3 ft	SBTC0075R086AS092611G073	276.0	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	21	100	20	No	Yes
					Vanadium	63	4.5	4	Yes	Yes
9/23/2011	SBTC0100L002	7.8-8.8 ft	SBTC0100L002S092311G088	--	Beryllium	<1	4	1	No	No
					Molybdenum	<50	73	50	No	No
					Nickel	<2	100	20	No	No
					Vanadium	7.9	4.5	4	Yes	Yes

Footnotes: Criteria[1] = Michigan Department of Environment Quality Residential and Non-Residential Part 201 Generic Groundwater Cleanup Criteria - Residential Drinking Water Criteria

Shaded cells indicate exceedances of Part 201 Criteria and calculated background values.

ATTACHMENT A
BACKGROUND SOIL SAMPLE DATA SET

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
9/21/2012	12:50 PM	SBSA0025R0153	SBSA0025R0153S092112S005	1	0 - 0.5 ft	ML	<0.5	<1	5.2	11
9/21/2012	12:50 PM	SBSA0025R0153	SBSA0025R0153S092112S005	1	0 - 0.5 ft	ML	<0.5	<1	5.2	11
9/21/2012	3:35 PM	SBSA0025R0159	SBSA0025R0159S092112S003	1	0 - 0.3 ft	ML	<0.5	1.9	7.1	20
9/21/2012	3:35 PM	SBSA0025R0159	SBSA0025R0159S092112S003	1	0 - 0.3 ft	ML	<0.5	1.9	7.1	20
10/3/2011	1:40 PM	SBTC0025R046	SBTC0025R046S100311S007	1	0 - 0.7 ft	ML	<0.5	<1	12	14
10/3/2011	12:35 PM	SBTC0025R047	SBTC0025R047S100311S010	1	0 - 1 ft	ML	<0.5	<1	13	20
9/20/2012	1:33 PM	SBSA0025R0146	SBSA0025R0146S092012S005	1	0 - 0.5 ft	OH	0.71	<1	20	24
7/18/2012	2:30 PM	SBSA0117	SBSA0117S071812S006	1	0 - 0.6 ft	OH	<0.5	2.7	10	15
7/18/2012	12:49 PM	SBSA0115	SBSA0115S071812S009	1	0 - 0.9 ft	OL	<0.5	2.6	12	14
7/18/2012	3:05 PM	SBSA0118	SBSA0118S071812S006	1	0 - 0.6 ft	OL	<0.5	2.4	9.7	12
7/18/2012	3:38 PM	SBSA0119	SBSA0119S071812S004	1	0 - 0.4 ft	OL	<0.5	2.1	9.8	14
7/18/2012	4:13 PM	SBSA0120	SBSA0120S071812S007	1	0 - 0.7 ft	OL	<0.5	2	8.4	12
7/19/2012	**8:35 AM**	**SBSA0121**	**SBSA0121D071912S007**	**1**	**0 - 0.7 ft**	**OL**	**<0.5**	**2.5**	**11**	**15**
7/19/2012	**8:35 AM**	**SBSA0121**	**SBSA0121S071912S007**	**1**	**0 - 0.7 ft**	**OL**	**<0.5**	**2.4**	**11**	**14**
7/19/2012	9:30 AM	SBSA0122	SBSA0122S071912S009	1	0 - 0.9 ft	OL	<0.5	2.5	9.4	13
7/19/2012	10:20 AM	SBSA0123	SBSA0123S071912S008	1	0 - 0.8 ft	OL	<0.5	2.4	9.6	13
7/20/2012	1:58 PM	SBSA0127	SBSA0127S072012S005	1	0 - 0.5 ft	OL	<0.5	2.1	8.7	12
7/20/2012	2:48 PM	SBSA0129	SBSA0129S072012S004	1	0 - 0.4 ft	OL	<0.5	2	9.5	11
8/1/2012	8:15 AM	SBSA0136	SBSA0136S080112S006	1	0 - 0.6 ft	OL	<0.5	2.1	8.9	14
7/31/2012	3:37 PM	SBSA0137	SBSA0137S073112S006	1	0 - 0.6 ft	OL	<0.5	2.5	9.9	12
10/4/2011	**9:30 AM**	**SBTC0000L001**	**SBTC0000L001S100411S010**	**1**	**0 - 0.1 ft**	**OL**	**<1.1**	**5.9**	**13**	**11**
10/4/2011	**9:30 AM**	**SBTC0000L001**	**SBTC0000L001D100411S010**	**1**	**0 - 1 ft**	**OL**	**<1.2**	**4.7**	**11**	**8.6**
9/14/2011	4:20 PM	SBTC0000L100B	SBTC0000L100BS091411S012	1	0 - 1.25 ft	OL	<1.3	11	9.9	4.3
10/7/2011	11:15 AM	SBTC0000L201	SBTC0000L201S100711S010	1	0 - 1 ft	OL	<1.2	<2.4	20	22
10/7/2011	**10:25 AM**	**SBTC0000L202**	**SBTC0000L202S100711S010**	**1**	**0 - 1 ft**	**OL**	**<1.3**	**59**	**5.7**	**11**
10/7/2011	**10:25 AM**	**SBTC0000L202**	**SBTC0000L202S100711S010-SPLIT**	**1**	**0 - 1 ft**	**OL**	**0.3**	**30**	**5.5**	**9.9**
10/7/2011	1:42 PM	SBTC0000L203	SBTC0000L203S100711S005	1	0 - 0.5 ft	OL	<1.1	2.4	9.9	41
10/7/2011	11:32 AM	SBTC0000L204	SBTC0000L204S100711S010	1	0 - 1 ft	OL	<2.1	41	6.5	13
10/7/2011	9:26 AM	SBTC0000L205	SBTC0000L205S100711S007	1	0 - 0.7 ft	OL	<1.4	<2.8	11	15
10/7/2011	10:00 AM	SBTC0000L206	SBTC0000L206S100711S010	1	0 - 1 ft	OL	<0.96	2.6	7.9	13
10/12/2011	3:18 PM	SBTC0000R004D1	SBTC0000R004D1S101211S005	1	0 - 0.5 ft	OL	<0.5	1.1	6.4	8.2
10/12/2011	**5:35 PM**	**SBTC0000R004F1**	**SBTC0000R004F1S101211S010**	**1**	**0 - 1 ft**	**OL**	**<0.5**	**2.1**	**5.7**	**8**
10/12/2011	**5:35 PM**	**SBTC0000R004F1**	**SBTC0000R004F1S101211S010-split**	**1**	**0 - 1 ft**	**OL**	**0.29**	**4.4**	**8.9**	**14**
10/11/2011	1:45 PM	SBTC0000R004M	SBTC0000R004MS101111S010	1	0 - 1 ft	OL	<0.5	2.4	14	15
10/7/2011	10:55 AM	SBTC0000R201	SBTC0000R201S100711S010	1	0 - 1 ft	OL	<1	<2	6.6	11
10/7/2011	**1:58 PM**	**SBTC0000R203**	**SBTC0000R203S100711S010**	**1**	**0 - 1 ft**	**OL**	**<1.3**	**3**	**8**	**9.6**
10/7/2011	**1:58 PM**	**SBTC0000R203**	**SBTC0000R203S100711S010-SPLIT**	**1**	**0 - 1 ft**	**OL**	**<0.2**	**4.6**	**5.2**	**6.5**
10/7/2011	**11:48 AM**	**SBTC0000R204**	**SBTC0000R204S100711S010**	**1**	**0 - 1 ft**	**OL**	**<0.96**	**<1.9**	**12**	**11**
10/7/2011	**11:48 AM**	**SBTC0000R204**	**SBTC0000R204S100711S010-SPLIT**	**1**	**0 - 1 ft**	**OL**	**0.35**	**2**	**12**	**14**
10/7/2011	11:08 AM	SBTC0000R206	SBTC0000R206S100711S010	1	0 - 1 ft	OL	<1	4.4	21	17
1/31/2014	10:45 AM	SBTC0000R504	SBTC0000R504S013114S008	1	0 - 0.8 ft	OL	<0.5	3.7	11	19
7/31/2012	**12:00 PM**	**SBSA0134**	**SBSA0134D073112S007**	**1**	**0 - 0.7 ft**	**SM**	**<0.5**	**<1**	**6.2**	**11**
7/31/2012	**12:00 PM**	**SBSA0134**	**SBSA0134S073112S007**	**1**	**0 - 0.7 ft**	**SM**	**<0.5**	**<1**	**6.2**	**13**
7/31/2012	2:10 PM	SBSA0135	SBSA0135S073112S005	1	0 - 0.5 ft	SM	<0.5	1.9	8.1	14
8/1/2012	3:56 PM	SBSA0140	SBSA0140S080112S004	1	0 - 0.4 ft	SM	<0.5	<1	5.7	11
10/11/2010	05:40 PM	PE- A10111740	SOA10111740BWA1	1	NA	unknown	NA	NA	5.7	4.9
9/25/2010	02:00 PM	PRA5-013	SOA09251400RJM1	1	0 - 0.5 ft	unknown	NA	NA	9.16	16.6
8/31/2010	12:00 AM	PRA5-013	PRA5013	1	NA	unknown	NA	NA	NA	NA
9/25/2010	01:50 PM	PRA5-014	SOA09251350RJM1	1	0 - 0.5 ft	unknown	NA	NA	6.85	12.2
9/25/2010	01:30 PM	PRA5-015	SOA09251330RJM1	1	0 - 0.5 ft	unknown	NA	NA	9.29	16
9/25/2010	01:45 PM	PRA5-016	SOA09251345RJM1	1	0 - 0.5 ft	unknown	NA	NA	9.04	16.4
9/8/2010	**05:15 PM**	**PRA5-017**	**PRA5-017- SAMPLE SPLIT**	**1**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**5**	**4.9**
9/8/2010	**05:15 PM**	**PRA5-017**	**SOA09081715CEH1**	**1**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**5.1**	**6.2**
9/8/2010	**05:55 PM**	**PRA5-046**	**PRA5-046- SAMPLE SPLIT**	**1**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**28**	**16**
9/8/2010	**05:55 PM**	**PRA5-046**	**SOA09081755CEH1**	**1**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**13**	**15**
9/8/2010	05:40 PM	PRA5-047	SOA09081740CEH1	1	0 - 0.5 ft	unknown	NA	NA	7.2	10
9/8/2010	**05:30 PM**	**PRA5-048**	**SOA09081730JTR1**	**1**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**12**	**14**
9/8/2010	**05:30 PM**	**PRA5-048**	**SOA09081730JTR2**	**1**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**13**	**17**
9/25/2010	**01:20 PM**	**PRA5-049**	**PRA5-049- SAMPLE SPLIT**	**1**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**5.8**	**7.3**
9/25/201	**01:20 PM**	**PRA5-049**	**SOA09251320RJM1**	**1**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**5.46**	**10.7**
10/17/2010	9:38 AM	SBSA0001	SA-SB0001-101710-2S	1	2 - 3 ft	Unknown	<0.5	<1	NA	15
10/14/2010	10:35 AM	SBSA0003	SA-SB0003-101410-0S	1	NA	Unknown	<0.5	<1	NA	8.9
10/14/2010	**10:45 AM**	**SBSA0003**	**SA-SB0003-101410-7.5S**	**1**	**NA**	**Unknown**	**<0.5**	**<1**	**NA**	**7.3**
10/14/2010	**10:45 AM**	**SBSA0003**	**SA-SB0003-101410-7.5T**	**1**	**NA**	**Unknown**	**<1.2**	**2.9**	**NA**	**9.7**
10/14/2010	9:20 AM	SBSA0004	SA-SB0004-101410-0S	1	NA	Unknown	<0.5	<1	NA	9.7
10/14/2010	9:30 AM	SBSA0004	SA-SB0004-101410-8S	1	NA	Unknown	<0.5	1.7	NA	12
10/17/2010	8:25 AM	SBSA0008	SA-SB0008-101710-3S	1	3 - 4 ft	Unknown	<0.5	<1	NA	5.7
10/14/2010	1:20 PM	SBSA0018	SA-SB0018-101410-3S	1	NA	Unknown	<1.3	<1	NA	23
10/16/2010	3:20 PM	SBSA0019	SA-SB0019-101610-4MS/MSD	1	3 - 4.5 ft	Unknown	<0.94	<1	NA	19

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
10/19/2010	**9:52 AM**	**SBSA0023**	**SA-SB0023-101910-2S**	**1**	**2 - 3 ft**	**Unknown**	**<0.5**	**<1**	**NA**	**5.3**
10/19/2010	**9:52 AM**	**SBSA0023**	**TG50023-(2-3) SAMPLE SPLIT**	**1**	**2 - 3 ft**	**Unknown**	**NA**	**NA**	**10**	**8.3**
10/15/2010	**2:40 PM**	**SBSA0028**	**SA-SB0028-101510-2S**	**1**	**NA**	**Unknown**	**<0.5**	**<1**	**NA**	**14**
10/15/2010	**2:40 PM**	**SBSA0028**	**TG5-0028 (2-3)-SAMPLE SPLIT**	**1**	**NA**	**Unknown**	**NA**	**NA**	**11**	**24**
10/17/2010	10:55 AM	SBSA0035	SA-SB0035-101710-2S	1	2 - 3 ft	Unknown	<0.5	<1	NA	16
10/17/2010	**10:55 AM**	**SBSA0035**	**SA-SB0035-101710-2T**	**1**	**2 - 3 ft**	**Unknown**	**<0.5**	**<1**	**NA**	**9.8**
10/17/2010	**10:55 AM**	**SBSA0035**	**TG50035-(2'-4') SAMPLE SPLIT**	**1**	**2 - 3 ft**	**Unknown**	**NA**	**NA**	**13**	**8.8**
10/15/2010	**4:15 PM**	**SBSA0036**	**SA-SB0036-101510-2S**	**1**	**2 - 4 ft**	**Unknown**	**<0.5**	**2**	**NA**	**18**
10/15/2010	**4:15 PM**	**SBSA0036**	**SA-SB0036-101510-2T**	**1**	**2 - 4 ft**	**Unknown**	**<0.5**	**<1**	**NA**	**16**
10/15/2010	1:11 PM	SBSA0037	SA-SB0037-101510-1S	1	1 - 1.5 ft	Unknown	<0.5	<1	NA	18
10/15/2010	1:55 PM	SBSA0037	SA-SB0037-101510-5S	1	5 - 6 ft	Unknown	<1.2	<1	NA	22
10/17/2010	**5:35 PM**	**SBSA0038**	**SA-SB0038-101710-2S**	**1**	**2 - 3 ft**	**Unknown**	**<0.5**	**<1**	**NA**	**14**
10/17/2010	**5:35 PM**	**SBSA0038**	**TG50038-(2'-3') SAMPLE SPLIT**	**1**	**2 - 3 ft**	**Unknown**	**NA**	**NA**	**6.6**	**9.7**
10/16/2010	**9:55 AM**	**SBSA0040**	**SA-SB0040-101610-2.5S**	**1**	**2.5 - 3.5 ft**	**Unknown**	**<0.69**	**<1**	**NA**	**9.4**
10/16/2010	**9:55 AM**	**SBSA0040**	**SA-SB0040-101610-2.5T**	**1**	**2.5 - 3.5 ft**	**Unknown**	**<0.86**	**<1**	**NA**	**17**
10/15/2010	**10:30 AM**	**SBSA0042**	**SA-SB0042-1015-6S**	**1**	**NA**	**Unknown**	**<1.1**	**9.2**	**NA**	**24**
10/15/2010	**10:30 AM**	**SBSA0042**	**TG5-0042 (5-6)-SAMPLE SPLIT**	**1**	**NA**	**Unknown**	**NA**	**NA**	**10**	**15**
10/17/2010	4:00 PM	SBSA0045	SA-SB0045-101710-4MS/MSD	1	NA	Unknown	<0.5	<1	NA	12
10/18/2010	**5:45 PM**	**SBSA0054**	**SA-SB0054-101810-0.5MS/MSD**	**1**	**0.5 - 1 ft**	**Unknown**	**<0.5**	**5.9**	**NA**	**11**
10/18/2010	**5:45 PM**	**SBSA0054**	**TG50054-(0.5-1.0) SAMPLE SPLIT**	**1**	**0.5 - 1 ft**	**Unknown**	**NA**	**NA**	**33**	**12**
10/16/2010	**11:20 AM**	**SBSA0055**	**SA-SB0055-101610-3S**	**1**	**3 - 4 ft**	**Unknown**	**<0.87**	**2.5**	**NA**	**16**
10/16/2010	**11:20 AM**	**SBSA0055**	**TG50055-(3'-4') SAMPLE SPLIT**	**1**	**3 - 4 ft**	**Unknown**	**NA**	**NA**	**5**	**14**
9/19/2012	10:50 AM	SSSA0025R0142	SSSA0025R0142S091912S016	1	1.6 - 1.6 ft	unknown	<16	53	36	28
9/19/2012	10:50 AM	SSSA0025R0142	SSSA0025R0142S091912S016	1	1.6 - 1.6 ft	Unknown	<16	53	36	28
9/19/2012	11:00 AM	SSSA0025R0143	SSSA0025R0143S091912S016	1	1.6 - 1.6 ft	unknown	<8.3	27	40	40
9/19/2012	11:00 AM	SSSA0025R0143	SSSA0025R0143S091912S016	1	1.6 - 1.6 ft	Unknown	<8.3	27	40	40
9/20/2012	**8:45 AM**	**SSSA0025R0144**	**SSSA0025R0144D092012S010**	**1**	**1 - 1 ft**	**unknown**	**<0.5**	**<1**	**4.4**	**9.4**
9/20/2012	**8:45 AM**	**SSSA0025R0144**	**SSSA0025R0144S092012S010**	**1**	**1 - 1 ft**	**unknown**	**<0.5**	**<1**	**5.0**	**10**
9/20/2012	8:55 AM	SSSA0025R0145	SSSA0025R0145S092012S013	1	1.3 - 1.3 ft	unknown	<0.5	<1	6.4	15
9/20/2012	8:55 AM	SSSA0025R0145	SSSA0025R0145S092012S013	1	1.3 - 1.3 ft	Unknown	<0.5	<1	6.4	15
9/20/2012	1:30 PM	SSSA0025R0147	SSSA0025R0147S092012S018	1	1.8 - 1.8 ft	unknown	<0.5	4.3	5.9	6.4
9/20/2012	1:30 PM	SSSA0025R0147	SSSA0025R0147S092012S018	1	1.8 - 1.8 ft	Unknown	<0.5	4.3	5.9	6.4
9/20/2012	2:05 PM	SSSA0025R0148	SSSA0025R0148S092012S018	1	1.8 - 1.8 ft	unknown	<0.5	3.7	5.1	7.1
9/20/2012	2:05 PM	SSSA0025R0148	SSSA0025R0148S092012S018	1	1.8 - 1.8 ft	Unknown	<0.5	3.7	5.1	7.1
9/20/2012	3:50 PM	SSSA0025R0149	SSSA0025R0149S092012S005	1	0.5 - 0.5 ft	unknown	<0.5	2.4	11	13
9/21/2012	9:57 AM	SSSA0025R0150	SSSA0025R0150S092112S015	1	1.5 - 1.5 ft	unknown	<0.5	1.7	8.8	14
9/21/2012	9:57 AM	SSSA0025R0150	SSSA0025R0150S092112S015	1	1.5 - 1.5 ft	Unknown	<0.5	1.7	8.8	14
9/21/2012	10:27 AM	SSSA0025R0151	SSSA0025R0151S092112S024	1	2.4 - 2.4 ft	unknown	<0.5	2.5	4.7	5.0
9/21/2012	10:27 AM	SSSA0025R0151	SSSA0025R0151S092112S024	1	2.4 - 2.4 ft	Unknown	<0.5	2.5	4.7	5
9/21/2012	10:52 AM	SSSA0025R0152	SSSA0025R0152S092112S012	1	1.2 - 1.2 ft	unknown	<0.5	2.5	9.8	10
9/21/2012	10:52 AM	SSSA0025R0152	SSSA0025R0152S092112S012	1	1.2 - 1.2 ft	Unknown	<0.5	2.5	9.8	10
9/21/2012	2:28 PM	SSSA0025R0155	SSSA0025R0155S092112S005	1	0.5 - 0.5 ft	unknown	<0.5	<1	2.6	5.8
9/21/2012	2:28 PM	SSSA0025R0155	SSSA0025R0155S092112S005	1	0.5 - 0.5 ft	Unknown	<0.5	<1	2.6	5.8
9/21/2012	2:36 PM	SSSA0025R0156	SSSA0025R0156S092112S005	1	0.5 - 0.5 ft	unknown	<0.5	<1	3.6	6.1
9/21/2012	2:36 PM	SSSA0025R0156	SSSA0025R0156S092112S005	1	0.5 - 0.5 ft	Unknown	<0.5	<1	3.6	6.1
9/21/2012	2:55 PM	SSSA0025R0157	SSSA0025R0157S092112S015	1	1.5 - 1.5 ft	unknown	<1.1	5.3	12	7.8
9/21/2012	2:55 PM	SSSA0025R0157	SSSA0025R0157S092112S015	1	1.5 - 1.5 ft	Unknown	<1.1	5.3	12	7.8
9/21/2012	1:10 PM	SSSA0025R0158	SSSA0025R0158S092112S015	1	1.5 - 1.5 ft	unknown	<0.65	4.6	22	21
9/21/2012	1:10 PM	SSSA0025R0158	SSSA0025R0158S092112S015	1	1.5 - 1.5 ft	Unknown	<0.65	4.6	22	21
9/24/2012	1:25 PM	SSSA0025R0161	SSSA0025R0161S092412S010	1	1 - 1 ft	unknown	<0.65	2.7	8.9	6.0
9/24/2012	2:12 PM	SSSA0025R0163	SSSA0025R0163S092412S012	1	1.2 - 1.2 ft	unknown	<1.7	3.6	5.4	4.1
9/24/2012	2:12 PM	SSSA0025R0163	SSSA0025R0163S092412S012	1	1.2 - 1.2 ft	Unknown	<1.7	3.6	5.4	4.1
9/24/2012	2:24 PM	SSSA0025R0164	SSSA0025R0164S092412S014	1	1.4 - 1.4 ft	unknown	<1.4	3.8	4.4	3.2
9/24/2012	2:24 PM	SSSA0025R0164	SSSA0025R0164S092412S014	1	1.4 - 1.4 ft	Unknown	<1.4	3.8	4.4	3.2
9/24/2012	2:35 PM	SSSA0025R0165	SSSA0025R0165S092412S010	1	1 - 1 ft	unknown	<0.5	2.0	8.9	15
9/24/2012	2:38 PM	SSSA0025R0166	SSSA0025R0166S092412S012	1	1.2 - 1.2 ft	unknown	<1.4	4.2	8.6	11
9/24/2012	2:38 PM	SSSA0025R0166	SSSA0025R0166S092412S012	1	1.2 - 1.2 ft	Unknown	<1.4	4.2	8.6	11

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
5/4/2011	**10:54 AM**	**SSSYATMY01**	**SSSYATMY01D050411S005**	**1**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**11**	**17**
5/4/2011	**10:54 AM**	**SSSYATMY01**	**SSSYATMY01S050411S005**	**1**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**12**	**17**
5/4/2011	11:10 AM	SSSYATMY02	SSSYATMY02S050411S005	1	0 - 0.5 ft	Unknown	<0.5	<1	4.3	7.1
5/4/2011	**11:20 AM**	**SSSYATMY03**	**SSSYATMY03S050411S005**	**1**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**4.7**	**10**
5/4/2011	**11:20 AM**	**SSSYATMY03**	**SSSYATMY03S050411S005-SPLIT**	**1**	**0 - 0.5 ft**	**Unknown**	**<0.2**	**<1**	**5.2**	**12**
5/4/2011	11:31 AM	SSSYATMY04	SSSYATMY04S050411S005	1	0 - 0.5 ft	Unknown	<0.5	<1	14	17
5/4/2011	11:39 AM	SSSYATMY05	SSSYATMY05S050411S005	1	0 - 0.5 ft	Unknown	<0.5	<1	11	17
5/4/2011	1:43 PM	SSSYATMY06	SSSYATMY06S050411S005	1	0 - 0.5 ft	Unknown	<0.5	<1	6	10
5/4/2011	1:50 PM	SSSYATMY07	SSSYATMY07S050411S005	1	0 - 0.5 ft	Unknown	<0.5	<1	4.8	8.3
5/4/2011	2:00 PM	SSSYATMY08	SSSYATMY08S050411S005	1	0 - 0.5 ft	Unknown	<0.5	2.1	13	11
5/4/2011	2:11 PM	SSSYATMY09	SSSYATMY09S050411S005	1	0 - 0.5 ft	Unknown	<0.5	3.3	8.2	13
5/4/2011	2:20 PM	SSSYATMY10	SSSYATMY10S050411S005	1	0 - 0.5 ft	Unknown	<0.5	<1	5.5	10
5/4/2011	2:31 PM	SSSYATMY11	SSSYATMY11S050411S005	1	0 - 0.5 ft	Unknown	<0.5	1.2	13	15
5/4/2011	**2:36 PM**	**SSSYATMY12**	**SSSYATMY12S050411S005**	**1**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**3.8**	**9.2**	**13**
5/4/2011	**2:36 PM**	**SSSYATMY12**	**SSSYATMY12S050411S005-SPLIT**	**1**	**0 - 0.5 ft**	**Unknown**	**0.3**	**4.4**	**11**	**18**
5/4/2011	2:45 PM	SSSYATMY13	SSSYATMY13S050411S005	1	0 - 0.5 ft	Unknown	<0.5	<1	12	19
5/4/2011	**2:56 PM**	**SSSYATMY14**	**SSSYATMY14S050411S005**	**1**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**2.1**	**8.9**	**15**
5/4/2011	**2:56 PM**	**SSSYATMY14**	**SSSYAYMY14S050411S005-SPLIT**	**1**	**0 - 0.5 ft**	**Unknown**	**0.3**	**2.2**	**12**	**17**
8/3/2011	3:47 PM	SBTC0025L03	SBTC0025L03S080311S008	2	0.3 - 0.85 ft	CL	0.92	3.8	33	51
8/3/2011	3:50 PM	SBTC0025L03	SBTC0025L03S080311S011	2	0.85 - 1.1 ft	CL	0.59	2.2	11	26
9/15/2011	10:10 AM	SBTC0025L103M	SBTC0025L103MS091511S068	2	4 - 6.8 ft	CL	<0.5	1.2	9.8	13
10/8/2014	2:50 PM	SBTC0025L523	SBTC0025L523S100814S029	2	1 - 2.9 ft	CL	<0.5	12	14	22
8/26/2011	8:47 AM	SBTC0025R101I	SBTC0025R101IS082611S025	2	2.2 - 2.5 ft	CL	<0.5	7.4	13	16
8/27/2011	**4:40 PM**	**SBTC0050L05D**	**SBTC0050L05D5082711S011-split**	**2**	**0 - 1.1 ft**	**CL**	**0.62**	**1.7**	**14**	**24**
8/27/2011	**4:40 PM**	**SBTC0050L05D**	**SBTC0050L05DS082711S011**	**2**	**0 - 1.1 ft**	**CL**	**0.62**	**1.9**	**16**	**35**
9/13/2011	3:18 PM	SBTC0050L05E	SBTC0050L05ES091311S018	2	0 - 1.8 ft	CL	0.55	1.9	15	27
8/5/2011	11:08 AM	SBTC0050L06	SBTC0050L06S080511S005	2	0 - 0.5 ft	CL	0.52	1.3	13	25
9/2/2011	**10:42 AM**	**SBTC0050L108E**	**SBTC0050L108ES090211S017**	**2**	**0.8 - 1.7 ft**	**CL**	**<0.5**	**5.2**	**16**	**20**
9/2/2011	**10:42 AM**	**SBTC0050L108E**	**SBTC0050L108ES090211S017-split**	**2**	**0.8 - 1.7 ft**	**CL**	**0.32**	**5.3**	**16**	**17**
8/30/2011	3:40 PM	SBTC0050L110A	SBTC0050L110AS083011S035	2	1.7 - 3.5 ft	CL	<0.5	4.8	13	15
10/15/2014	3:25 PM	SBTC0050L508	SBTC0050L508S101514S024	2	2.1 - 2.4 ft	CL	<0.5	<1	19	26
8/5/2011	3:05 PM	SBTC0050R04	SBTC0050R04S080511S010	2	0.5 - 1 ft	CL	0.62	3.1	16	28
9/13/2011	10:05 AM	SBTC0050R101E	SBTC0050R101ES091311S024	2	1.8 - 2.4 ft	CL	<0.5	3.3	17	17
9/10/2011	8:55 AM	SBTC0025L101G1	SBTC0025L101G1S091011S008	2	0 - 0.8 ft	ML	<0.5	2.5	15	17
8/19/2011	**10:00 AM**	**SBTC0025L21**	**SBTC0025L21D081911S005**	**2**	**0 - 0.5 ft**	**ML**	**<0.5**	**11**	**5.5**	**8.9**
8/19/2011	**10:40 AM**	**SBTC0025L21**	**SBTC0025L21S081911S005**	**2**	**0 - 0.5 ft**	**ML**	**<0.5**	**1.8**	**14**	**13**
4/7/2014	1:15 PM	SBTC0025L513	SBTC0025L513S040714S018	2	0.7 - 1.8 ft	ML	<0.5	1.3	12	11
4/8/2014	8:50 AM	SBTC0025L515	SBTC0025L515S040814S020	2	0.8 - 2 ft	ML	<0.5	4.9	20	10
10/16/2014	**1:10 PM**	**SBTC0025L521**	**SBTC0025L521D101614S025**	**2**	**0.7 - 2.5 ft**	**ML**	**<0.5**	**4.2**	**10**	**9.7**
10/16/2014	**1:10 PM**	**SBTC0025L521**	**SBTC0025L521S101614S025**	**2**	**0.7 - 2.5 ft**	**ML**	**<0.5**	**3.3**	**13**	**15**
10/8/2014	2:43 PM	SBTC0025L523	SBTC0025L523S100814S008	2	0 - 0.8 ft	ML	<0.5	13	14	22
10/8/2014	2:50 PM	SBTC0025L523	SBTC0025L523S100814S029	2	1 - 2.9 ft	ML	<0.5	12	14	22
10/9/2014	12:55 PM	SBTC0025L527	SBTC0025L527S100914S017	2	0 - 1.7 ft	ML	<0.5	1.6	17	21
8/20/2011	10:28 AM	SBTC0025R28	SBTC0025R28S082011S005	2	0 - 0.5 ft	ML	<0.5	<1	15	24
4/10/2014	9:40 AM	SBTC0025R568	SBTC0025R568S041014S014	2	0 - 1.4 ft	ML	<0.5	<1	8.9	24
4/10/2014	9:45 AM	SBTC0025R568	SBTC0025R568S041014S020	2	1.5 - 2 ft	ML	<0.5	<1	6.8	17
4/10/2014	2:20 PM	SBTC0025R571	SBTC0025R571S041014S010	2	0 - 1 ft	ML	<0.5	<1	5.8	17
4/10/2014	3:20 PM	SBTC0025R572	SBTC0025R572S041014S010	2	0 - 1 ft	ML	<0.5	<1	7	19
8/4/2011	**3:10 PM**	**SBTC0050R01**	**SBTC0050R01S080411S007**	**2**	**0.2 - 0.7 ft**	**ML**	**<0.5**	**4**	**9.8**	**13**
8/4/2011	**3:10 PM**	**SBTC0050R01**	**SBTC0050R01S080411S007-split**	**2**	**0.2 - 0.7 ft**	**ML**	**0.32**	**3.4**	**11**	**15**
8/26/2011	9:47 AM	SBTC0050R11B	SBTC0050R11BS082611S014	2	1 - 1.4 ft	ML	<0.5	<1	8.3	12
8/26/2011	3:57 PM	SBTC0050R26	SBTC0050R26S082611S016	2	1.1 - 1.6 ft	ML	<0.5	1.1	12	20
4/8/2014	2:35 PM	SBTC0050R507	SBTC0050R507S040814S005	2	0 - 0.5 ft	ML	<0.5	<1	7.2	18
4/9/2014	8:55 AM	SBTC0050R508	SBTC0050R508S040914S005	2	0 - 0.5 ft	ML	<0.5	1	7.1	16
4/9/2014	10:15 AM	SBTC0050R509	SBTC0050R509S040914S009	2	0.5 - 0.9 ft	ML	<0.5	<1	4.7	12
4/9/2014	11:15 AM	SBTC0050R510	SBTC0050R510S040914S005	2	0 - 0.5 ft	ML	<0.5	<1	5.8	14
4/9/2014	1:10 PM	SBTC0050R511	SBTC0050R511S040914S012	2	0.6 - 1.2 ft	ML	<0.5	<1	6.1	14
4/9/2014	1:15 PM	SBTC0050R511	SBTC0050R511S040914S020	2	1.3 - 2 ft	ML	<0.5	<1	6.7	15
10/8/2014	1:00 PM	SBTC0050R518	SBTC0050R518S100814S016	2	0 - 1.6 ft	ML	<0.5	<1	5.8	14
10/8/2014	1:08 PM	SBTC0050R518	SBTC0050R518S100814S024	2	2 - 2.4 ft	ML	<0.5	<1	10	20
10/7/2011	**4:50 PM**	**SBTC0025L046**	**SBTC0025L046D100711S005**	**2**	**0 - 0.5 ft**	**OL**	**<0.84**	**6.9**	**10**	**7.2**
10/7/2011	**4:50 PM**	**SBTC0025L046**	**SBTC0025L046S100711S005**	**2**	**0 - 0.5 ft**	**OL**	**<0.71**	**3.6**	**18**	**20**
10/8/2011	**7:44 AM**	**SBTC0025L048**	**SBTC0025L048D100811S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**4.9**	**6.1**	**6.7**
10/8/2011	**7:44 AM**	**SBTC0025L048**	**SBTC0025L048S100811S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**3.8**	**7.5**	**8.4**
10/8/2011	**7:34 AM**	**SBTC0025L048**	**SBTC0025L048S100811S010-SPLIT**	**2**	**0 - 1 ft**	**OL**	**0.35**	**6.4**	**11**	**15**
10/8/2011	**8:35 AM**	**SBTC0025L049**	**SBTC0025L049D100811S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**3.9**	**12**	**10**
10/8/2011	**8:35 AM**	**SBTC0025L049**	**SBTC0025L049S100811S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**2.5**	**9**	**9.8**
10/8/2011	**8:35 AM**	**SBTC0025L049**	**SBTC0025L049S100811S010-SPLIT**	**2**	**0 - 1 ft**	**OL**	**<0.2**	**3.1**	**12**	**12**
9/1/2011	11:10 AM	SBTC0025L101F1	SBTC0025L101F1S090111S005	2	0 - 0.5 ft	OL	<0.53	2.6	18	20

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
8/18/2011	11:30 AM	SBTC0025L102G	SBTC0025L102GS081811S005	2	0 - 0.5 ft	OL	<0.5	2.4	11	12
9/14/2011	6:08 PM	SBTC0025L105D	SBTC0025L105DS091411S007	2	0 - 0.7 ft	OL	<0.5	4.2	12	17
9/2/2011	**7:20 AM**	**SBTC0025L110D**	**SBTC0025L110DD090211S005**	**2**	**0 - 0.5 ft**	**OL**	**0.7**	**2.7**	**19**	**28**
9/2/2011	**7:20 AM**	**SBTC0025L110D**	**SBTC0025L110DS090211S005**	**2**	**0 - 0.5 ft**	**OL**	**0.59**	**2.8**	**19**	**26**
9/10/2011	11:25 AM	SBTC0025L110H	SBTC0025L110HS091011S010	2	0 - 1 ft	OL	<0.5	1.4	11	18
9/12/2011	4:53 PM	SBTC0025L113	SBTC0025L113S091211S004	2	0 - 0.4 ft	OL	<0.5	1.1	5.8	6
10/8/2011	**5:31 PM**	**SBTC0025L115B**	**SBTC0025L115BS100811S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**4.2**	**7.5**	**10**
10/8/2011	**5:31 PM**	**SBTC0025L115B**	**SBTC0025L115BS100811S010-SPLIT**	**2**	**0 - 1 ft**	**OL**	**0.27**	**5**	**7**	**13**
10/10/2011	**9:00 AM**	**SBTC0025L115C**	**SBTC0025L115CD101011S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**1.2**	**8.9**	**16**
10/10/2011	**9:00 AM**	**SBTC0025L115C**	**SBTC0025L115CS101011S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**1**	**8.9**	**16**
10/10/2011	2:10 PM	SBTC0025L115D	SBTC0025L115DS101011S010	2	0 - 1 ft	OL	<0.5	<1	8.8	15
10/10/2011	12:15 PM	SBTC0025L115E	SBTC0025L115ES101011S010	2	0 - 1 ft	OL	<0.5	<1	8.2	15
8/6/2011	**1:35 PM**	**SBTC0025L13**	**SBTC0025612S080611S005-split**	**2**	**0 - 0.5 ft**	**OL**	**0.51**	**4.3**	**17**	**21**
8/6/2011	**1:35 PM**	**SBTC0025L13**	**SBTC0025L13S080611S005**	**2**	**0 - 0.5 ft**	**OL**	**0.6**	**4.9**	**21**	**24**
8/20/2011	8:05 AM	SBTC0025L22	SBTC0025L22S082011S005	2	0 - 0.5 ft	OL	0.63	2.8	21	28
8/30/2011	3:21 PM	SBTC0025L30	SBTC0025L30S083011S010	2	0 - 1 ft	OL	<0.94	16	9.3	7.9
8/30/2011	1:50 PM	SBTC0025L31	SBTC0025L31S083011S015	2	0 - 1.5 ft	OL	<1.1	6.8	14	12
9/10/2011	12:09 PM	SBTC0025L45	SBTC0025L45S091011S010	2	0 - 1 ft	OL	<0.94	9.6	15	11
4/4/2014	9:55 AM	SBTC0025L506	SBTC0025L506S040414S011	2	0 - 1.1 ft	OL	<0.5	2.9	12	14
4/7/2014	8:50 AM	SBTC0025L511	SBTC0025L511S040714S005	2	0 - 0.5 ft	OL	NA	NA	NA	NA
4/7/2014	1:10 PM	SBTC0025L513	SBTC0025L513S040714S005	2	0 - 0.5 ft	OL	<0.5	2.3	7.4	8.2
4/7/2014	1:15 PM	SBTC0025L513	SBTC0025L513S040714S018	2	0.7 - 1.8 ft	OL	<0.5	1.3	12	11
4/7/2014	2:00 PM	SBTC0025L514	SBTC0025L514S040714S004	2	0 - 0.4 ft	OL	<0.5	1.9	7.2	7.7
4/7/2014	2:05 PM	SBTC0025L514	SBTC0025L514S040714S012	2	0.5 - 1.2 ft	OL	<0.5	3.9	14	15
4/8/2014	8:45 AM	SBTC0025L515	SBTC0025L515S040814S005	2	0 - 0.5 ft	OL	<0.5	2.2	8.2	9.9
4/8/2014	8:50 AM	SBTC0025L515	SBTC0025L515S040814S020	2	0.8 - 2 ft	OL	<0.5	4.9	20	10
4/8/2014	10:25 AM	SBTC0025L517	SBTC0025L517S040814S006	2	0 - 0.6 ft	OL	<0.5	1.9	6.7	6.3
10/16/2014	1:05 PM	SBTC0025L521	SBTC0025L521S101614S007	2	0 - 0.7 ft	OL	<0.5	4.3	8.3	12
10/16/2014	**1:10 PM**	**SBTC0025L521**	**SBTC0025L521D101614S025**	**2**	**0.7 - 2.5 ft**	**OL**	**<0.5**	**4.2**	**10**	**9.7**
10/16/2014	**1:10 PM**	**SBTC0025L521**	**SBTC0025L521S101614S025**	**2**	**0.7 - 2.5 ft**	**OL**	**<0.5**	**3.3**	**13**	**15**
10/8/2014	2:43 PM	SBTC0025L523	SBTC0025L523S100814S008	2	0 - 0.8 ft	OL	<0.5	13	14	22
10/14/2014	8:20 AM	SBTC0025L531	SBTC0025L531S101414S012	2	0 - 1.2 ft	OL	<0.5	3.4	9.6	12
10/4/2011	2:55 PM	SBTC0025R048	SBTC0025R048S100411S010	2	0 - 1 ft	OL	<1.1	2.3	5	6.4
8/26/2011	11:30 AM	SBTC0025R101H	SBTC0025R101HS082611S014	2	0 - 1.4 ft	OL	<0.93	<1.9	7.3	12
8/26/2011	8:45 AM	SBTC0025R101I	SBTC0025R101IS082611S022	2	0 - 2.2 ft	OL	<0.72	4.4	6.5	8.4
8/26/2011	10:20 AM	SBTC0025R101K	SBTC0025R101KS082611S019	2	0 - 1.9 ft	OL	<0.5	2.7	7.9	10
9/14/2011	**10:40 AM**	**SBTC0025R105D**	**SBTC0025R105DD091411S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**8**	**11**	**15**
9/14/2011	**10:40 AM**	**SBTC0025R105D**	**SBTC0025R105DS091411S010**	**2**	**0.2 - 1 ft**	**OL**	**<0.5**	**6.7**	**8.3**	**9.5**
9/12/2011	3:46 PM	SBTC0025R112	SBTC0025R112S091211S007	2	0 - 0.7 ft	OL	<0.5	5.2	11	12
10/4/2011	10:15 AM	SBTC0025R113	SBTC0025R113S100411S004	2	0 - 0.4 ft	OL	<0.5	4	8.4	12
10/4/2011	**11:50 AM**	**SBTC0025R116**	**SBTC0025R116S100411S010**	**2**	**0 - 1 ft**	**OL**	**<0.81**	**3.3**	**9.5**	**9.6**
10/4/2011	**11:50 AM**	**SBTC0025R116**	**SBTC0025R116S100411S010-SPLIT**	**2**	**0 - 1 ft**	**OL**	**0.44**	**3.2**	**10**	**12**
10/4/2011	**2:00 PM**	**SBTC0025R118**	**SBTC0025R118S100411S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**2.6**	**11**	**16**
10/4/2011	**2:00 PM**	**SBTC0025R118**	**SBTC0025R118S100411S010-SPLIT**	**2**	**0 - 1 ft**	**OL**	**0.35**	**3.1**	**14**	**18**
8/9/2011	11:20 AM	SBTC0025R22D	SBTC0025R22DS080911S005	2	0 - 0.5 ft	OL	<0.5	4.7	8.5	10
8/22/2011	9:15 AM	SBTC0025R40	SBTC0025R40S082211S005	2	0 - 0.5 ft	OL	<0.5	3.4	9.9	12
10/10/2014	9:00 AM	SBTC0025R585	SBTC0025R585S101014S003	2	0 - 0.3 ft	OL	<0.5	2.5	9.2	12
10/10/2014	9:50 AM	SBTC0025R586	SBTC0025R586S101014S006	2	0 - 0.6 ft	OL	<0.8	2	8.1	9.4
10/10/2014	10:35 AM	SBTC0025R587	SBTC0025R587S101014S020	2	0 - 2 ft	OL	<0.5	3.8	7.4	13
10/16/2014	3:30 PM	SBTC0025R590	SBTC0025R590S101614S016	2	0 - 1.6 ft	OL	<0.5	7.4	9.8	12
8/5/2011	8:20 AM	SBTC0050L01	SBTC0050L01S080511S005	2	0 - 0.5 ft	OL	0.68	1.8	17	38
10/5/2011	**3:52 PM**	**SBTC0050L026**	**SBTC0050L026S100511S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**4.3**	**12**	**16**
10/5/2011	**3:52 PM**	**SBTC0050L026**	**SBTC0050L026S100511S010-SPLIT**	**2**	**0 - 1 ft**	**OL**	**0.34**	**2.7**	**11**	**16**
8/5/2011	**9:25 AM**	**SBTC0050L03**	**SBTC0050L03S080511S005**	**2**	**0 - 0.5 ft**	**OL**	**<0.5**	**1.4**	**12**	**24**
8/5/2011	**9:35 AM**	**SBTC0050L03**	**SBTC0050L03S080511S005-split**	**2**	**0 - 0.5 ft**	**OL**	**0.54**	**<1**	**13**	**26**
8/29/2011	3:50 PM	SBTC0050L05A	SBTC0050L05AS082911S004	2	0 - 0.4 ft	OL	<0.5	5.5	9.6	14
8/27/2011	**3:50 PM**	**SBTC0050L05B**	**SBTC0050L05BD082711S006**	**2**	**0 - 0.6 ft**	**OL**	**<0.5**	**4.6**	**9.7**	**15**
8/27/2011	**3:50 PM**	**SBTC0050L05B**	**SBTC0050L05BS082711S006**	**2**	**0 - 0.6 ft**	**OL**	**<0.5**	**4.1**	**13**	**26**
8/8/2011	**5:50 PM**	**SBTC0050L08**	**SBTC0050L08S080811S005**	**2**	**0 - 0.5 ft**	**OL**	**0.65**	**1.5**	**15**	**35**
8/8/2011	**5:50 PM**	**SBTC0050L08**	**SBTC0050L08S080811S005-split**	**2**	**0 - 0.5 ft**	**OL**	**0.7**	**1.9**	**15**	**35**
8/8/2011	6:45 PM	SBTC0050L09	SBTC0050L09S080811S005	2	0 - 0.5 ft	OL	<0.5	1.4	12	25
8/8/2011	7:20 PM	SBTC0050L10	SBTC0050L10S080811S005	2	0 - 0.5 ft	OL	<0.5	1.4	12	25
8/29/2011	3:10 PM	SBTC0050L101A	SBTC0050L101AS082911S006	2	0 - 0.6 ft	OL	<0.5	2.3	12	20
9/1/2011	12:45 PM	SBTC0050L102E	SBTC0050L102ES090111S010	2	0 - 1 ft	OL	<0.5	5.5	11	14
9/1/2011	**1:30 PM**	**SBTC0050L102F**	**SBTC0050L102FS090111S013**	**2**	**0.8 - 1.3 ft**	**OL**	**<0.5**	**6.9**	**9.5**	**12**
9/1/2011	**1:30 PM**	**SBTC0050L102F**	**SBTC0050L102FS090111S013-split**	**2**	**0.8 - 1.3 ft**	**OL**	**0.31**	**5.4**	**12**	**14**
9/1/2011	2:30 PM	SBTC0050L104D	SBTC0050L104DS090111S010	2	0 - 1 ft	OL	<0.5	2	9	11
8/31/2011	6:00 PM	SBTC0050L104E	SBTC0050L104ES083111S005	2	0 - 0.5 ft	OL	<0.5	5.9	7.9	11
9/1/2011	1:50 PM	SBTC0050L105D	SBTC0050L105DS090111S005	2	0 - 0.5 ft	OL	<0.5	4.8	9.2	11

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
9/1/2011	3:05 PM	SBTC0050L105E	SBTC0050L105ES090111S005	2	0 - 0.5 ft	OL	<0.5	4.5	14	23
9/1/2011	4:00 PM	SBTC0050L106D	SBTC0050L106DS090111S008	2	0 - 0.85 ft	OL	<0.5	3	11	12
9/2/2011	9:55 AM	SBTC0050L108D	SBTC0050L108DS090211S007	2	0 - 0.7 ft	OL	<0.5	6	11	16
9/2/2011	9:57 AM	SBTC0050L108D	SBTC0050L108DS090211S023	2	0.7 - 2.3 ft	OL	<0.5	<1	15	16
9/2/2011	10:40 AM	SBTC0050L108E	SBTC0050L108ES090211S008	2	0 - 0.8 ft	OL	<0.5	5.9	12	17
9/2/2011	10:37 AM	SBTC0050L109D	SBTC0050L109DS090211S017	2	1.2 - 1.7 ft	OL	<0.5	<1	4.4	7.3
10/6/2011	**11:00 AM**	**SBTC0050L113**	**SBTC0050L113S100611S005**	**2**	**0 - 0.5 ft**	**OL**	**<0.5**	**2.7**	**7.9**	**11**
10/6/2011	**11:00 AM**	**SBTC0050L113**	**SBTC0050L113S100611S005-SPLIT**	**2**	**0 - 0.5 ft**	**OL**	**0.32**	**4**	**12**	**14**
10/6/2011	12:15 PM	SBTC0050L114	SBTC0050L114S100611S005	2	0 - 0.5 ft	OL	<0.5	4.2	7.8	11
10/8/2011	2:00 PM	SBTC0050L117A	SBTC0050L117AS100811S010	2	0 - 1 ft	OL	<0.5	4.9	11	13
10/8/2011	2:23 PM	SBTC0050L117B	SBTC0050L117BS100811S010	2	0 - 1 ft	OL	<0.5	3.2	8.2	10
10/5/2011	3:10 PM	SBTC0050L118	SBTC0050L118S100511S008	2	0 - 0.8 ft	OL	<0.51	5.3	11	13
8/9/2011	8:50 AM	SBTC0050L12	SBTC0050L12S080911S005	2	0 - 0.5 ft	OL	<0.5	5.8	9.1	13
10/8/2011	**3:50 PM**	**SBTC0050L120B**	**SBTC0050L120BD100811S010**	**2**	**0 - 1 ft**	**OL**	**0.56**	**1.8**	**17**	**29**
10/8/2011	**3:50 PM**	**SBTC0050L120B**	**SBTC0050L120BS100811S010**	**2**	**0 - 1 ft**	**OL**	**0.53**	**1.3**	**15**	**27**
8/29/2011	11:20 AM	SBTC0050L14C	SBTC0050L14CS082911S010	2	0 - 1 ft	OL	<0.5	1.5	14	26
8/29/2011	2:15 PM	SBTC0050L14D	SBTC0050L14DS082911S007	2	0 - 0.7 ft	OL	0.55	1.7	16	31
8/29/2011	5:30 PM	SBTC0050L19	SBTC0050L19S082911S005	2	0 - 0.5 ft	OL	<0.5	1.4	15	25
8/29/2011	1:30 PM	SBTC0050L20	SBTC0050L20S082911S013	2	0.7 - 1.3 ft	OL	<0.5	2	11	21
8/29/2011	9:10 AM	SBTC0050L21	SBTC0050L21S082911S005	2	0 - 0.5 ft	OL	<0.5	6.4	12	15
4/2/2014	3:35 PM	SBTC0050L503	SBTC0050L503S040214S006	2	0 - 0.6 ft	OL	<0.5	4.8	9.5	12
4/3/2014	**3:05 PM**	**SBTC0050L504**	**SBTC0050L504D040314S006**	**2**	**0 - 0.6 ft**	**OL**	**<0.5**	**7.5**	**8.6**	**13**
4/3/2014	**3:05 PM**	**SBTC0050L504**	**SBTC0050L504S040314S006**	**2**	**0 - 0.6 ft**	**OL**	**<0.5**	**5.8**	**7.7**	**12**
10/8/2011	1:30 PM	SBTC0050R045A	SBTC0050R045AS100811S009	2	0 - 0.9 ft	OL	<0.5	3	10	13
10/5/2011	**2:20 PM**	**SBTC0050R047**	**SBTC0050R047S100511S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**2.7**	**8.4**	**15**
10/5/2011	**2:20 PM**	**SBTC0050R047**	**SBTC0050R047S100511S010-SPLIT**	**2**	**0 - 1 ft**	**OL**	**0.31**	**2.1**	**6.7**	**14**
9/10/2011	4:34 PM	SBTC0050R08A	SBTC0050R08AS091011S010	2	0 - 1 ft	OL	<0.5	4.4	4.8	8
9/13/2011	**9:50 AM**	**SBTC0050R101E**	**SBTC0050R101ES091311S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**3**	**11**	**14**
9/13/2011	**9:50 AM**	**SBTC0050R101E**	**SBTC0050R101ES091311S010-split**	**2**	**0 - 1 ft**	**OL**	**0.35**	**4.2**	**8.2**	**13**
9/13/2011	**10:40 AM**	**SBTC0050R103B**	**SBTC0050R103BD091311S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**3.7**	**12**	**18**
9/13/2011	**10:40 AM**	**SBTC0050R103B**	**SBTC0050R103BS091311S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**2.5**	**13**	**20**
8/25/2011	**2:15 PM**	**SBTC0050R105E**	**SBTC0050R105ES082511S006**	**2**	**0 - 0.6 ft**	**OL**	**<0.5**	**3.6**	**9**	**12**
8/25/2011	**2:15 PM**	**SBTC0050R105E**	**SBTC0050R105S082511S006-split**	**2**	**0 - 0.6 ft**	**OL**	**0.28**	**1.8**	**10**	**13**
9/13/2011	3:30 PM	SBTC0050R105H	SBTC0050R105HS091311S007	2	0 - 0.7 ft	OL	<0.5	5.8	9.1	12
8/24/2011	5:20 PM	SBTC0050R106D	SBTC0050R106DS082411S005	2	0 - 0.5 ft	OL	<0.5	2.9	11	15
8/24/2011	3:30 PM	SBTC0050R106E	SBTC0050R106ES082411S005	2	0 - 0.5 ft	OL	<0.5	2.3	10	14
8/27/2011	5:40 PM	SBTC0050R10A	SBTC0050R10AS082711S008	2	0 - 0.8 ft	OL	<0.5	4.6	12	18
8/27/2011	6:05 PM	SBTC0050R10B	SBTC0050R10BS082711S015	2	1 - 1.5 ft	OL	0.55	4.2	17	27
9/14/2011	7:56 AM	SBTC0050R110H	SBTC0050R110HS091411S005	2	0 - 0.5 ft	OL	<0.5	2.4	12	19
10/4/2011	6:15 PM	SBTC0050R117	SBTC0050R117S100411S010	2	0 - 1 ft	OL	<0.54	5.9	10	12
10/4/2011	**6:00 PM**	**SBTC0050R118**	**SBTC0050R118S100411S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**2.1**	**9.2**	**16**
10/4/2011	**6:00 PM**	**SBTC0050R118**	**SBTC0050R118S100411S010-SPLIT**	**2**	**0 - 1 ft**	**OL**	**0.34**	**2.6**	**12**	**19**
10/5/2011	8:12 AM	SBTC0050R119	SBTC0050R119S100511S004	2	0 - 0.4 ft	OL	<0.5	3.4	6.2	8.1
8/25/2011	5:50 PM	SBTC0050R11C	SBTC0050R11CS082511S004	2	0 - 0.4 ft	OL	<0.5	3.7	9.7	14
10/5/2011	9:08 AM	SBTC0050R121	SBTC0050R121S100511S010	2	0 - 1 ft	OL	<0.5	2.2	6.5	11
10/5/2011	1:40 PM	SBTC0050R125	SBTC0050R125S100511S004	2	0 - 0.4 ft	OL	<0.5	3.6	10	11
8/24/2011	**8:50 AM**	**SBTC0050R13**	**SBTC0050R13S082411S005**	**2**	**0 - 0.5 ft**	**OL**	**<0.5**	**4**	**12**	**17**
8/24/2011	**8:50 AM**	**SBTC0050R13**	**SBTC0050R13S082411S005-split**	**2**	**0 - 0.5 ft**	**OL**	**0.37**	**4.7**	**13**	**18**
8/23/2011	9:15 AM	SBTC0050R16	SBTC0050R16S082311S005	2	0 - 0.5 ft	OL	<0.5	3.3	6.8	8.8
8/23/2011	11:55 AM	SBTC0050R19	SBTC0050R19S082311S005	2	0 - 0.5 ft	OL	0.7	17	14	25
8/23/2011	**2:10 PM**	**SBTC0050R20**	**SBTC0050R07S082311S005-split**	**2**	**0 - 0.5 ft**	**OL**	**0.54**	**<1**	**11**	**20**
8/23/2011	**2:10 PM**	**SBTC0050R20**	**SBTC0050R20S082311S005**	**2**	**0 - 0.5 ft**	**OL**	**0.55**	**1.7**	**11**	**23**
8/23/2011	2:45 PM	SBTC0050R21	SBTC0050R21S082311S005	2	0 - 0.5 ft	OL	0.59	1.7	15	28
8/23/2011	6:00 PM	SBTC0050R24	SBTC0050R24S082311S005	2	0 - 0.5 ft	OL	<0.5	<1	13	26
8/24/2011	7:45 AM	SBTC0050R25	SBTC0050R25S082411S005	2	0 - 0.5 ft	OL	<0.5	4.2	11	15
4/3/2014	10:40 AM	SBTC0050R503	SBTC0050R503S040314S013	2	1 - 1.3 ft	OL	<0.5	2.9	8.8	11
4/4/2014	10:40 AM	SBTC0050R506	SBTC0050R506S040414S011	2	0.3 - 1.1 ft	OL	<0.5	2.9	13	18
10/16/2014	8:45 AM	SBTC0050R523	SBTC0050R523S101614S014	2	0 - 1.4 ft	OL	<0.5	2.3	4.8	5.8
10/16/2014	10:25 AM	SBTC0050R525	SBTC0050R525S101614S006	2	0 - 0.6 ft	OL	<0.5	2.6	13	14
8/26/2011	2:45 PM	SBTC0025L102Y	SBTC0025L102YS082611S010	2	0 - 1 ft	PT	<0.92	2.2	13	16
10/7/2011	5:47 PM	SBTC0025L116	SBTC0025L116S100711S010	2	0 - 1 ft	PT	<1.2	20	27	21
4/7/2014	9:30 AM	SBTC0025R564	SBTC0025R564S040714S007	2	0 - 0.7 ft	PT	<0.58	2.8	13	16
4/7/2014	9:35 AM	SBTC0025R564	SBTC0025R564S040714S016	2	0.8 - 1.6 ft	PT	<1.2	5.4	8.4	8.1
4/7/2014	2:40 PM	SBTC0025R566	SBTC0025R566S040714S005	2	0 - 0.5 ft	PT	<0.5	4.9	9.2	11
4/10/2014	1:20 PM	SBTC0025R569	SBTC0025R569S041014S013	2	0.5 - 1.3 ft	SM	<0.5	<1	7.8	21
4/10/2014	1:25 PM	SBTC0025R569	SBTC0025R569S041014S020	2	1.5 - 2 ft	SM	<0.5	<1	6.9	20
4/10/2014	10:50 AM	SBTC0025R570	SBTC0025R570S041014S010	2	0 - 1 ft	SM	<0.5	<1	5.8	14
4/11/2014	9:00 AM	SBTC0025R573	SBTC0025R573S041114S020	2	0 - 2 ft	SM	<0.5	<1	5.2	11
4/11/2014	**10:05 AM**	**SBTC0025R574**	**SBTC0025R574D041114S020**	**2**	**0 - 2 ft**	**SM**	**<0.5**	**<1**	**5.1**	**10**

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
4/11/2014	**10:05 AM**	**SBTC0025R574**	**SBTC0025R574S041114S020**	**2**	**0 - 2 ft**	**SM**	**<0.5**	**1.1**	**7.6**	**13**
4/11/2014	11:10 AM	SBTC0025R575	SBTC0025R575S041114S017	2	0 - 1.7 ft	SM	<0.5	<1	5.7	11
4/11/2014	1:00 PM	SBTC0025R576	SBTC0025R576S041114S017	2	0 - 1.7 ft	SM	<0.5	1.2	8.2	19
10/7/2014	1:52 PM	SBTC0025R578	SBTC0025R578S100714S015	2	0.9 - 1.5 ft	SM	<0.5	<1	6.2	14
10/7/2014	2:58 PM	SBTC0025R579	SBTC0025R579S100714S010	2	0 - 1 ft	SM	<0.5	<1	4.5	13
9/1/2011	**5:42 PM**	**SBTC0050L106F**	**SBTC0050L106FS090111S022**	**2**	**1.7 - 2.2 ft**	**SM**	**<0.5**	**1.2**	**10**	**16**
9/1/2011	**5:42 PM**	**SBTC0050L106F**	**SBTC0050L106FS090111S022-split**	**2**	**1.7 - 2.2 ft**	**SM**	**0.43**	**2.7**	**19**	**28**
9/13/2011	**5:17 PM**	**SBTC0050R107I**	**SBTC0050R107ID091311S015**	**2**	**0.5 - 1.5 ft**	**SM**	**<0.5**	**1.5**	**14**	**18**
9/13/2011	**5:17 PM**	**SBTC0050R107I**	**SBTC0050R107IS091311S015**	**2**	**0.9 - 1.5 ft**	**SM**	**<0.5**	**1.3**	**8.7**	**13**
9/13/2011	**5:17 PM**	**SBTC0050R107I**	**SBTC0050R107IS091311S015-split**	**2**	**0.9 - 1.5 ft**	**SM**	**0.33**	**<1**	**15**	**17**
10/4/2011	5:25 PM	SBTC0050R116	SBTC0050R116S100411S010	2	0 - 1 ft	SM	<0.5	<1	7.8	14
4/10/2014	**8:35 AM**	**SBTC0050R513**	**SBTC0050R513D041014S012**	**2**	**0 - 1.2 ft**	**SM**	**<0.5**	**<1**	**6.4**	**16**
4/10/2014	**8:35 AM**	**SBTC0050R513**	**SBTC0050R513S041014S012**	**2**	**0 - 1.2 ft**	**SM**	**<0.5**	**<1**	**6.8**	**17**
4/10/2014	8:40 AM	SBTC0050R513	SBTC0050R513S041014S020	2	1.4 - 2 ft	SM	<0.5	<1	8.8	23
10/17/2014	7:55 AM	SBTC0050R515	SBTC0050R515S101714S016	2	0.65 - 1.6 ft	SM	<0.5	<1	3.9	11
10/8/2014	9:05 AM	SBTC0050R516	SBTC0050R516S100814S005	2	0 - 0.5 ft	SM	<0.5	<1	6.5	15
8/30/2011	4:30 PM	SBTC0025L32	SBTC0025L32S083011S004	2	0 - 0.4 ft	SP	<0.5	<1	14	11
4/10/2014	1:20 PM	SBTC0025R569	SBTC0025R569S041014S013	2	0.5 - 1.3 ft	SP	<0.5	<1	7.8	21
4/10/2014	1:25 PM	SBTC0025R569	SBTC0025R569S041014S020	2	1.5 - 2 ft	SP	<0.5	<1	6.9	20
4/10/2014	10:50 AM	SBTC0025R570	SBTC0025R570S041014S010	2	0 - 1 ft	SP	<0.5	<1	5.8	14
4/11/2014	9:00 AM	SBTC0025R573	SBTC0025R573S041114S020	2	0 - 2 ft	SP	<0.5	<1	5.2	11
4/11/2014	**10:05 AM**	**SBTC0025R574**	**SBTC0025R574D041114S020**	**2**	**0 - 2 ft**	**SP**	**<0.5**	**<1**	**5.1**	**10**
4/11/2014	**10:05 AM**	**SBTC0025R574**	**SBTC0025R574S041114S020**	**2**	**0 - 2 ft**	**SP**	**<0.5**	**1.1**	**7.6**	**13**
4/11/2014	11:10 AM	SBTC0025R575	SBTC0025R575S041114S017	2	0 - 1.7 ft	SP	<0.5	<1	5.7	11
4/11/2014	1:00 PM	SBTC0025R576	SBTC0025R576S041114S017	2	0 - 1.7 ft	SP	<0.5	1.2	8.2	19
10/7/2014	12:55 PM	SBTC0025R577	SBTC0025R577S100714S032	2	2.2 - 3.2 ft	SP	<0.5	3.9	10	16
8/29/2011	**9:12 AM**	**SBTC0050L21**	**SBTC0050L21S082911S017**	**2**	**1.2 - 1.7 ft**	**SP**	**<0.5**	**2.8**	**10**	**15**
8/29/2011	**9:12 AM**	**SBTC0050L21**	**SBTC0050L21S082911S017-split**	**2**	**1.2 - 1.7 ft**	**SP**	**0.25**	**1.3**	**10**	**12**
8/25/2011	**1:20 PM**	**SBTC0050R107F**	**SBTC0050R107FD082511S006**	**2**	**0 - 0.6 ft**	**SP**	**<0.5**	**1.1**	**7.8**	**10**
8/25/2011	**1:20 PM**	**SBTC0050R107F**	**SBTC0050R107FS082511S006**	**2**	**0 - 0.6 ft**	**SP**	**<0.5**	**1.3**	**11**	**9.5**
4/9/2014	1:15 PM	SBTC0050R511	SBTC0050R511S040914S020	2	1.3 - 2 ft	SP	<0.5	<1	6.7	15
4/10/2014	**8:35 AM**	**SBTC0050R513**	**SBTC0050R513D041014S012**	**2**	**0 - 1.2 ft**	**SP**	**<0.5**	**<1**	**6.4**	**16**
4/10/2014	**8:35 AM**	**SBTC0050R513**	**SBTC0050R513S041014S012**	**2**	**0 - 1.2 ft**	**SP**	**<0.5**	**<1**	**6.8**	**17**
4/10/2014	8:40 AM	SBTC0050R513	SBTC0050R513S041014S020	2	1.4 - 2 ft	SP	<0.5	<1	8.8	23
10/8/2014	**10:20 AM**	**SBTC0050R517**	**SBTC0050R517D100814S016**	**2**	**0 - 1.6 ft**	**SP**	**<0.5**	**<1**	**8.6**	**17**
10/8/2014	**10:20 AM**	**SBTC0050R517**	**SBTC0050R517S100814S016**	**2**	**0 - 1.6 ft**	**SP**	**<0.5**	**<1**	**5.9**	**12**
10/8/2014	10:25 AM	SBTC0050R517	SBTC0050R517S100814S025	2	2 - 2.5 ft	SP	<0.5	<1	12	14
9/12/2011	10:30 AM	SBTC0025R109	SBTC0025R109S091211S007	2	0 - 0.7 ft	SW	<0.5	1.3	5.6	9.3
9/12/2011	12:08 PM	SBTC0025R110	SBTC0025R110S091211S012	2	0 - 1.2 ft	SW	<0.5	1.7	5.5	5.2
9/12/2011	1:46 PM	SBTC0025R111	SBTC0025R111S091211S008	2	0 - 0.8 ft	SW	<0.5	1.2	9.1	9.4
10/15/2014	10:20 AM	SBTC0025R591	SBTC0025R591S101514S019	2	1.6 - 1.9 ft	SW	<0.5	<1	7.6	16
9/1/2011	**4:02 PM**	**SBTC0050L106D**	**SBTC0050L106DS090111S024**	**2**	**1.8 - 2.4 ft**	**SW**	**<0.5**	**1.5**	**12**	**22**
9/1/2011	**4:02 PM**	**SBTC0050L106D**	**SBTC0050L106DS090111S024-split**	**2**	**1.8 - 2.4 ft**	**SW**	**0.23**	**<1**	**12**	**18**
9/1/2011	**5:42 PM**	**SBTC0050L106F**	**SBTC0050L106FS090111S022**	**2**	**1.7 - 2.2 ft**	**SW**	**<0.5**	**1.2**	**10**	**16**
9/1/2011	**5:42 PM**	**SBTC0050L106F**	**SBTC0050L106FS090111S022-split**	**2**	**1.7 - 2.2 ft**	**SW**	**0.43**	**2.7**	**19**	**28**
11/11/2011	**14:00 PM**	**ESTC0050L056**	**ESTC0050L056S111111S015**	**2**	**1.5 - 1.5 ft**	**Unknown**	**<0.5**	**1.5**	**5.9**	**9.2**
11/11/2011	**14:00 PM**	**ESTC0050L056**	**ESTC0050L056S111111S015-SPLIT**	**2**	**1.5 - 1.5 ft**	**Unknown**	**0.22**	**2.1**	**7**	**11**
11/15/2011	12:46 PM	ESTC0050L066	ESTC0050L066S111511S015	2	1.5 - 1.5 ft	Unknown	<0.5	4	6.7	11
11/16/2011	11:25 AM	ESTC0050L069	ESTC0050L069S111611S015	2	1.5 - 1.5 ft	Unknown	<0.5	2.7	9.2	12
11/16/2011	11:33 AM	ESTC0050L070	ESTC0050L070S111611S015	2	1.5 - 1.5 ft	Unknown	<0.5	1.8	14	25
11/16/2011	12:08 PM	ESTC0050L071	ESTC0050L071S111611S015	2	1.5 - 1.5 ft	Unknown	<0.5	5.3	12	14
11/16/2011	12:16 PM	ESTC0050L072	ESTC0050L072S111611S025	2	2.5 - 2.5 ft	Unknown	<0.5	<1	12	27
11/16/2011	**12:31 PM**	**ESTC0050L073**	**ESTC0050L073S111611S025**	**2**	**2.5 - 2.5 ft**	**Unknown**	**<0.5**	**<1**	**12**	**23**
11/16/2011	**12:31 PM**	**ESTC0050L073**	**ESTC0050L073S111611S025-SPLIT**	**2**	**2.5 - 2.5 ft**	**Unknown**	**0.6**	**<1**	**15**	**26**
11/16/2011	12:51 PM	ESTC0050L074	ESTC0050L074S111611S015	2	1.5 - 1.5 ft	Unknown	<0.5	1.5	7.8	14
11/18/2011	**19:31 AM**	**ESTC0050L090**	**ESTC0050L090S111811S015**	**2**	**1.5 - 1.5 ft**	**Unknown**	**0.52**	**<1**	**11**	**15**
11/18/2011	**19:31 AM**	**ESTC0050L090**	**ESTC0050L090S111811S015-SPLIT**	**2**	**1.5 - 1.5 ft**	**Unknown**	**0.5**	**<1**	**15**	**24**
11/19/2011	19:59 AM	ESTC0050L101	ESTC0050L101S111911S015	2	1.5 - 1.5 ft	Unknown	0.78	1.7	15	32
11/16/2011	**18:59 AM**	**ESTC0050R073**	**ESTC0050R073D111611S010**	**2**	**1 - 1 ft**	**Unknown**	**<0.5**	**9.3**	**8.1**	**14**
11/16/2011	**18:59 AM**	**ESTC0050R073**	**ESTC0050R073S111611S010**	**2**	**1 - 1 ft**	**Unknown**	**<0.52**	**6.9**	**8.3**	**13**
11/16/2011	12:23 PM	ESTC0050R077	ESTC0050R077S111611S010	2	1 - 1 ft	Unknown	<0.5	2.8	7.7	11
11/17/2011	19:53 AM	ESTC0050R087	ESTC0050R087S111711S015	2	1.5 - 1.5 ft	Unknown	<0.84	3.3	18	24
11/17/2011	11:55 AM	ESTC0050R089	ESTC0050R089S111711S010	2	1 - 1 ft	Unknown	<0.5	3	9.3	13
11/17/2011	11:59 AM	ESTC0050R090	ESTC0050R090S111711S015	2	1.5 - 1.5 ft	Unknown	<0.5	1.7	9.4	13
11/18/2011	11:59 AM	ESTC0050R099	ESTC0050R099S111811S015	2	1.5 - 1.5 ft	Unknown	<0.5	3.2	3.4	4.3
11/22/2011	**10:36 AM**	**ESTC0050R112**	**ESTC0050R112S112211S010**	**2**	**1 - 1 ft**	**Unknown**	**<0.5**	**2.7**	**14**	**23**
11/22/2011	**10:36 AM**	**ESTC0050R112**	**ESTC0050R112S112211S010-SPLIT**	**2**	**1 - 1 ft**	**Unknown**	**0.38**	**4**	**13**	**16**
11/22/2011	10:45 AM	ESTC0050R113	ESTC0050R113S112211S015	2	1.5 - 1.5 ft	Unknown	<0.5	<1	16	27
10/15/2010	4:18 PM	PE-1C10151618	SO1C10151618MJM1	2	0 - 0.5 ft	Unknown	NA	<1	5.9	16

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
10/18/2010	**4:00 PM**	**SBSA0051**	**SA-SB0051-101810-0.5S**	**2**	**0.5 - 1 ft**	**Unknown**	**<0.5**	**1.8**	**NA**	**11**
10/18/2010	**4:00 PM**	**SBSA0051**	**SA-SB0051-101810-0.5T**	**2**	**0.5 - 1 ft**	**Unknown**	**<0.5**	**2.3**	**NA**	**8.5**
10/18/2010	**4:00 PM**	**SBSA0051**	**TG50051-(0.5-1.0) SAMPLE SPLIT**	**2**	**0.5 - 1 ft**	**Unknown**	**NA**	**NA**	**6.8**	**6.4**
10/15/2010	6:00 PM	SO1A	SO1A10151800MJM1	2	0 - 0.5 ft	Unknown	NA	<1	5.5	14
10/15/2010	6:10 PM	SO1B	SO1B10151810MJM1	2	0 - 0.5 ft	Unknown	NA	<1	5.5	10
11/18/2010	**11:35 AM**	**SO1E**	**A-CELL1-1E- SAMPLESPL IT-EVW**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**NA**	**5.2**	**14**
10/15/2010	**3:45 PM**	**SO1F**	**EOS-CELL1-1F-SAMPLE SPLIT-KC**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**NA**	**4.1**	**11**
10/15/2010	**3:45 PM**	**SO1F**	**SO1F10151545MJM1**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**<1**	**7.7**	**32**
10/15/2010	3:35 PM	SO1G	SO1G10151535MJM1	2	0 - 0.5 ft	Unknown	NA	<1	6	17
10/15/2010	5:45 PM	SO1H	SO1H10151745MJM1	2	0 - 0.5 ft	Unknown	NA	<1	6	17
10/15/2010	4:30 PM	SO1I	SO1I10151630MJM1	2	0 - 0.5 ft	Unknown	NA	<1	6.9	20
10/15/2010	5:30 PM	SO1J	SO1J10151730MJM1	2	0 - 0.5 ft	Unknown	NA	<1	8.8	22
10/15/2010	3:20 PM	SO1N	SO1N10151520MJM1	2	0 - 0.5 ft	Unknown	NA	3.1	14	15
10/15/2010	2:00 PM	SO2Y	SO2Y10151400MSM1	2	0 - 0.5 ft	Unknown	NA	<1	4	12
10/16/2010	6:45 PM	SO3A	SO3A10161845JPM1	2	0 - 0.5 ft	Unknown	NA	<2.5	16	19
10/16/2010	7:05 PM	SO3B	SO3B10161905JPM1	2	0 - 0.5 ft	Unknown	NA	<2.9	5.6	16
10/16/2010	**4:40 PM**	**SO3E**	**SO3E10161640JPM1**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**<1**	**11**	**28**
10/16/2010	**4:40 PM**	**SO3E**	**SO3E10161640JPM2**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**1.2**	**11**	**25**
10/16/2010	5:15 PM	SO3F	SO3F10161715JPM1	2	0 - 0.5 ft	Unknown	NA	<1	17	32
11/18/2010	**11:20 AM**	**SO3H**	**A-CELL3-3H- SAMPLESPL IT-EVW**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**NA**	**5.9**	**14**
10/16/2010	5:35 PM	SO3I	SO3I10161735JPM1	2	0 - 0.5 ft	Unknown	NA	<1	12	21
10/16/2010	5:45 PM	SO3J	SO3J10161745JPM1	2	0 - 0.5 ft	Unknown	NA	<3	9.3	19
10/16/2010	4:20 PM	SO3K	SO3K10161620JPM1	2	0 - 0.5 ft	Unknown	NA	<1	34	34
10/16/2010	6:00 PM	SO3L	SO3L10161800JPM1	2	0 - 0.5 ft	Unknown	NA	<2.7	13	16
11/4/2010	3:00 PM	SO5A	SO5A11041500CGO1	2	0 - 0.5 ft	Unknown	NA	1.3	13	13
11/20/2010	**2:00 PM**	**SO6A**	**SO6A1120101400TMR1**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**NA**	**7.3**
11/20/2010	**2:00 PM**	**SO6A**	**SO6A1120101400TMR2**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**NA**	**10**
11/20/2010	2:13 PM	SO6B	SO6B1120101413TMR1	2	0 - 0.5 ft	Unknown	<0.5	<1	NA	11
11/20/2010	**3:01 PM**	**SO6G**	**SO6G1120101501TMR1**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**NA**	**15**
11/20/2010	**3:01 PM**	**SO6G**	**YDA-CELL6-6G-SS- SAMPLESPLI T-KC**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**NA**	**4.3**	**15**
10/13/2010	8:10 AM	SO7A	SO7A10130810RWS1	2	0 - 0.5 ft	Unknown	NA	<1	8.5	15
10/13/2010	8:20 AM	SO7B	SO7B10130820RWS1	2	0 - 0.5 ft	Unknown	NA	<1	12	28
10/13/2010	8:30 AM	SO7C	SO7C10130830RWS1	2	0 - 0.5 ft	Unknown	NA	<1	5.8	17
10/13/2010	**8:40 AM**	**SO7D**	**SO7D10130840RWS1**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**1.1**	**14**	**30**
10/13/2010	**8:40 AM**	**SO7D**	**SO7D10130840RWS2**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**<1**	**12**	**21**
10/20/2010	1:50 PM	SO8A	SO8A10201350DUP1	2	0 - 0.5 ft	Unknown	NA	<1	6.2	12
10/20/2010	1:55 PM	SO8B	SO8B10201355DUP1	2	0 - 0.5 ft	Unknown	NA	<1	5.4	11
10/20/2010	1:15 PM	SO8D	SO8D10201315DUP1	2	0 - 0.5 ft	Unknown	NA	1	5	11
10/20/2010	1:20 PM	SO8G	SO8G10201320DUP1	2	0 - 0.5 ft	Unknown	NA	1.1	6.4	16
10/20/2010	2:10 PM	SO8M	SO8M10201410DUP1	2	0 - 0.5 ft	Unknown	NA	<1.1	4.3	11
12/8/2010	**12:22 PM**	**SOOMA**	**SOOMA1208101222TMR1**	**2**	**0 - 0 ft**	**Unknown**	**<0.5**	**<1**	**NA**	**11**
12/8/2010	**12:22 PM**	**SOOMA**	**SOOMA1208101222TMR2**	**2**	**0 - 0 ft**	**Unknown**	**<0.5**	**<1**	**NA**	**12**
12/8/2010	12:33 PM	SOOMB	SOOMB1208101233TMR1	2	0 - 0 ft	Unknown	<0.5	<1	NA	13
12/8/2010	**12:44 PM**	**SOOMC**	**A-OMC-0.5- SAMPLE SPLIT-EVW**	**2**	**0 - 0 ft**	**Unknown**	**NA**	**NA**	**3.8**	**13**
12/8/2010	**12:44 PM**	**SOOMC**	**SOOMC1208101244TMR1**	**2**	**0 - 0 ft**	**Unknown**	**<0.5**	**<1**	**NA**	**10**
12/8/2010	12:56 PM	SOOMD	SOOMD1208101256TMR1	2	0 - 0 ft	Unknown	<0.5	1.2	NA	32
6/1/2011	3:29 PM	SSSYA2C	SSSYA2CS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	14	26
6/1/2011	**3:34 PM**	**SSSYA2D**	**SSSYA2DD060111SX**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**9.8**	**19**
6/1/2011	**3:34 PM**	**SSSYA2D**	**SSSYA2DS060111SX**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**9.4**	**18**
6/1/2011	3:43 PM	SSSYA2E	SSSYA2ES060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	5.7	13
6/1/2011	2:19 PM	SSSYA2I	SSSYA2IS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	6.7	16
6/1/2011	2:05 PM	SSSYA2J	SSSYA2JS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	5.9	11
6/1/2011	**1:57 PM**	**SSSYA2K**	**SSSYA2KS060111SX**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**6.1**	**11**
6/1/2011	**1:57 PM**	**SSSYA2K**	**SSSYA2KS060111SX- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.3**	**<1**	**7.2**	**17**
6/1/2011	2:11 PM	SSSYA2M	SSSYA2MS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	5.7	12
6/1/2011	**1:40 PM**	**SSSYA2N**	**SSSYA2ND060111SX**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**8.8**	**15**
6/1/2011	**1:40 PM**	**SSSYA2N**	**SSSYA2NS060111SX**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**6.8**	**12**
6/1/2011	1:15 PM	SSSYA2O	SSSYA2OS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	9.6	16
6/1/2011	1:30 PM	SSSYA2P	SSSYA2PS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	8	17
6/13/2011	**3:40 PM**	**SSSYA2S**	**SSSYA2SR061311S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.25**	**<1**	**7.7**	**14**
6/13/2011	**3:00 PM**	**SSSYA2X**	**SSSYA2XR061311S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.55**	**<1**	**14**	**17**
6/1/2011	**2:23 PM**	**SSSYA2Y**	**SSSYA2YS060111SX**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**18**	**21**
6/1/2011	**2:23 PM**	**SSSYA2Y**	**SSSYA2YS060111SX- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.48**	**<1**	**14**	**19**
7/12/2011	**9:15 AM**	**SSSYA4A**	**SSSYA4AD071211S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**8**	**13**
7/12/2011	**9:15 AM**	**SSSYA4A**	**SSSYA4AS071211S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**8.8**	**14**
7/12/2011	3:50 PM	SSSYA4AA	SSSYA4AAS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	11	19
7/12/2011	9:25 AM	SSSYA4B	SSSYA4BS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	12	20
7/12/2011	9:45 AM	SSSYA4C	SSSYA4CS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	7.1	11
7/12/2011	9:35 AM	SSSYA4D	SSSYA4DS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	9.8	14

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
7/12/2011	1:30 PM	SSSYA4E	SSSYA4ES071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	13	15
7/12/2011	**9:55 AM**	**SSSYA4F**	**SSSYA4FS071211S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**9.9**	**15**
7/12/2011	**9:55 AM**	**SSSYA4F**	**SSSYA4FS071211S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.2**	**<1**	**9**	**16**
7/12/2011	12:40 PM	SSSYA4G	SSSYA4GS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	12	15
7/12/2011	1:20 PM	SSSYA4I	SSSYA4IS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	13	28
7/12/2011	10:05 AM	SSSYA4J	SSSYA4JS071211S005	2	0 - 0.5 ft	Unknown	<0.5	1.1	13	17
7/12/2011	**10:50 AM**	**SSSYA4K**	**SSSYA4KS071211S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**15**	**20**
7/12/2011	**10:50 AM**	**SSSYA4K**	**SSSYA4KS071211S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.2**	**<1**	**8.9**	**17**
7/12/2011	11:00 AM	SSSYA4L	SSSYA4LS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	16	18
7/12/2011	12:55 PM	SSSYA4M	SSSYA4MS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	8.2	16
7/12/2011	**1:10 PM**	**SSSYA4N**	**SSSYA4NS071211S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**12**	**15**
7/12/2011	**1:10 PM**	**SSSYA4N**	**SSSYA4NS071211S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.2**	**<1**	**9.2**	**16**
7/12/2011	1:40 PM	SSSYA4O	SSSYA4OS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	9.1	18
7/12/2011	1:50 PM	SSSYA4P	SSSYA4PS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	7.7	15
7/12/2011	2:10 PM	SSSYA4Q	SSSYA4QS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	8.5	13
7/12/2011	**2:20 PM**	**SSSYA4R**	**SSSYA4RS071211S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**12**	**8.9**
7/12/2011	**2:20 PM**	**SSSYA4R**	**SSSYA4RS071211S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.2**	**<1**	**11**	**7.7**
7/12/2011	2:30 PM	SSSYA4S	SSSYA4SS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	11	9.3
7/12/2011	2:40 PM	SSSYA4T	SSSYA4TS071211S005	2	0 - 0.5 ft	Unknown	<0.5	1.4	18	19
7/12/2011	**2:50 PM**	**SSSYA4U**	**SSSYA4UD071211S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**25**	**20**
7/12/2011	**2:50 PM**	**SSSYA4U**	**SSSYA4US071211S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**15**	**18**
7/12/2011	3:00 PM	SSSYA4V	SSSYA4VS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	11	20
7/12/2011	3:10 PM	SSSYA4W	SSSYA4WS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	6.6	12
7/12/2011	**3:20 PM**	**SSSYA4X**	**SSSYA4XS071211S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**9.3**	**13**
7/12/2011	**3:20 PM**	**SSSYA4X**	**SSSYA4XS071211S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.2**	**<1**	**5.6**	**11**
7/12/2011	3:30 PM	SSSYA4Y	SSSYA4YS071211S005	2	0 - 0.5 ft	Unknown	<0.5	<1	5.7	12
7/12/2011	3:40 PM	SSSYA4Z	SSSYA4ZS071211S005	2	0 - 0.5 ft	Unknown	0.55	1.1	22	26
6/30/2011	**9:10 AM**	**SSSYA5A**	**SSSYA5AD063011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**5.7**	**14**
6/30/2011	**9:10 AM**	**SSSYA5A**	**SSSYA5AS063011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**7.4**	**18**
6/30/2011	9:40 AM	SSSYA5B	SSSYA5BS063011S005	2	0 - 0.5 ft	Unknown	<0.87	<1	17	16
6/30/2011	10:00 AM	SSSYA5C	SSSYA5CS063011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	8	19
6/30/2011	**10:10 AM**	**SSSYA5D**	**SSSYA5DS063011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**17**	**17**
6/30/2011	**10:10 AM**	**SSSYA5D**	**SSSYA5DS063011S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.39**	**<1**	**15**	**19**
6/30/2011	10:30 AM	SSSYA5E	SSSYA5ES063011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	11	8.9
6/30/2011	10:45 AM	SSSYA5F	SSSYA5FS063011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	12	13
6/30/2011	10:55 AM	SSSYA5G	SSSYA5GS063011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	15	15
6/30/2011	11:05 AM	SSSYA5H	SSSYA5HS063011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	4.8	13
6/30/2011	11:20 AM	SSSYA5I	SSSYA5IS063011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	7	11
6/30/2011	**11:35 AM**	**SSSYA5J**	**SSSYA5JS063011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**11**	**15**
6/30/2011	**11:35 AM**	**SSSYA5J**	**SSSYA5JS063011S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.3**	**<1**	**11**	**16**
6/30/2011	1:00 PM	SSSYA5K	SSSYA5KS063011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	9.2	14
6/30/2011	1:15 PM	SSSYA5L	SSSYA5LS063011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	5.7	10
6/30/2011	1:25 PM	SSSYA5M	SSSYA5MS063011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	9.5	21
5/20/2011	**3:00 PM**	**SSSYAA1**	**SSSYAA1S052011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**5.7**	**9.2**
5/20/2011	**3:00 PM**	**SSSYAA1**	**SSSYAA1S052011S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.2**	**<1**	**5.5**	**8.2**
7/14/2011	10:15 AM	SSSYAA2	SSSYAA2S071411S005	2	0 - 0.5 ft	Unknown	<0.5	<1	3.7	8.6
7/14/2011	**10:00 AM**	**SSSYAA3**	**SSSYAA3S071411S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**6**	**13**
7/14/2011	**10:00 AM**	**SSSYAA3**	**SSSYAA3S071411S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.22**	**<1**	**6.9**	**14**
7/14/2011	9:55 AM	SSSYAA4	SSSYAA4S071411S005	2	0 - 0.5 ft	Unknown	<0.5	<1	5.8	12
7/14/2011	9:45 AM	SSSYAA5	SSSYAA5S071411S005	2	0 - 0.5 ft	Unknown	<0.5	<1	6	10
7/14/2011	**9:15 AM**	**SSSYAA7**	**SSSYAA7D071411S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**5.7**	**11**
7/14/2011	**9:15 AM**	**SSSYAA7**	**SSSYAA7S071411S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**5.1**	**9.6**
7/14/2011	10:25 AM	SSSYAB1	SSSYAB1S071411S005	2	0 - 0.5 ft	Unknown	<0.5	<1	4.8	8.7
5/20/2011	2:30 PM	SSSYAB3	SSSYAB3S052011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	9.1	15
7/14/2011	**10:35 AM**	**SSSYAC1**	**SSSYAC1S071411S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**6.7**	**12**
7/14/2011	**10:35 AM**	**SSSYAC1**	**SSSYAC1S071411S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.22**	**<1**	**10**	**13**
7/14/2011	10:50 AM	SSSYAC4	SSSYAC4S071411S005	2	0 - 0.5 ft	Unknown	<0.5	<1	3.8	9.3
7/14/2011	10:55 AM	SSSYAC5	SSSYAC5S071411S005	2	0 - 0.5 ft	Unknown	<0.5	<1	3.8	8.2
5/20/2011	2:40 PM	SSSYAD2	SSSYAD2S052011S005	2	0 - 0.5 ft	Unknown	<0.5	1.7	13	31
5/20/2011	**2:25 PM**	**SSSYAD3**	**SSSYAD3S052011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**8**	**16**
5/20/2011	**2:25 PM**	**SSSYAD3**	**SSSYAD3S052011S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.24**	**<1**	**8.4**	**16**
7/14/2011	11:15 AM	SSSYAD4	SSSYAD4S071411S005	2	0 - 0.5 ft	Unknown	<0.5	1.3	8.8	15
5/20/2011	1:50 PM	SSSYAD5	SSSYAD5S052011S005	2	0 - 0.5 ft	Unknown	<0.5	3.2	12	14
5/19/2011	10:20 AM	SSSYADA0100001	SSSYADA0100001S051911S005	2	0 - 0.5 ft	Unknown	<0.5	<1	5.1	12
5/19/2011	10:40 AM	SSSYADA0200002	SSSYADA0200002S051911S005	2	0 - 0.5 ft	Unknown	<0.5	<1	4.8	12
5/19/2011	10:50 AM	SSSYADA0300003	SSSYADA0300003S051911S005	2	0 - 0.5 ft	Unknown	<0.5	<1	4.7	11
5/19/2011	11:00 AM	SSSYADA0400004	SSSYADA0400004S051911S005	2	0 - 0.5 ft	Unknown	<0.5	<1	5.7	16
5/19/2011	**11:15 AM**	**SSSYADA0500005**	**SSSYADA0500005S051911S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**5.4**	**14**
5/19/2011	**11:15 AM**	**SSSYADA0500005**	**SSYAD0500005S051911S005-split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.22**	**<1**	**6.4**	**12**

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
5/19/2011	11:25 AM	SSSYADA0600006	SSSYADA0600006S051911S005	2	0 - 0.5 ft	Unknown	<0.5	<1	5.3	12
5/19/2011	11:35 AM	SSSYADA0700007	SSSYADA0700007S051911S005	2	0 - 0.5 ft	Unknown	<0.5	<1	6.3	13
5/19/2011	11:45 AM	SSSYADA0800008	SSSYADA0800008S051911S005	2	0 - 0.5 ft	Unknown	<0.5	<1	5.3	11
5/19/2011	**12:00 PM**	**SSSYADA0900009**	**SSSYADA0900009D051911S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**6.9**	**15**
5/19/2011	**12:00 PM**	**SSSYADA0900009**	**SSSYADA0900009S051911S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**6.3**	**13**
6/30/2011	**2:10 PM**	**SSSYAE1**	**SSSYAE1S063011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**9.9**	**18**
6/30/2011	**2:10 PM**	**SSSYAE1**	**SSSYAE1S063011S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.28**	**1.1**	**11**	**20**
7/14/2011	**12:05 PM**	**SSSYAF1**	**SSSYAF1S071411S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**8.2**	**15**
7/14/2011	**12:05 PM**	**SSSYAF1**	**SSSYAF1S071411S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.29**	**<1**	**10**	**19**
7/14/2011	11:50 AM	SSSYAF2	SSSYAF2S071411S005	2	0 - 0.5 ft	Unknown	<0.5	<1	8.8	25
7/14/2011	11:35 AM	SSSYAG1	SSSYAG1S071411S005	2	0 - 0.5 ft	Unknown	0.69	<1	18	20
7/14/2011	12:25 PM	SSSYAI1	SSSYAI1S071411S005	2	0 - 0.5 ft	Unknown	<0.5	<1	3.8	9.1
6/30/2011	2:00 PM	SSSYAI2	SSSYAI2S063011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	3.8	10
5/20/2011	10:55 AM	SSSYAK1	SSSYAK1S052011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	3.7	9.6
5/20/2011	**10:35 AM**	**SSSYAK2**	**SSSYAK2S052011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**1.8**	**18**	**37**
5/20/2011	**10:35 AM**	**SSSYAK2**	**SSSYAKZS052011S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.38**	**2.4**	**23**	**36**
5/20/2011	11:30 AM	SSSYAN2	SSSYAN2S052011S005	2	0 - 0.5 ft	Unknown	<0.5	1.3	9.3	20
5/20/2011	10:00 AM	SSSYAN5	SSSYAN5S052011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	5.5	13
5/20/2011	9:55 AM	SSSYAN6	SSSYAN6S052011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	4.4	12
5/20/2011	**9:25 AM**	**SSSYAO1**	**SSSYAD1S052011S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.2**	**<1**	**6.7**	**12**
5/20/2011	**9:25 AM**	**SSSYAO1**	**SSSYAO1S052011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**7.3**	**14**
6/3/2011	**10:05 AM**	**SSSYAO3R**	**EOS-YARDA-060311-EM**	**2**	**0 - 0.6 ft**	**Unknown**	**0.44**	**<1**	**13**	**18**
5/20/2011	10:20 AM	SSSYAP1	SSSYAP1S052011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	6.1	15
5/20/2011	9:45 AM	SSSYAP2	SSSYAP2S052011S005	2	0 - 0.5 ft	Unknown	<0.5	2	12	15
5/19/2011	**1:15 PM**	**SSSYASE0100001**	**SSSYASE0100001S051911S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**1.6**	**8.5**	**19**
5/19/2011	**1:15 PM**	**SSSYASE0100001**	**SSYASE0100001S051911S005-split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.42**	**1.1**	**10**	**19**
5/19/2011	1:35 PM	SSSYASE0300003	SSSYASE0300003S051911S005	2	0 - 0.5 ft	Unknown	<0.5	3.7	10	16
5/19/2011	1:50 PM	SSSYASE0400004	SSSYASE0400004S051911S005	2	0 - 0.5 ft	Unknown	<0.5	<1	13	19
5/19/2011	2:00 PM	SSSYASE0500005	SSSYASE0500005S051911S005	2	0 - 0.5 ft	Unknown	<0.5	<1	13	19
5/19/2011	**2:10 PM**	**SSSYASE0600006**	**SSSYASE0600006S051911S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**13**	**20**
5/19/2011	**2:10 PM**	**SSSYASE0600006**	**SSYASE0600006S051911S005-split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.4**	**<1**	**13**	**20**
5/19/2011	2:20 PM	SSSYASE0700007	SSSYASE0700007S051911S005	2	0 - 0.5 ft	Unknown	<0.5	1.6	5.9	11
5/19/2011	2:30 PM	SSSYASE0800008	SSSYASE0800008S051911S005	2	0 - 0.5 ft	Unknown	<0.5	1	12	17
5/19/2011	2:35 PM	SSSYASE0900009	SSSYASE0900009S051911S005	2	0 - 0.5 ft	Unknown	<0.5	<1	13	19
5/19/2011	2:40 PM	SSSYASE1000010	SSSYASE1000010S051911S005	2	0 - 0.5 ft	Unknown	<0.5	2	11	17
5/19/2011	**2:45 PM**	**SSSYASE1100011**	**SSSYASE1100011S051911S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**11**	**17**
5/19/2011	**2:45 PM**	**SSSYASE1100011**	**SSYASE1100011S051911S005-split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.46**	**<1**	**14**	**21**
5/19/2011	2:55 PM	SSSYASE1200012	SSSYASE1200012S051911S005	2	0 - 0.5 ft	Unknown	<0.5	<1	12	19
5/19/2011	2:57 PM	SSSYASE1300013	SSSYASE1300013S051911S005	2	0 - 0.5 ft	Unknown	<0.5	<1	12	19
5/19/2011	**3:00 PM**	**SSSYASE1400014**	**SSSYASE1400014S051911S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**1.5**	**5.7**	**15**
5/19/2011	**3:00 PM**	**SSSYASE1400014**	**SSYASE1400014S051911S005-split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.24**	**1.2**	**5.6**	**13**
5/19/2011	**3:10 PM**	**SSSYASE1500015**	**SSSYASE1500015D051911S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**13**	**20**
5/19/2011	**3:10 PM**	**SSSYASE1500015**	**SSSYASE1500015S051911S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**12**	**18**
9/15/2011	2:10 PM	SBTC0075R067	SBTC0075R067S091511S002	3	0 - 0.2 ft	CL	<0.5	3.6	15	25
9/16/2011	8:21 AM	SBTC0100L001	SBTC0100L001S091611S054	3	4.9 - 5.4 ft	CL	0.8	26	21	54
9/17/2011	1:43 PM	SBTC0100L034	SBTC0100L034S091711S004	3	0 - 0.4 ft	CL	<0.5	2.9	10	13
9/17/2011	**8:50 AM**	**SBTC0100R011**	**SBTC0100R011S091711S010**	**3**	**0 - 1 ft**	**CL**	**<0.57**	**1.8**	**15**	**25**
9/17/2011	**8:50 AM**	**SBTC0100R011**	**SBTC0100R011S091711S010-split**	**3**	**0 - 1 ft**	**CL**	**0.46**	**2.4**	**14**	**20**
1/27/2014	2:05 PM	SBTC0100R520	SBTC0100R520S012714S014	3	0.7 - 1.35 ft	CL	<0.5	2.5	8.2	29
9/15/2011	12:30 PM	SBTC0075R065	SBTC0075R065S091511S010	3	0 - 1 ft	GC	<0.5	<1	7.2	9.8
9/15/2011	12:30 PM	SBTC0075R065	SBTC0075R065S091511S010	3	0 - 1 ft	GW	<0.5	<1	7.2	9.8
1/27/2014	**3:30 PM**	**SBTC0075L506**	**SBTC0075L506D012714S011**	**3**	**0.35 - 1.1 ft**	**ML**	**<0.5**	**2.6**	**8**	**9.4**
1/27/2014	**3:30 PM**	**SBTC0075L506**	**SBTC0075L506S012714S011**	**3**	**0.35 - 1.1 ft**	**ML**	**<0.5**	**3.3**	**6.5**	**9**
1/30/2014	1:45 PM	SBTC0075L507	SBTC0075L507S013014S006	3	0.25 - 0.6 ft	ML	<0.5	2.3	7.4	8
1/30/2014	2:55 PM	SBTC0075L511	SBTC0075L511S013014S005	3	0.15 - 0.5 ft	ML	<0.5	2.8	16	35
9/16/2011	10:41 AM	SBTC0075R074	SBTC0075R074S091611S044	3	4 - 4.4 ft	ML	<0.5	1.2	11	17
1/22/2014	9:12 AM	SBTC0075R506	SBTC0075R506S012214S021	3	0.7 - 2.1 ft	ML	<0.5	2.6	11	19
1/28/2014	10:00 AM	SBTC0075R511	SBTC0075R511S012814S009	3	0.4 - 0.9 ft	ML	<0.5	4.3	11	15
9/29/2011	**11:10 AM**	**SBTC0100R071A**	**SBTC0100R071AS092911S010**	**3**	**0 - 1 ft**	**ML**	**<0.5**	**1.5**	**6.5**	**9**
9/29/2011	**11:10 AM**	**SBTC0100R071A**	**SBTC0100R071AS092911S010-split**	**3**	**0 - 1 ft**	**ML**	**<0.2**	**<1**	**8.2**	**9.4**
9/30/2011	**10:10 AM**	**SBTC0100R107**	**SBTC0100R107D093011S010**	**3**	**0 - 1 ft**	**ML**	**<0.5**	**<1**	**3.3**	**5.8**
9/30/2011	**10:10 AM**	**SBTC0100R107**	**SBTC0100R107S093011S010**	**3**	**0.5 - 1 ft**	**ML**	**<0.5**	**1.3**	**4.6**	**6.3**
3/4/2014	11:20 AM	SBTC0100R531	SBTC0100R531S030414S016	3	0 - 1.6 ft	ML	<0.5	<1.0	8	14
3/4/2014	11:20 AM	SBTC0100R531	SBTC0100R531S030414S016	3	0 - 1.6 ft	ML	<0.5	<1.0	8	14
2/4/2014	9:10 AM	SBTC0125L502	SBTC0125L502S020414S007	3	0.5 - 0.7 ft	ML	<0.5	2.9	9	11
9/21/2011	**9:55 AM**	**SBTC0125R010**	**SBTC0125R010S092111S010**	**3**	**0 - 1 ft**	**ML**	**<0.5**	**1.5**	**12**	**22**
9/21/2011	**9:55 AM**	**SBTC0125R010**	**SBTC0125R010S092111S010-split**	**3**	**0 - 1 ft**	**ML**	**0.29**	**2.2**	**12**	**17**
9/13/2011	4:15 PM	SBTC0075L016	SBTC0075L016S091311S010	3	0 - 1 ft	OL	<0.5	<1.0	6.6	7.8
9/22/2011	**11:50 AM**	**SBTC0075L018A**	**SBTC0075L018AS092211S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**5.2**	**11**	**14**

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
9/22/2011	**11:50 AM**	**SBTC0075L018A**	**SBTC0075L018AS092211S010-split**	**3**	**0 - 1 ft**	**OL**	**<0.2**	**3.5**	**8.4**	**9.8**
9/14/2011	10:20 AM	SBTC0075L022	SBTC0075L022S091411S010	3	0 - 1 ft	OL	<0.5	<1.0	8.7	7.4
9/14/2011	10:35 AM	SBTC0075L024	SBTC0075L024S091411S010	3	0 - 1 ft	OL	<0.5	1.7	8.7	12
9/15/2011	11:40 AM	SBTC0075L028	SBTC0075L028S091511S010	3	0 - 1 ft	OL	<0.5	1.7	13	17
9/15/2011	2:20 PM	SBTC0075L030	SBTC0075L030S091511S010	3	0 - 1 ft	OL	<0.52	1.3	9.3	14
9/22/2011	**10:30 AM**	**SBTC0075L034A**	**SBTC0075L034AD092211S010**	**3**	**0 - 1 ft**	**OL**	**<0.82**	**4.6**	**8.9**	**7.7**
9/22/2011	**10:30 AM**	**SBTC0075L034A**	**SBTC0075L034AS092211S010**	**3**	**0 - 1 ft**	**OL**	**<0.9**	**7.3**	**10**	**11**
9/22/2011	10:10 AM	SBTC0075L038B	SBTC0075L038BS092211S006	3	0 - 0.6 ft	OL	<0.76	3.7	6.1	3.8
9/16/2011	**3:55 PM**	**SBTC0075L042**	**SBTC0075L042S091611S010**	**3**	**0 - 1 ft**	**OL**	**<0.53**	**4.7**	**7.8**	**9.8**
9/16/2011	**3:55 PM**	**SBTC0075L042**	**SBTC0075L042S091611S010-split**	**3**	**0 - 1 ft**	**OL**	**0.27**	**5.1**	**9.2**	**11**
9/16/2011	4:30 PM	SBTC0075L048	SBTC0075L048S091611S008	3	0.3 - 0.8 ft	OL	<0.61	1.2	6.9	10
9/16/2011	5:50 PM	SBTC0075L050	SBTC0075L050S091611S006	3	0 - 0.6 ft	OL	<0.5	5	10	15
9/17/2011	**8:40 AM**	**SBTC0075L052**	**SBTC0075L052D091711S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**1.5**	**13**	**23**
9/17/2011	**8:40 AM**	**SBTC0075L052**	**SBTC0075L052S091711S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**1.7**	**9.4**	**14**
9/17/2011	12:25 PM	SBTC0075L054	SBTC0075L054S091711S008	3	0 - 0.8 ft	OL	<0.5	1.8	10	19
9/17/2011	10:24 AM	SBTC0075L056	SBTC0075L056S091711S007	3	0 - 0.7 ft	OL	<0.54	3.1	9.7	16
9/19/2011	10:55 AM	SBTC0075L061	SBTC0075L061S091911S002	3	0 - 0.2 ft	OL	<0.5	5.2	17	21
9/19/2011	**13:18 PM**	**SBTC0075L064**	**SBTC0075L064S091911S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**4.9**	**10**	**21**
9/19/2011	**13:18 PM**	**SBTC0075L064**	**SBTC0075L064S091911S010-SPLIT**	**3**	**0 - 1 ft**	**OL**	**0.35**	**3.5**	**9.6**	**18**
9/19/2011	12:00 PM	SBTC0075L066	SBTC0075L066S091911S010	3	0 - 1 ft	OL	0.67	15	15	29
9/21/2011	13:10 PM	SBTC0075L068A	SBTC0075L068AS092111S010	3	0 - 1 ft	OL	0.71	3.1	24	52
9/21/2011	2:10 PM	SBTC0075L072A	SBTC0075L072AS092111S010	3	0 - 1 ft	OL	<0.5	1.3	3.8	5.4
1/21/2014	2:40 PM	SBTC0075L503	SBTC0075L503S012114S002	3	0 - 0.2 ft	OL	<0.5	2.3	8.7	9.5
1/21/2014	3:45 PM	SBTC0075L504	SBTC0075L504S012114S002	3	0 - 0.2 ft	OL	<0.5	5.6	9.7	13
1/23/2014	10:07 AM	SBTC0075L505	SBTC0075L505S012314S001	3	0 - 0.1 ft	OL	<0.5	2.2	11	15
1/30/2014	1:45 PM	SBTC0075L507	SBTC0075L507S013014S006	3	0.25 - 0.6 ft	OL	<0.5	2.3	7.4	8
1/30/2014	2:50 PM	SBTC0075L510	SBTC0075L510S013014S009	3	0 - 0.9 ft	OL	<0.5	3.4	10	12
1/31/2014	4:00 PM	SBTC0075L512	SBTC0075L512S013114S005	3	0 - 0.5 ft	OL	<0.5	2.7	8.2	9.6
1/31/2014	**3:00 PM**	**SBTC0075L513**	**SBTC0075L513D013114S007**	**3**	**0 - 0.7 ft**	**OL**	**<0.5**	**2.8**	**9.7**	**12**
1/31/2014	**3:00 PM**	**SBTC0075L513**	**SBTC0075L513S013114S007**	**3**	**0 - 0.7 ft**	**OL**	**<0.5**	**2.3**	**9.1**	**11**
2/10/2014	3:05 PM	SBTC0075L517	SBTC0075L517S021014S005	3	0 - 0.5 ft	OL	NA	3	NA	NA
9/12/2011	9:20 AM	SBTC0075R001	SBTC0075R01S091211S004	3	0 - 0.4 ft	OL	<0.5	3.1	7.2	8.6
9/12/2011	9:44 AM	SBTC0075R002	SBTC0075R02S091211S005	3	0 - 0.5 ft	OL	<0.5	3.4	9.7	11
9/12/2011	**12:05 PM**	**SBTC0075R008**	**SBTC0075R008S091211S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**1**	**9.0**	**18**
9/12/2011	**12:05 PM**	**SBTC0075R008**	**SBTC0075R008S091211S010-split**	**3**	**0 - 1 ft**	**OL**	**0.30**	**1.8**	**9.2**	**15**
9/12/2011	1:40 PM	SBTC0075R010	SBTC0075R010S091211S010	3	0 - 1 ft	OL	<1	4.1	12	21
9/12/2011	2:25 PM	SBTC0075R011	SBTC0075R011S091211S005	3	0 - 0.5 ft	OL	<0.5	3.4	7.0	10
9/12/2011	3:00 PM	SBTC0075R012	SBTC0075R012S091211S006	3	0 - 0.6 ft	OL	<0.5	1.9	8.0	12
9/13/2011	1:35 PM	SBTC0075R013	SBTC0075R013S091311S010	3	0 - 1 ft	OL	<0.5	1.9	16	17
9/12/2011	5:10 PM	SBTC0075R014	SBTC0075R014S091211S006	3	0.1 - 0.6 ft	OL	<0.5	1.8	6.9	11
9/13/2011	8:08 AM	SBTC0075R018	SBTC0075R018S091311S013	3	0 - 1.3 ft	OL	<0.67	3.8	11	19
9/13/2011	8:15 AM	SBTC0075R019	SBTC0075R019S091311S010	3	0 - 1 ft	OL	<0.5	1.9	13	19
9/13/2011	8:59 AM	SBTC0075R022	SBTC0075R022S091311S009	3	0 - 0.9 ft	OL	<0.51	<1	5.4	8.9
9/13/2011	9:20 AM	SBTC0075R023	SBTC0075R023S091311S010	3	0 - 1 ft	OL	<0.5	1.8	12	21
9/13/2011	**2:25 PM**	**SBTC0075R024**	**SBTC0075R024S091311S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**<1**	**5.9**	**7.7**
9/13/2011	**2:25 PM**	**SBTC0075R024**	**SBTC0075R024S091311S010-split**	**3**	**0 - 1 ft**	**OL**	**0.34**	**3**	**9.7**	**13**
9/13/2011	2:50 PM	SBTC0075R025	SBTC0075R025S091311S010	3	0 - 1 ft	OL	<0.5	1.5	12	20
9/13/2011	12:50 PM	SBTC0075R026	SBTC0075R026S091311S009	3	0 - 0.9 ft	OL	<0.57	1.4	8.5	14
9/15/2011	1:45 PM	SBTC0075R037	SBTC0075R037S091511S010	3	0 - 1 ft	OL	<0.69	2.4	14	26
9/15/2011	2:25 PM	SBTC0075R038	SBTC0075R038S091511S012	3	0 - 1.25 ft	OL	<0.78	2.8	6.4	7.6
9/15/2011	3:15 PM	SBTC0075R040	SBTC0075R040S091511S008	3	0 - 0.8 ft	OL	<0.5	2.6	10	14
9/21/2011	9:45 AM	SBTC0075R044A	SBTC0075R044AS092111S006	3	0 - 0.6 ft	OL	<0.5	6.7	7.3	8.8
9/21/2011	**9:47 AM**	**SBTC0075R044A**	**SBTC0075R044AS092111S018**	**3**	**1.2 - 1.8 ft**	**OL**	**<0.5**	**53**	**16**	**17**
9/21/2011	**9:47 AM**	**SBTC0075R044A**	**SBTC0075R044AS092111S018-split**	**3**	**1.2 - 1.8 ft**	**OL**	**0.4**	**67**	**19**	**14**
9/15/2011	5:00 PM	SBTC0075R048	SBTC0075R048S091511S006	3	0 - 0.6 ft	OL	<0.5	1.5	7.3	11
9/14/2011	**3:25 PM**	**SBTC0075R056**	**SBTC0075R056D091411S007**	**3**	**0 - 0.7 ft**	**OL**	**<0.5**	**1.9**	**9.3**	**16**
9/14/2011	**3:25 PM**	**SBTC0075R056**	**SBTC0075R056S091411S007**	**3**	**0 - 0.7 ft**	**OL**	**<0.5**	**1.1**	**9.1**	**16**
9/14/2011	4:20 PM	SBTC0075R058	SBTC0075R058S091411S010	3	0 - 1 ft	OL	<0.5	6.5	8.4	11
9/20/2011	2:25 PM	SBTC0075R064A	SBTC0075R064AS092011S010	3	0 - 1 ft	OL	<0.5	1.4	8.5	15

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
9/21/2011	11:40 AM	SBTC0075R068A	SBTC0075R068AS092111S007	3	0 - 0.7 ft	OL	<0.5	1.9	8.1	11
9/20/2011	**12:45 PM**	**SBTC0075R070A**	**SBTC0075R070AD092011S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**3.7**	**11**	**20**
9/20/2011	**12:45 PM**	**SBTC0075R070A**	**SBTC0075R070AS092011S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**4.5**	**12**	**22**
9/16/2011	**8:50 AM**	**SBTC0075R071**	**SBTC0075R071D091611S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**3**	**20**	**18**
9/16/2011	**8:50 AM**	**SBTC0075R071**	**SBTC0075R071S091611S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**4.1**	**17**	**26**
9/16/2011	9:06 AM	SBTC0075R072	SBTC0075R072S091611S009	3	0 - 0.9 ft	OL	<0.5	8.8	10	20
9/16/2011	9:35 AM	SBTC0075R073	SBTC0075R073S091611S003	3	0 - 0.3 ft	OL	<0.5	5	15	28
9/16/2011	**10:05 AM**	**SBTC0075R074**	**SBTC0075R074S091611S009**	**3**	**0 - 0.9 ft**	**OL**	**0.64**	**<1**	**11**	**19**
9/16/2011	**10:05 AM**	**SBTC0075R074**	**SBTC0075R074S091611S009-split**	**3**	**0 - 0.9 ft**	**OL**	**0.57**	**1.6**	**11**	**20**
9/16/2011	11:05 AM	SBTC0075R076	SBTC0075R076S091611S009	3	0 - 0.9 ft	OL	<0.5	1.7	9.5	14
9/16/2011	1:00 PM	SBTC0075R077	SBTC0075R077S091611S004	3	0 - 0.4 ft	OL	<0.5	3.2	7.5	9.6
9/16/2011	4:10 PM	SBTC0075R078	SBTC0075R078S091611S009	3	0 - 0.9 ft	OL	<0.5	3.9	9.6	16
9/16/2011	4:55 PM	SBTC0075R080	SBTC0075R080S091611S010	3	0 - 1 ft	OL	<0.5	2.2	8.3	8.6
9/16/2011	**6:10 PM**	**SBTC0075R082**	**SBTC0075R082S091611S005**	**3**	**0 - 0.5 ft**	**OL**	**<0.5**	**2.1**	**11**	**13**
9/15/2011	**6:10 PM**	**SBTC0075R082**	**SBTC0075R082S091611S005-split**	**3**	**0 - 0.5 ft**	**OL**	**0.28**	**3.5**	**15**	**15**
1/24/2014	10:30 AM	SBTC0075R501	SBTC0075R501S012414S003	3	0 - 0.3 ft	OL	<0.5	3.4	7.9	9.5
1/24/2014	10:35 AM	SBTC0075R501	SBTC0075R501S012414S007	3	0 - 0.7 ft	OL	<0.5	3.2	10	11
1/22/2014	9:10 AM	SBTC0075R506	SBTC0075R506S012214S006	3	0 - 0.6 ft	OL	<0.5	3.4	11	21
1/22/2014	9:12 AM	SBTC0075R506	SBTC0075R506S012214S021	3	0.7 - 2.1 ft	OL	<0.5	2.6	11	19
1/22/2014	10:20 AM	SBTC0075R507	SBTC0075R507S012214S005	3	0 - 0.5 ft	OL	NA	NA	NA	NA
1/28/2014	8:50 AM	SBTC0075R510	SBTC0075R510S012814S007	3	0.25 - 0.65 ft	OL	<0.5	6.1	8.8	11
1/28/2014	10:00 AM	SBTC0075R511	SBTC0075R511S012814S009	3	0.4 - 0.9 ft	OL	<0.5	4.3	11	15
2/3/2014	10:45 AM	SBTC0075R513	SBTC0075R513S020314S005	3	0 - 0.5 ft	OL	<0.5	2.8	8.6	10
2/3/2014	10:45 AM	SBTC0075R514	SBTC0075R514S020314S005	3	0 - 0.5 ft	OL	<0.5	3.5	16	22
9/22/2011	2:20 PM	SBTC0100L006A	SBTC0100L006AS092211S010	3	0 - 1 ft	OL	<0.5	2.2	3.9	5.3
9/16/2011	**10:00 AM**	**SBTC0100L008**	**SBTC0100L008D091611S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**4.2**	**9.3**	**13**
9/16/2011	**10:00 AM**	**SBTC0100L008**	**SBTC0100L008S091611S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**6.2**	**13**	**16**
9/16/2011	**10:00 AM**	**SBTC0100L008**	**SBTC0100L008S091611S010-split**	**3**	**0 - 1 ft**	**OL**	**0.35**	**2.8**	**9.8**	**14**
9/17/2011	3:45 PM	SBTC0100L012	SBTC0100L012S091711S010	3	0 - 1 ft	OL	<0.5	4.1	9.6	13
9/17/2011	**2:50 PM**	**SBTC0100L014**	**SBTC0100L014S091711S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**1.9**	**12**	**20**
9/17/2011	**2:50 PM**	**SBTC0100L014**	**SBTC0100L014S091711S010-SPLIT**	**3**	**0 - 1 ft**	**OL**	**0.41**	**2.3**	**12**	**24**
9/17/2011	**5:20 PM**	**SBTC0100L017**	**SBTC0100L017S091711S010**	**3**	**0 - 1 ft**	**OL**	**<0.8**	**6.4**	**12**	**16**
9/17/2011	**5:20 PM**	**SBTC0100L017**	**SBTC0100L017S091711S010-SPLIT**	**3**	**0 - 1 ft**	**OL**	**0.24**	**5.3**	**6.4**	**8.5**
9/17/2011	5:25 PM	SBTC0100L018	SBTC0100L018S091711S010	3	0 - 1 ft	OL	<0.63	2.7	17	28
9/19/2011	8:45 AM	SBTC0100L020	SBTC0100L020S091911S010	3	0 - 1 ft	OL	<0.5	4.2	9.2	14
9/17/2011	**11:35 AM**	**SBTC0100L021**	**SBTC0100L021S091711S010**	**3**	**0 - 1 ft**	**OL**	**<0.54**	**1.8**	**12**	**20**
9/17/2011	**11:35 AM**	**SBTC0100L021**	**SBTC0100L021S091711S010-split**	**3**	**0 - 1 ft**	**OL**	**0.42**	**2.5**	**13**	**18**
9/19/2011	**8:55 AM**	**SBTC0100L022**	**SBTC0100L022D091911S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**4.5**	**14**	**23**
9/19/2011	**8:55 AM**	**SBTC0100L022**	**SBTC0100L022S091911S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**3.4**	**14**	**22**
9/17/2011	10:20 AM	SBTC0100L024	SBTC0100L024S091711S010	3	0 - 1 ft	OL	<0.58	3.5	7.5	10
9/17/2011	**9:30 AM**	**SBTC0100L026**	**SBTC0075L026S091711S010-split**	**3**	**0 - 1 ft**	**OL**	**0.3**	**2.7**	**9.4**	**14**
9/17/2011	**9:30 AM**	**SBTC0100L026**	**SBTC0100L026S091711S010**	**3**	**0 - 1 ft**	**OL**	**<0.51**	**2.3**	**8.3**	**13**
9/17/2011	12:15 PM	SBTC0100L028	SBTC0100L028S091711S010	3	0 - 1 ft	OL	<0.5	1.6	12	21
9/17/2011	3:45 PM	SBTC0100L032	SBTC0100L032S091711S006	3	0 - 0.6 ft	OL	<0.62	2.2	11	19
9/19/2011	8:50 AM	SBTC0100L038	SBTC0100L038S091911S009	3	0 - 0.9 ft	OL	<0.5	4.5	8.8	12
9/19/2011	10:44 AM	SBTC0100L042	SBTC0100L042S091911S005	3	0 - 0.5 ft	OL	<0.6	2.9	8.1	14
9/22/2011	3:45 PM	SBTC0100L044B	SBTC0100L044BS092211S010	3	0 - 1 ft	OL	<0.53	1.5	7.8	14
9/19/2011	**2:40 PM**	**SBTC0100L048**	**SBTC0100L048S091911S010**	**3**	**0 - 1 ft**	**OL**	**<0.88**	**2.4**	**10**	**17**
9/19/2011	**2:40 PM**	**SBTC0100L048**	**SBTC0100L048S091911S010-SPLIT**	**3**	**0 - 1 ft**	**OL**	**0.41**	**3**	**12**	**17**
9/19/2011	4:10 PM	SBTC0100L049	SBTC0100L049S091911S010	3	0 - 1 ft	OL	<0.5	5.7	5.2	6.6
9/19/2011	4:15 PM	SBTC0100L050	SBTC0100L050S091911S004	3	0 - 0.4 ft	OL	<0.52	10	10	15
9/19/2011	**3:30 PM**	**SBTC0100L052**	**SBTC0100L052D091911S011**	**3**	**0 - 1.1 ft**	**OL**	**<0.54**	**3.6**	**8**	**12**
9/19/2011	**3:30 PM**	**SBTC0100L052**	**SBTC0100L052S091911S011**	**3**	**0 - 1.1 ft**	**OL**	**<0.5**	**4.5**	**11**	**14**
9/19/2011	**3:30 PM**	**SBTC0100L054**	**SBTC0100L054S091911S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**5.8**	**13**	**20**
9/19/2011	**3:30 PM**	**SBTC0100L054**	**SBTC0100L054S091911S010-SPLIT**	**3**	**0 - 1 ft**	**OL**	**0.49**	**5**	**14**	**27**
9/23/2011	10:40 AM	SBTC0100L058B	SBTC0100L058BS092311S010	3	0 - 1 ft	OL	<0.77	3.7	3.8	5.2
9/20/2011	11:25 AM	SBTC0100L060	SBTC0100L060S092011S010	3	0 - 1 ft	OL	<0.5	4.4	9.8	15
9/23/2011	**12:25 PM**	**SBTC0100L064B**	**SBTC0100L064BS092311S010**	**3**	**0 - 1 ft**	**OL**	**<0.58**	**3.1**	**8.8**	**15**
9/23/2011	**12:25 PM**	**SBTC0100L064B**	**SBTC0100L064BS092311S010-split**	**3**	**0 - 1 ft**	**OL**	**<0.2**	**2.7**	**7.2**	**11**
9/23/2011	**2:00 PM**	**SBTC0100L068**	**SBTC0100L068D092311S007**	**3**	**0 - 0.7 ft**	**OL**	**<0.5**	**2.5**	**6**	**8.9**
9/23/2011	**2:00 PM**	**SBTC0100L068**	**SBTC0100L068S092311S007**	**3**	**0 - 0.7 ft**	**OL**	**<0.5**	**2.3**	**6.4**	**8.6**
9/23/2011	**2:35 PM**	**SBTC0100L070**	**SBTC0100L070S092311S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**4.1**	**9.3**	**16**
9/23/2011	**2:35 PM**	**SBTC0100L070**	**SBTC0100L070S092311S010-split**	**3**	**0 - 1 ft**	**OL**	**<0.2**	**4.5**	**8.8**	**11**
9/23/2011	3:20 PM	SBTC0100L072	SBTC0100L072S092311S010	3	0 - 1 ft	OL	<0.54	6	11	15
9/23/2011	4:05 PM	SBTC0100L074	SBTC0100L074S092311S010	3	0 - 1 ft	OL	<0.5	4	9.4	11
9/23/2011	4:20 PM	SBTC0100L076	SBTC0100L076S092311S010	3	0 - 1 ft	OL	<0.5	2	8.3	14
9/24/2011	**8:50 AM**	**SBTC0100L078A**	**SBTC0100L078AD092411S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**1.7**	**4.6**	**5.7**
9/24/2011	**8:50 AM**	**SBTC0100L078A**	**SBTC0100L078AS092411S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**1.5**	**3.4**	**4.7**
9/24/2011	2:30 PM	SBTC0100L088	SBTC0100L088S092411S010	3	0 - 1 ft	OL	<0.5	2	8.3	12

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
9/26/2011	11:40 AM	SBTC0100L096A	SBTC0100L096AS092611S010	3	0 - 1 ft	OL	<0.7	1.4	14	11
9/26/2011	**4:30 PM**	**SBTC0100L098B**	**SBTC0100L098BD092611S006**	**3**	**0 - 0.6 ft**	**OL**	**<0.5**	**1.7**	**7.4**	**11**
9/26/2011	**4:30 PM**	**SBTC0100L098B**	**SBTC0100L098BS092611S006**	**3**	**0 - 0.6 ft**	**OL**	**<0.52**	**2**	**7.9**	**12**
1/23/2014	7:40 AM	SBTC0100L503	SBTC0100L503S012314S004	3	0 - 0.35 ft	OL	<0.5	1	12	13
1/23/2014	9:00 AM	SBTC0100L504	SBTC0100L504S012314S006	3	0 - 0.6 ft	OL	<0.5	5.5	14	23
1/23/2014	9:05 AM	SBTC0100L504	SBTC0100L504S012314S011	3	0.9 - 1.1 ft	OL	<0.59	3.1	5.8	7.9
1/29/2014	2:50 PM	SBTC0100L505	SBTC0100L505S012914S006	3	0 - 0.6 ft	OL	<0.71	6.2	12	16
1/29/2014	3:00 PM	SBTC0100L506	SBTC0100L506S012914S008	3	0 - 0.8 ft	OL	<0.52	2.6	12	12
2/11/2014	1:55 PM	SBTC0100L515	SBTC0100L515S021114S005	3	0 - 0.5 ft	OL	NA	4.9	NA	NA
9/16/2011	5:20 PM	SBTC0100R004	SBTC0100R004S091611S010	3	0 - 1 ft	OL	<0.5	2.1	28	18
9/21/2011	5:10 PM	SBTC0100R007C	SBTC0100R007CS092111S010	3	0 - 1 ft	OL	<0.72	3.3	10	16
9/19/2011	10:20 AM	SBTC0100R019	SBTC0100R019S091911S008	3	0 - 0.8 ft	OL	<0.5	4	8.6	12
9/19/2011	12:00 PM	SBTC0100R021	SBTC0100R021S091911S010	3	0 - 1 ft	OL	<0.5	3.6	13	24
9/19/2011	1:35 PM	SBTC0100R025	SBTC0100R025S091911S004	3	0 - 0.4 ft	OL	<0.5	3.8	8.9	14
9/20/2011	9:05 AM	SBTC0100R029	SBTC0100R029S092011S010	3	0 - 1 ft	OL	<0.5	1.3	6.4	8.2
9/22/2011	**11:30 AM**	**SBTC0100R031B**	**SBTC0100R031BD092211S010**	**3**	**0 - 1 ft**	**OL**	**<0.97**	**2.2**	**4.2**	**5.5**
9/22/2011	**11:30 AM**	**SBTC0100R031B**	**SBTC0100R031BS09211S010-split**	**3**	**0.6 - 1 ft**	**OL**	**0.31**	**2.4**	**7.2**	**11**
9/22/2011	**11:30 AM**	**SBTC0100R031B**	**SBTC0100R031BS092211S010**	**3**	**0.6 - 1 ft**	**OL**	**<0.89**	**<1.8**	**24**	**35**
9/20/2011	**10:25 AM**	**SBTC0100R033**	**SBTC0100R033D092011S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**2.5**	**8.1**	**12**
9/20/2011	**10:25 AM**	**SBTC0100R033**	**SBTC0100R033S092011S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**4.2**	**8.1**	**12**
9/20/2011	**10:25 AM**	**SBTC0100R033**	**SBTC0100R033S092011S010-split**	**3**	**0 - 1 ft**	**OL**	**0.44**	**2.7**	**12**	**19**
9/20/2011	**10:45 AM**	**SBTC0100R035**	**SBTC0100R035D092011S003**	**3**	**0 - 0.3 ft**	**OL**	**<0.5**	**4.8**	**11**	**16**
9/20/2011	**10:45 AM**	**SBTC0100R035**	**SBTC0100R035S092011S003**	**3**	**0 - 0.3 ft**	**OL**	**<0.5**	**5.1**	**9.3**	**17**
9/22/2011	**2:00 PM**	**SBTC0100R037B**	**SBTC0100R037BS092211S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**1.4**	**8.1**	**13**
9/22/2011	**2:00 PM**	**SBTC0100R037B**	**SBTC0100R037BS092211S010-split**	**3**	**0 - 1 ft**	**OL**	**0.3**	**1.5**	**8.1**	**15**
9/22/2011	**1:45 PM**	**SBTC0100R039A**	**SBTC0100R039AD092211S003**	**3**	**0 - 0.3 ft**	**OL**	**<0.5**	**4.6**	**8**	**12**
9/22/2011	**1:45 PM**	**SBTC0100R039A**	**SBTC0100R039AS092211S003**	**3**	**0 - 0.3 ft**	**OL**	**<0.5**	**4.5**	**7.3**	**9.4**
9/22/2011	2:20 PM	SBTC0100R041A	SBTC0100R041AS092211S005	3	0 - 0.5 ft	OL	<0.5	4.9	7.3	9.7
9/20/2011	**1:40 PM**	**SBTC0100R043**	**SBTC0100R043S092011S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**4.1**	**12**	**21**
9/20/2011	**1:40 PM**	**SBTC0100R043**	**SBTC0100R043S092011S010-split**	**3**	**0 - 1 ft**	**OL**	**0.42**	**3.1**	**12**	**19**
9/20/2011	3:55 PM	SBTC0100R047	SBTC0100R047S092011S010	3	0 - 1 ft	OL	<1	5	8	14
9/20/2011	4:20 PM	SBTC0100R051	SBTC0100R051S092011S010	3	0 - 1 ft	OL	<0.57	5.1	14	19
9/20/2011	5:40 PM	SBTC0100R053	SBTC0100R053S092011S010	3	0 - 1 ft	OL	<0.57	3.2	14	23
9/20/2011	5:55 PM	SBTC0100R055	SBTC0100R055S092011S010	3	0 - 1 ft	OL	0.58	1.5	14	23
9/21/2011	**8:45 AM**	**SBTC0100R056**	**SBTC0100R056D092111S016**	**3**	**0.6 - 1.6 ft**	**OL**	**<0.5**	**5.1**	**20**	**26**
9/21/2011	**8:45 AM**	**SBTC0100R056**	**SBTC0100R056S092111S016**	**3**	**0.6 - 1.6 ft**	**OL**	**<0.5**	**2.6**	**11**	**18**
9/21/2011	8:05 AM	SBTC0100R057	SBTC0100R057S092111S010	3	0 - 1 ft	OL	<0.5	2.1	7	8.9
9/21/2011	9:15 AM	SBTC0100R059	SBTC0100R059S092111S005	3	0 - 0.5 ft	OL	0.62	7.5	35	34
9/28/2011	4:00 PM	SBTC0100R061A	SBTC0100R061AS092811S010	3	0 - 1 ft	OL	<0.5	7.1	9.3	12
9/28/2011	4:10 PM	SBTC0100R063A	SBTC0100R063AS092811S010	3	0 - 1 ft	OL	<0.5	4.5	5.5	7.8
9/27/2011	3:35 PM	SBTC0100R065	SBTC0100R065S092711S010	3	0 - 1 ft	OL	<0.5	6.3	7.5	10
9/28/2011	**4:55 PM**	**SBTC0100R069A**	**SBTC0100R069AD092811S010**	**3**	**0 - 1 ft**	**OL**	**<0.52**	**4.7**	**7.4**	**9.6**
9/28/2011	**4:55 PM**	**SBTC0100R069A**	**SBTC0100R069AS092811S010**	**3**	**0 - 1 ft**	**OL**	**<0.54**	**4.8**	**6.4**	**8.6**
9/27/2011	5:15 PM	SBTC0100R075	SBTC0100R075S092711S004	3	0 - 0.4 ft	OL	<0.51	1.2	8.1	9.1
9/29/2011	11:31 AM	SBTC0100R077B	SBTC0100R077BS092911S007	3	0 - 0.7 ft	OL	<0.51	3.5	6	8.5
9/28/2011	11:00 AM	SBTC0100R079	SBTC0100R079S092811S009	3	0 - 0.9 ft	OL	<0.53	4.5	11	20
9/28/2011	9:53 AM	SBTC0100R081	SBTC0100R081S092811S010	3	0 - 1 ft	OL	<0.68	2.5	11	17
9/29/2011	12:32 PM	SBTC0100R083A	SBTC0100R083AS092911S009	3	0 - 0.9 ft	OL	<1.4	7.6	6.4	11
9/29/2011	3:25 PM	SBTC0100R088	SBTC0100R088S092911S010	3	0 - 1 ft	OL	<0.5	2.7	12	19
9/29/2011	2:50 PM	SBTC0100R089	SBTC0100R089S092911S010	3	0 - 1 ft	OL	0.59	3	14	24
9/29/2011	**3:15 PM**	**SBTC0100R090**	**SBTC0100R090S092911S010**	**3**	**0 - 1 ft**	**OL**	**<1.1**	**2.9**	**15**	**23**
9/29/2011	**3:15 PM**	**SBTC0100R090**	**SBTC0100R090S092911S010-split**	**3**	**0 - 1 ft**	**OL**	**<0.2**	**<1**	**14**	**13**
9/29/2011	3:20 PM	SBTC0100R091	SBTC0100R091S092911S010	3	0 - 1 ft	OL	0.66	4.9	19	32
9/30/2011	1:00 PM	SBTC0100R092A	SBTC0100R092AS093011S010	3	0 - 1 ft	OL	0.88	4	16	34
9/29/2011	6:05 PM	SBTC0100R095	SBTC0100R095S092911S010	3	0 - 1 ft	OL	<0.5	4.1	13	21
10/13/2011	**6:24 PM**	**SBTC0100R096D**	**SBTC0100R096DS101311S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**2.3**	**12**	**21**
10/13/2011	**6:24 PM**	**SBTC0100R096D**	**SBTC0100R096DS101311S010-split**	**3**	**0 - 1 ft**	**OL**	**0.31**	**4.9**	**9.2**	**17**
9/29/2011	5:28 PM	SBTC0100R097	SBTC0100R097S092911S010	3	0 - 1 ft	OL	0.66	2.4	15	27
9/29/2011	6:15 PM	SBTC0100R098	SBTC0100R098S092911S009	3	0 - 0.9 ft	OL	<0.5	3	13	19
9/30/2011	9:50 AM	SBTC0100R100	SBTC0100R100S093011S009	3	0 - 0.9 ft	OL	<0.5	2.8	9.8	18
9/30/2011	**10:42 AM**	**SBTC0100R101**	**SBTC0100R101S093011S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**1.5**	**11**	**20**
9/30/2011	**10:42 AM**	**SBTC0100R101**	**SBTC0100R101S093011S010-split**	**3**	**0 - 1 ft**	**OL**	**0.33**	**3.3**	**13**	**15**
9/30/2011	**8:50 AM**	**SBTC0100R102**	**SBTC0100R102S093011S010**	**3**	**0.7 - 1.2 ft**	**OL**	**<0.5**	**1.6**	**6.4**	**7.9**
9/30/2011	**8:50 AM**	**SBTC0100R102**	**SBTC0100R102S093011S010-split**	**3**	**0.7 - 1.2 ft**	**OL**	**0.45**	**1.9**	**14**	**19**
9/30/2011	8:45 AM	SBTC0100R103	SBTC0100R103S093011S010	3	0 - 1 ft	OL	0.55	1.7	9.9	22
9/30/2011	**10:25 AM**	**SBTC0100R104**	**SBTC0100R104D093011S007**	**3**	**0 - 0.7 ft**	**OL**	**<0.5**	**3**	**10**	**17**
9/30/2011	**10:25 AM**	**SBTC0100R104**	**SBTC0100R104S093011S007**	**3**	**0 - 0.7 ft**	**OL**	**<0.5**	**3.4**	**12**	**16**
9/30/2011	9:40 AM	SBTC0100R106	SBTC0100R106S093011S010	3	0 - 1 ft	OL	<0.85	<1.7	5.8	7.5
9/30/2011	**2:00 PM**	**SBTC0100R108**	**SBTC0100R108S093011S010**	**3**	**0 - 1 ft**	**OL**	**<0.72**	**5.4**	**12**	**18**

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
9/30/2011	**2:00 PM**	**SBTC0100R108**	**SBTC0100R108S093011S010-split**	**3**	**0 - 1 ft**	**OL**	**0.36**	**3.4**	**12**	**15**
1/22/2014	**11:30 AM**	**SBTC0100R501**	**SBTC0100R501D012214S007**	**3**	**0.3 - 0.7 ft**	**OL**	**<0.55**	**3.6**	**9.1**	**14**
1/22/2014	**11:30 AM**	**SBTC0100R501**	**SBTC0100R501S012214S007**	**3**	**0.3 - 0.7 ft**	**OL**	**<0.57**	**8.5**	**12**	**19**
1/27/2014	9:40 AM	SBTC0100R517	SBTC0100R517S012714S005	3	0 - 0.5 ft	OL	<0.5	3.9	10	11
1/27/2014	9:48 AM	SBTC0100R517	SBTC0100R517S012714S010	3	0.8 - 1 ft	OL	<0.5	1.9	9.6	17
1/27/2014	2:05 PM	SBTC0100R520	SBTC0100R520S012714S014	3	0.7 - 1.35 ft	OL	<0.5	2.5	8.2	29
2/4/2014	10:25 AM	SBTC0100R523	SBTC0100R523S020414S004	3	0.1 - 0.35 ft	OL	<0.5	3.4	7.3	11
1/9/2012	**11:45 AM**	**SBTC0100R592**	**SBTC0100R592S010912S006**	**3**	**0 - 0.6 ft**	**OL**	**0.67**	**3.3**	**15**	**28**
1/9/2012	**11:45 AM**	**SBTC0100R592**	**SBTC0100R592S010912S006-SPLIT**	**3**	**0 - 0.6 ft**	**OL**	**0.63**	**3.2**	**14**	**26**
1/9/2012	11:20 AM	SBTC0100R592C	SBTC0100R592CS010912S008	3	0 - 0.8 ft	OL	<0.5	6.8	8.4	12
9/26/2011	5:00 PM	SBTC0125L004A	SBTC0125L004AS092611S010	3	0 - 1 ft	OL	<0.5	2.8	11	12
9/24/2011	12:10 PM	SBTC0125L006A	SBTC0125L006AS092411S006	3	0 - 0.6 ft	OL	<0.5	2.4	8.9	9.4
9/24/2011	**10:50 AM**	**SBTC0125L010A**	**SBTC0125L010AS092411S006**	**3**	**0 - 0.6 ft**	**OL**	**<0.5**	**1.8**	**8.9**	**10**
9/24/2011	**10:50 AM**	**SBTC0125L010A**	**SBTC0125L010AS092411S006-split**	**3**	**0 - 0.6 ft**	**OL**	**0.3**	**1.6**	**10**	**13**
9/24/2011	9:25 AM	SBTC0125L012A	SBTC0125L012AS092411S004	3	0 - 0.4 ft	OL	<0.5	1.6	7.2	10
9/24/2011	9:15 AM	SBTC0125L014D	SBTC0125L014DS092411S004	3	0 - 0.4 ft	OL	<0.51	3.5	9	14
9/23/2011	6:10 PM	SBTC0125L016A	SBTC0125L016AS092311S007	3	0 - 0.7 ft	OL	<0.5	2.4	9	12
9/24/2011	8:20 AM	SBTC0125L018A	SBTC0125L018AS092411S002	3	0 - 0.2 ft	OL	<0.5	3.1	11	14
9/23/2011	4:50 PM	SBTC0125L022A	SBTC0125L022AS092311S003	3	0 - 0.3 ft	OL	<0.5	2.3	13	15
9/23/2011	**3:15 PM**	**SBTC0125L024**	**SBTC0125L024S092311S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**1.7**	**17**	**15**
9/23/2011	**3:15 PM**	**SBTC0125L024**	**SBTC0125L024S092311S010-split**	**3**	**0 - 1 ft**	**OL**	**0.25**	**1.3**	**11**	**13**
9/23/2011	**3:20 PM**	**SBTC0125L026**	**SBTC0125L026S092311S008**	**3**	**0 - 0.8 ft**	**OL**	**<0.5**	**1.6**	**11**	**21**
9/20/2011	5:05 PM	SBTC0125R002	SBTC0125R002S092011S003	3	0 - 0.3 ft	OL	<0.5	6.1	9.4	10
9/20/2011	5:20 PM	SBTC0125R004	SBTC0125R004S092011S010	3	0 - 1 ft	OL	<0.5	1.9	7	10
9/22/2011	3:10 PM	SBTC0125R008A	SBTC0125R008AS092211S004	3	0 - 0.4 ft	OL	<0.5	5.4	7.2	11
9/23/2011	9:05 AM	SBTC0125R012D	SBTC0125R012DS092311S007	3	0 - 0.7 ft	OL	<0.5	3.9	7.1	10
9/22/2011	4:00 PM	SBTC0125R016A	SBTC0125R016AS092211S003	3	0 - 0.3 ft	OL	<0.5	3.1	8	11
9/21/2011	12:42 PM	SBTC0125R018	SBTC0125R018S092111S006	3	0 - 0.6 ft	OL	<0.57	5.5	8.2	12
9/21/2011	2:03 PM	SBTC0125R020	SBTC0125R020S092111S004	3	0 - 0.4 ft	OL	<0.5	4.9	8.3	12
9/21/2011	2:48 PM	SBTC0125R022	SBTC0125R022S092111S003	3	0 - 0.3 ft	OL	<0.5	5.2	7.4	9
9/23/2011	2:25 PM	SBTC0125R028A	SBTC0125R028AS092311S010	3	0 - 1 ft	OL	<0.5	1.7	13	21
9/30/2011	11:00 AM	SBTC0100R105	SBTC0100R105S093011S010	3	0 - 1 ft	PT	<0.5	1.7	8.2	13
1/23/2014	1:50 PM	SBTC0100R510	SBTC0100R510S012314S024	3	1.5 - 2.35 ft	PT	<1.2	3.4	11	9.6
9/16/2011	11:50 AM	SBTC0075R076	SBTC0075R076S091611S046	3	4 - 4.6 ft	SC	<0.5	<1	11	11
9/17/2011	15:25 PM	SBTC0075L058	SBTC0075L058S091711S005	3	0 - 0.5 ft	SM	<0.61	11	8.5	13
9/17/2011	11:10 AM	SBTC0075L059	SBTC0075L059S091711S010	3	0 - 1 ft	SM	<0.5	2.2	13	19
9/19/2011	12:35 PM	SBTC0075L063	SBTC0075L063S091911S002	3	0 - 0.2 ft	SM	0.93	<1	23	110
9/19/2011	**5:05 PM**	**SBTC0075L070**	**SBTC0075L070S091911S005**	**3**	**0 - 0.5 ft**	**SM**	**<0.5**	**1.8**	**11**	**17**
9/19/2011	**5:05 PM**	**SBTC0075L070**	**SBTC0075L070S091911S005-SPLIT**	**3**	**0 - 0.5 ft**	**SM**	**0.41**	**1.4**	**16**	**24**
9/22/2011	**4:20 PM**	**SBTC0125R024A**	**SBTC0125R024AS092211S010**	**3**	**0.6 - 1 ft**	**SM**	**<0.5**	**<1**	**7.3**	**13**
9/22/2011	**4:20 PM**	**SBTC0125R024A**	**SBTC0125R024AS092211S010-split**	**3**	**0.6 - 1 ft**	**SM**	**0.33**	**<1**	**9.4**	**15**
2/14/2014	9:25 AM	SBTC0125R510	SBTC0125R510S021414S016	3	1.4 - 1.6 ft	SM	NA	<1	NA	NA
9/14/2011	8:45 AM	SBTC0075L020	SBTC0075L020S091411S010	3	0 - 1 ft	SP	<0.5	4	6.8	8.1
9/16/2011	11:45 AM	SBTC0075L044	SBTC0075L044S091611S005	3	0 - 0.5 ft	SP	<0.5	<1.0	4.4	5.5
9/21/2011	5:10 PM	SBTC0125R026	SBTC0125R026S092111S010	3	0 - 1 ft	SP	<0.5	<1	6.2	13
2/14/2014	9:25 AM	SBTC0125R510	SBTC0125R510S021414S016	3	1.4 - 1.6 ft	SP	NA	<1	NA	NA
9/13/2011	8:40 AM	SBTC0075L008	SBTC0075L008S091311S010	3	0 - 1 ft	SW	<0.5	<1.0	11	14
9/20/2011	**4:55 PM**	**SBTC0075R052A**	**SBTC0075R052AS092011S005**	**3**	**0 - 0.5 ft**	**SW**	**<0.5**	**1.7**	**6.9**	**7.5**
9/20/2011	**4:55 PM**	**SBTC0075R052A**	**SBTC0075R052AS092011S005-split**	**3**	**0 - 0.5 ft**	**SW**	**<0.2**	**1.8**	**7.9**	**10**
9/20/2011	9:05 AM	SBTC0100R029	SBTC0100R029S092011S010	3	0 - 1 ft	SW	<0.5	1.3	6.4	8.2
2/12/2014	3:05 PM	SBTC0125R509	SBTC0125R509S021214S005	3	0 - 0.5 ft	SW	NA	<1	NA	NA
12/12/2011	**10:29 AM**	**ESTC0075L107**	**ESTC0075L107S121211S010**	**3**	**1 - 1 ft**	**Unknown**	**<0.5**	**3.1**	**15**	**9.7**
12/12/2011	**10:49 AM**	**ESTC0075L107**	**ESTC0075L107S121211S010-SPLIT**	**3**	**1 - 1 ft**	**Unknown**	**<0.2**	**3.4**	**25**	**18**
1/17/2012	9:09 AM	ESTC0100L126	ESTC0100L126S011712S015	3	1.5 - 1.5 ft	Unknown	<0.5	1.7	5.7	7
1/19/2012	11:01 AM	ESTC0100L131	ESTC0100L131S011912S010	3	1 - 1 ft	Unknown	<0.5	<1	6.6	10
1/20/2012	4:21 PM	ESTC0100L137	ESTC0100L137S012012S005	3	0.5 - 0.5 ft	Unknown	<0.5	3	8.6	10
1/18/2012	2:47 PM	ESTC0100R146	ESTC0100R146S011812S005	3	0.5 - 0.5 ft	Unknown	<0.5	5.6	11	14
1/20/2012	4:11 PM	ESTC0100R155	ESTC0100R155S012012S005	3	0.5 - 0.5 ft	Unknown	<0.5	1.8	6.2	<1
1/23/2012	**10:57 AM**	**ESTC0100R158**	**ESTC0100R158D012312S005**	**3**	**0.5 - 0.5 ft**	**Unknown**	**0.64**	**<1.2**	**11**	**16**
1/23/2012	**10:57 AM**	**ESTC0100R158**	**ESTC0100R158S012312S005**	**3**	**0.5 - 0.5 ft**	**Unknown**	**0.83**	**<1.4**	**13**	**26**
1/25/2012	10:43 AM	ESTC0100R159	ESTC0100R159S012512S005	3	0.5 - 0.5 ft	Unknown	<0.5	1.4	9.2	10
2/2/2012	9:48 AM	ESTC0125R205	ESTC0125R205S020212S005	3	0.5 - 0.5 ft	Unknown	<0.5	1	9	17
1/11/2013	9:50 AM	SSTC0100L01	SSTC0100L01S011113SX	3	0.0-0.5 ft	Unknown	<0.93	<2.3	12	18
1/11/2013	**10:00 AM**	**SSTC0100L03**	**SSTC0100L03D011113SX**	**3**	**0.0-0.5 ft**	**Unknown**	**<1.2**	**7.3**	**9.2**	**13**
1/11/2013	**10:00 AM**	**SSTC0100L03**	**SSTC0100L03S011113SX**	**3**	**0.0-0.5 ft**	**Unknown**	**<1.2**	**5.4**	**11**	**15**
1/11/2013	10:50 AM	SSTC0100R02	SSTC0100R02S011113SX	3	0.0-0.5 ft	Unknown	<0.91	3.6	7.1	9.3
1/10/2013	**11:25 AM**	**SSTC0125R01**	**SSTC0125R01D011013SX**	**3**	**0.0-0.5 ft**	**Unknown**	**<0.66**	**<1.6**	**10**	**12**
1/10/2013	**11:25 AM**	**SSTC0125R01**	**SSTC0125R01S011013SX**	**3**	**0.0-0.5 ft**	**Unknown**	**<0.61**	**<1.5**	**9.1**	**13**
1/10/2013	11:26 AM	SSTC0125R02	SSTC0125R02S011013SX	3	0.0-0.5 ft	Unknown	<0.56	<1.4	9.6	11

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
1/10/2013	11:34 AM	SSTC0125R03	SSTC0125R03S011013SX	3	0.0-0.5 ft	Unknown	<0.68	<1.7	11	11
1/10/2013	11:40 AM	SSTC0125R04	SSTC0125R04S011013SX	3	0.0-0.5 ft	Unknown	<0.55	<1.4	11	12
1/10/2013	11:50 AM	SSTC0125R06	SSTC0125R06S011013SX	3	0.0-0.5 ft	Unknown	<0.57	<1.4	14	17
1/11/2013	11:35 AM	SSTC0125R07	SSTC0125R07S011113SX	3	0.0-0.5 ft	Unknown	<0.58	<1.4	9.1	16
1/11/2013	11:46 AM	SSTC0125R08	SSTC0125R08S011113SX	3	0.0-0.5 ft	Unknown	<0.5	<1.2	7.3	9.2
1/11/2013	11:34 AM	SSTC0125R09	SSTC0125R09S011113SX	3	0.0-0.5 ft	Unknown	<0.55	<1.4	6.6	12
1/11/2013	11:00 AM	SSTC0125R10	SSTC0125R10S011113SX	3	0.0-0.5 ft	Unknown	<1.1	5.4	8	12
10/24/2011	**10:01 AM**	**TC-STAGING-01-102411**	**TC- STAGING-01-102411**	**3**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**2.7**	**7.2**	**7.9**
10/24/2011	**10:01 AM**	**TC-STAGING-01-102411**	**TC- STAGING-01-102411-DUP**	**3**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**3.6**	**10**	**11**
10/24/2011	10:09 AM	TC-STAGING-02-102411	TC- STAGING-02-102411	3	0 - 0.5 ft	Unknown	<0.5	3.1	10	11
9/29/2011	**9:40AM**	**SBTC0150R062**	**SBTC0150R062D092911S005**	**4**	**0 - 0.5**	**CH**	**<0.5**	**1.2**	**11**	**18**
9/29/2011	**9:40AM**	**SBTC0150R062**	**SBTC0150R062S092911S005**	**4**	**0 - 0.5**	**CH**	**<0.5**	**1.4**	**12**	**22**
9/29/2011	**5:35PM**	**SBTC0125L030A**	**SBTC0125L030AS092911S008**	**4**	**0 - 0.8**	**CL**	**<0.5**	**<1**	**7.9**	**11**
2/28/2014	2:05PM	SBTC0125R515	SBTC0125R515S022814S014	4	1.1 - 1.4	CL	<0.5	1.4	15	26
10/4/2011	2:45PM	SBTC0150L054	SBTC0150L054S100411S005	4	0 - 0.5	CL	<0.5	1.1	12	13
3/6/2014	9:15AM	SBTC0150L505	SBTC0150L505S030614S012	4	0 - 1.2	CL	<0.5	1.5	9.2	15
3/11/2014	12:48PM	SBTC0150L511	SBTC0150L511S031114S005	4	0 - 0.5	CL	<0.5	1.7	12	16
3/28/2014	9:00AM	SBTC0150L519	SBTC0150L519S032814S008	4	0.5 - 0.8	CL	<0.5	3	17	21
9/29/2011	10:15AM	SBTC0150R064	SBTC0150R064S092911S003	4	0 - 0.3	CL	<0.5	1.5	9.3	24
9/29/2011	**10:55AM**	**SBTC0150R065**	**SBTC0150R065S092911S003**	**4**	**0 - 0.3**	**CL**	**<0.5**	**1.5**	**10**	**14**
9/29/2011	**10:55AM**	**SBTC0150R065**	**SBTC0150R065S092911S003-split**	**4**	**0 - 0.3**	**CL**	**<0.2**	**1.1**	**10**	**15**
3/6/2014	10:25AM	SBTC0150R505	SBTC0150R505S030614S016	4	1.1 - 1.6	CL	<0.5	<1	10	16
10/11/2011	7:50AM	SBTC0175L038	SBTC0175L038S101111S010	4	0 - 1	CL	<0.5	1.5	12	20
10/12/2011	**10:45AM**	**SBTC0175L060**	**SBTC0175L060S101211S010**	**4**	**0 - 1**	**CL**	**<0.5**	**2.1**	**2.6**	**3.6**
10/12/2011	**10:45AM**	**SBTC0175L060**	**SBTC0175L060S101211S010-SPLIT**	**4**	**0 - 1**	**CL**	**0.25**	**2.7**	**9**	**12**
10/11/2011	**5:20PM**	**SBTC0175L060A**	**SBTC0175L060AD101111S010**	**4**	**0 - 1**	**CL**	**<0.5**	**3.4**	**8.4**	**12**
10/11/2011	5:20PM	SBTC0175L060A	SBTC0175L060AS101111S010	4	0 - 1	CL	<0.5	2.4	10	17
10/12/2011	11:45AM	SBTC0175L062	SBTC0175L062S101211S006	4	0 - 0.6	CL	<0.5	1.4	8	11
10/12/2011	5:45PM	SBTC0175L078	SBTC0175L078S101211S004	4	0 - 0.45	CL	<0.5	2.5	13	11
10/13/2011	**9:20AM**	**SBTC0175L080**	**SBTC0175L080D101311S010**	**4**	**0 - 1**	**CL**	**<0.5**	**1.5**	**9.1**	**13**
10/13/2011	**9:20AM**	**SBTC0175L080**	**SBTC0175L080S101311S010**	**4**	**0 - 1**	**CL**	**<0.5**	**1.5**	**8.7**	**15**
10/13/2011	10:00AM	SBTC0175L082	SBTC0175L082S101311S010	4	0 - 1	CL	<0.5	1.1	9.4	15
3/28/2014	10:35AM	SBTC0175L509	SBTC0175L509S032814S016	4	1.2 - 1.6	CL	<0.5	3.3	8.5	15
3/28/2014	10:35AM	SBTC0175L509	SBTC0175L509S032814S016	4	1.2 - 1.6	CL	<0.5	3.3	8.5	15
10/1/2011	7:50AM	SBTC0175R008	SBTC0175R008S100111S002	4	0 - 0.2	CL	0.58	1.7	29	36
10/3/2011	10:20AM	SBTC0175R028	SBTC0175R028S100311S006	4	0 - 0.6	CL	<0.5	2.3	15	19
10/15/2011	10:00AM	SBTC0175R062	SBTC0175R062S101511S004	4	0 - 0.4	CL	<0.5	<1	8.3	15
10/6/2011	4:20PM	SBTC0175R068	SBTC0175R068S100611S002	4	0 - 0.2	CL	<0.5	3	11	16
10/15/2011	**3:30PM**	**SBTC0175R084B**	**SBTC0175R084BD101511S010**	**4**	**0 - 1**	**CL**	**0.68**	**1.5**	**16**	**27**
10/15/2011	**3:30PM**	**SBTC0175R084B**	**SBTC0175R084BS101511S010**	**4**	**0 - 1**	**CL**	**<0.5**	**1.8**	**12**	**18**
10/29/2011	3:50PM	SBTC0175R117	SBTC0175R117S102911S005	4	0 - 0.5	CL	0.51	<1	18	30
10/5/2011	2:15PM	SBTC0150L064	SBTC0150L064S100511S010	4	0 - 1	GM	<0.5	4.3	13	11
10/5/2011	2:15PM	SBTC0150L064	SBTC0150L064S100511S010	4	0 - 1	GW	<0.5	4.3	13	11
9/23/2011	5:50PM	SBTC0125R030	SBTC0125R030S092311S006	4	0 - 0.6	ML	<0.5	<1	7	13
9/26/2011	8:05AM	SBTC0125R046	SBTC0125R046S092611S009	4	0 - 0.9	ML	<0.5	2.5	16	18
10/6/2011	1:45PM	SBTC0150L062B	SBTC0150L062BS100611S009	4	0.4 - 0.9	ML	<0.5	1.5	9.2	16
3/5/2014	2:45PM	SBTC0150L504	SBTC0150L504S030514S010	4	0 - 1	ML	<0.5	1.2	9.4	11
3/12/2014	1:20PM	SBTC0150L514	SBTC0150L514S031214S005	4	0 - 0.5	ML	<0.5	3.6	9.3	13
3/12/2014	3:00PM	SBTC0150L515	SBTC0150L515S031214S010	4	0 - 1	ML	<0.5	1.7	12	17
9/26/2011	10:25AM	SBTC0150R016	SBTC0150R016S092611S005	4	0 - 0.5	ML	<0.5	3.2	20	34
9/27/2011	8:35AM	SBTC0150R030	SBTC0150R030S092711S010	4	0 - 1	ML	<0.5	1.5	10	14
10/4/2011	8:05AM	SBTC0150R036A	SBTC0150R036AS100411S003	4	0 - 0.3	ML	<0.5	1.6	9.8	15
10/4/2011	10:40AM	SBTC0150R040A	SBTC0150R040AS100411S006	4	0 - 0.6	ML	<0.5	1.6	9.6	15
9/28/2011	**1:55PM**	**SBTC0150R048**	**SBTC0150R048S092811S007**	**4**	**0 - 0.7**	**ML**	**<0.5**	**1.5**	**9.7**	**18**
9/28/2011	**1:55PM**	**SBTC0150R048**	**SBTC0150R048S092811S007-split**	**4**	**0 - 0.7**	**ML**	**<0.2**	**1**	**10**	**17**
9/28/2011	5:25PM	SBTC0150R059	SBTC0150R059S092811S006	4	0 - 0.6	ML	<0.5	<1	5.9	8.9
9/30/2011	7:55AM	SBTC0150R080	SBTC0150R080S093011S010	4	0.5 - 1	ML	<0.5	2.2	13	20
10/28/2011	**12:30PM**	**SBTC0150R103**	**SBTC0150R103S102811S010**	**4**	**0 - 1**	**ML**	**<0.5**	**1.5**	**14**	**17**
10/28/2011	**12:30PM**	**SBTC0150R103**	**SBTC0150R103S102811S010-SPLIT**	**4**	**0 - 1**	**ML**	**0.34**	**1.7**	**11**	**18**
3/3/2014	10:45AM	SBTC0150R502	SBTC0150R502S030314S020	4	1.5 - 2	ML	<0.85	4.1	15	19
3/5/2014	10:40AM	SBTC0150R506	SBTC0150R506S030514S018	4	1.2 - 1.8	ML	<0.5	3.3	8.7	13
3/11/2014	10:35AM	SBTC0150R510	SBTC0150R510S031114S009	4	0 - 0.9	ML	<0.5	<1	10	20
3/12/2014	**11:12AM**	**SBTC0150R511**	**SBTC0150R511D031214S010**	**4**	**0 - 1**	**ML**	**<0.5**	**1.1**	**8**	**14**
3/12/2014	**11:12AM**	**SBTC0150R511**	**SBTC0150R511S031214S010**	**4**	**0 - 1**	**ML**	**<0.5**	**1.5**	**9.9**	**15**
10/11/2011	5:50PM	SBTC0175L045	SBTC0175L045S101111S004	4	0 - 0.5	ML	<0.5	1.4	9.6	12
10/29/2011	**9:55AM**	**SBTC0175L113**	**SBTC0175L113S102911S008**	**4**	**0 - 0.8**	**ML**	**<0.5**	**<1**	**7.6**	**10**
10/29/2011	**9:55AM**	**SBTC0175L113**	**SBTC0175L113S102911S008-SPLIT**	**4**	**0 - 0.8**	**ML**	**<0.2**	**<1**	**7.8**	**12**
3/14/2014	8:50AM	SBTC0175L501	SBTC0175L501S031414S005	4	0 - 0.5	ML	<0.5	1.7	11	17
3/28/2014	10:35AM	SBTC0175L509	SBTC0175L509S032814S016	4	1.2 - 1.6	ML	<0.5	3.3	8.5	15

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
3/28/2014	10:35AM	SBTC0175L509	SBTC0175L509S032814S016	4	1.2 - 1.6	ML	<0.5	3.3	8.5	15
10/7/2011	**5:00PM**	**SBTC0175R006B**	**SBTC0175R006BS100711S007**	**4**	**0 - 0.7**	**ML**	**<0.5**	**1.5**	**10**	**16**
10/7/2011	**5:00PM**	**SBTC0175R006B**	**SBTC0175R006BS100711S007-SPLIT**	**4**	**0 - 0.7**	**ML**	**0.26**	**1.3**	**11**	**14**
10/4/2011	4:10PM	SBTC0175R032	SBTC0175R032S100411S005	4	0 - 0.5	ML	<0.5	1.2	11	17
10/26/2011	**11:45AM**	**SBTC0175R099**	**SBTC0175R099S102611S005**	**4**	**0 - 0.5**	**ML**	**<0.5**	**1.8**	**13**	**23**
10/26/2011	**11:45AM**	**SBTC0175R099**	**SBTC0175R099S102611S005-SPLIT**	**4**	**0 - 0.5**	**ML**	**0.59**	**1.5**	**16**	**28**
10/29/2011	5:20PM	SBTC0175R104	SBTC0175R104S102911S007	4	0 - 0.7	ML	<0.5	1.2	11	20
10/31/2011	**9:07AM**	**SBTC0175R105**	**SBTC0175R105S103111S013**	**4**	**0.8 - 1.3**	**ML**	**<0.5**	**<1**	**8.2**	**16**
10/31/2011	**9:07AM**	**SBTC0175R105**	**SBTC0175R105S103111S013-SPLIT**	**4**	**0.8 - 1.3**	**ML**	**0.24**	**<1**	**5.9**	**11**
10/31/2011	**1:40PM**	**SBTC0175R111**	**SBTC0175R111S103111S008**	**4**	**0 - 0.8**	**ML**	**<0.5**	**<1**	**6.4**	**12**
10/31/2011	**1:40PM**	**SBTC0175R111**	**SBTC0175R111S103111S008-SPLIT**	**4**	**0 - 0.8**	**ML**	**<0.2**	**<1**	**6.7**	**13**
10/31/2011	2:25PM	SBTC0175R112	SBTC0175R112S103111S007	4	0 - 0.7	ML	<0.5	<1	7.2	12
10/31/2011	**3:20PM**	**SBTC0175R113**	**SBTC0175R113S103111S010**	**4**	**0 - 1**	**ML**	**<0.5**	**<1**	**8**	**13**
10/31/2011	**3:20PM**	**SBTC0175R113**	**SBTC0175R113S103111S010-SPLIT**	**4**	**0 - 1**	**ML**	**0.34**	**<1**	**23**	**13**
10/3/2011	5:15PM	SBTC0175L016	SBTC0175L016S100311S008	4	0 - 0.8	OH	<0.5	1	8.9	13
9/29/2011	4:45PM	SBTC0125L034A	SBTC0125L034AS092911S010	4	0 - 1	OL	<0.93	5	13	15
9/29/2011	5:20PM	SBTC0125L036A	SBTC0125L036AS092911S010	4	0 - 1	OL	<0.5	<1	3.1	4.5
9/29/2011	11:45AM	SBTC0125L038	SBTC0125L038S092911S010	4	0 - 1	OL	<0.77	<1.5	6.6	4.4
9/29/2011	5:55PM	SBTC0125L048A	SBTC0125L048AS092911S003	4	0 - 0.3	OL	<0.5	1.7	6.7	11
2/26/2014	2:44PM	SBTC0125L505	SBTC0125L505S022614S006	4	0 - 0.6	OL	<0.5	1.5	12	17
2/28/2014	11:05AM	SBTC0125L508	SBTC0125L508S022814S010	4	0 - 1	OL	<0.52	3.1	14	21
9/24/2011	**11:25AM**	**SBTC0125R036**	**SBTC0125R036D092411S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**8.2**	**14**
9/24/2011	**11:25AM**	**SBTC0125R036**	**SBTC0125R036S092411S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**8.1**	**14**
2/26/2014	1:20PM	SBTC0125R512	SBTC0125R512S022614S005	4	0 - 0.5	OL	<0.5	2.2	9.7	15
9/28/2011	10:50AM	SBTC0150L010	SBTC0150L010S092811S010	4	0 - 1	OL	<0.85	2.2	12	14
9/30/2011	5:15PM	SBTC0150L016	SBTC0150L016S093011S010	4	0 - 1	OL	<0.83	5.3	9.6	6.8
10/13/2011	11:24AM	SBTC0150L018A	SBTC0150L018AS101311S010	4	0 - 1	OL	<0.5	1.6	9.8	12
10/3/2011	9:40AM	SBTC0150L036	SBTC0150L036S100311S009	4	0 - 0.9	OL	<0.5	1.1	11	15
10/3/2011	**11:40AM**	**SBTC0150L038**	**SBTC0150L038S100311S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.1**	**14**	**22**
10/3/2011	**11:40AM**	**SBTC0150L038**	**SBTC0150L038S100311S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.4**	**2.1**	**13**	**18**
10/5/2011	**4:20PM**	**SBTC0150L042A**	**SBTC0150L042AS100511S007**	**4**	**0.2 - 0.7**	**OL**	**<0.5**	**1.8**	**10**	**16**
10/5/2011	**4:20PM**	**SBTC0150L042A**	**SBTC0150L042AS100511S007-SPLIT**	**4**	**0.2 - 0.7**	**OL**	**0.35**	**2.3**	**11**	**14**
10/3/2011	9:40AM	SBTC0150L044	SBTC0150L044S100311S005	4	0 - 0.5	OL	<0.54	2.1	12	17
10/4/2011	2:53PM	SBTC0150L056	SBTC0150L056S100411S006	4	0 - 0.6	OL	<0.5	<1	8.7	15
10/4/2011	**4:50PM**	**SBTC0150L058**	**SBTC0150L058D100411S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.6**	**9.5**	**14**
10/4/2011	**4:50PM**	**SBTC0150L058**	**SBTC0150L058S100411S010**	**4**	**0 - 1**	**OL**	**<0.5**	**2.1**	**9.1**	**15**
10/5/2011	11:51AM	SBTC0150L059	SBTC0150L059S100511S007	4	0 - 0.75	OL	<0.5	<1	5.2	6.9
10/5/2011	11:00AM	SBTC0150L060	SBTC0150L060S100511S006	4	0 - 0.6	OL	<0.5	1.6	11	15
10/8/2011	3:20PM	SBTC0150L064C	SBTC0150L064CS100811S010	4	0 - 1	OL	0.59	<1	12	25
10/28/2011	12:00PM	SBTC0150L064E	SBTC0150L064ES102811S010	4	0 - 1	OL	<0.5	1.2	13	23
10/5/2011	**5:50PM**	**SBTC0150L066**	**SBTC0150L066S100511S007**	**4**	**0 - 0.7**	**OL**	**<0.6**	**2.5**	**9.9**	**17**
10/5/2011	**5:50PM**	**SBTC0150L066**	**SBTC0150L066S100511S007-SPLIT**	**4**	**0 - 0.7**	**OL**	**0.34**	**1.9**	**8.7**	**14**
10/5/2011	**3:40PM**	**SBTC0150L068**	**SBTC0150L068S100511S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.8**	**8.7**	**18**
10/5/2011	**3:40PM**	**SBTC0150L068**	**SBTC0150L068D100511S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**6.4**	**12**
10/7/2011	**9:07AM**	**SBTC0150L072**	**SBTC0150L072S100711S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.7**	**9.3**	**14**
10/7/2011	**9:07AM**	**SBTC0150L072**	**SBTC0150L072S100711S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.29**	**2.3**	**9.2**	**15**
10/7/2011	6:20PM	SBTC0150L074A	SBTC0150L074AS100711S010	4	0 - 1	OL	<0.5	1.5	11	21
10/6/2011	5:15PM	SBTC0150L075	SBTC0150L075S100611S010	4	0 - 1	OL	<0.5	<1	7.3	12
10/6/2011	4:36PM	SBTC0150L076	SBTC0150L076S100611S010	4	0 - 1	OL	<0.5	1.2	10	17
10/8/2011	9:20AM	SBTC0150L078B	SBTC0150L078BS100811S010	4	0 - 1	OL	<0.78	4.9	15	17
10/8/2011	1:40PM	SBTC0150L080A	SBTC0150L080AS100811S007	4	0 - 0.7	OL	<0.5	<1	7	12
10/7/2011	9:25AM	SBTC0150L082	SBTC0150L082S100711S010	4	0 - 1	OL	<0.5	2.1	12	18
10/7/2011	**1:40PM**	**SBTC0150L083**	**SBTC0150L083S100711S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.7**	**13**	**34**
10/7/2011	**1:40PM**	**SBTC0150L083**	**SBTC0150L083S100711S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.35**	**1**	**10**	**18**
10/7/2011	11:40AM	SBTC0150L084	SBTC0150L084S100711S006	4	0 - 0.6	OL	<0.5	1.8	9.4	14
10/7/2011	2:18PM	SBTC0150L086	SBTC0150L086S100711S010	4	0 - 1	OL	<0.5	2	14	21
10/7/2011	3:40PM	SBTC0150L091	SBTC0150L091S100711S010	4	0 - 1	OL	<0.5	<1	6.7	12
10/8/2011	**8:25AM**	**SBTC0150L094**	**SBTC0150L094D100811S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.3**	**7.9**	**12**
10/8/2011	**8:25AM**	**SBTC0150L094**	**SBTC0150L094S100811S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.4**	**9.2**	**17**
10/8/2011	**8:25AM**	**SBTC0150L094**	**SBTC0150L094S100811S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.28**	**1.5**	**11**	**17**
10/8/2011	11:00AM	SBTC0150L096A	SBTC0150L096AS100811S010	4	0 - 1	OL	<0.51	1.5	9.8	15
10/8/2011	**11:50AM**	**SBTC0150L097**	**SBTC0150L097D100811S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.2**	**6.3**	**11**
10/8/2011	**11:50AM**	**SBTC0150L097**	**SBTC0150L097S100811S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.5**	**9.8**	**17**
3/4/2014	2:54PM	SBTC0150L502	SBTC0150L502S030414S005	4	0 - 0.5	OL	<0.5	1.8	6	8.6
3/5/2014	2:45PM	SBTC0150L504	SBTC0150L504S030514S010	4	0 - 1	OL	<0.5	1.2	9.4	11
9/26/2011	**4:05PM**	**SBTC0150R002A**	**SBTC0150R002AS092611S010**	**4**	**0 - 1**	**OL**	**0.56**	**1.1**	**14**	**27**
9/26/2011	**4:05PM**	**SBTC0150R002A**	**SBTC0150R002AS092611S010-split**	**4**	**0 - 1**	**OL**	**0.51**	**1**	**12**	**22**
9/26/2011	5:40PM	SBTC0150R004A	SBTC0150R004AS092611S010	4	0 - 1	OL	0.5	1.1	12	21
9/26/2011	**12:40PM**	**SBTC0150R008**	**SBTC0150R008S092611S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.9**	**12**	**22**

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
9/26/2011	**12:40PM**	**SBTC0150R008**	**SBTC0150R008S092611S010-split**	**4**	**0 - 1**	**OL**	**0.32**	**1.6**	**11**	**18**
10/13/2011	**2:18PM**	**SBTC0150R012C**	**SBTC0150R012CS101311S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.5**	**12**	**21**
10/13/2011	**2:18PM**	**SBTC0150R012C**	**SBTC0150R012CS101311S010-split**	**4**	**0 - 1**	**OL**	**0.41**	**1.6**	**11**	**17**
9/26/2011	1:40PM	SBTC0150R018	SBTC0150R018S092611S003	4	0 - 0.3	OL	<0.5	2	9.6	16
9/26/2011	4:45PM	SBTC0150R020	SBTC0150R020S092611S006	4	0 - 0.6	OL	<0.5	2	11	16
9/26/2011	1:30PM	SBTC0150R022	SBTC0150R022S092611S005	4	0 - 0.5	OL	<0.55	1.5	8.7	16
9/30/2011	11:15AM	SBTC0150R022E	SBTC0150R022ES093011S008	4	0 - 0.8	OL	<0.5	1.2	8.7	14
9/26/2011	5:00PM	SBTC0150R024	SBTC0150R024S092611S010	4	0 - 1	OL	<0.6	1.3	13	19
10/22/2011	3:45PM	SBTC0150R026A	SBTC0150R026AS102211S010	4	0 - 1	OL	<0.5	<1	13	20
10/22/2011	5:25PM	SBTC0150R026C	SBTC0150R026CS102211S010	4	0 - 1	OL	<0.66	<1.3	11	20
9/26/2011	6:23PM	SBTC0150R032	SBTC0150R032S092611S010	4	0 - 1	OL	<0.5	2.8	9.6	13
9/28/2011	**7:55AM**	**SBTC0150R034**	**SBTC0150R034D092811S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.3**	**9.6**	**13**
9/28/2011	**7:55AM**	**SBTC0150R034**	**SBTC0150R034S092811S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.4**	**11**	**15**
9/28/2011	**9:35AM**	**SBTC0150R042**	**SBTC0150R042D092811S007**	**4**	**0 - 0.7**	**OL**	**<0.5**	**2.6**	**15**	**16**
9/28/2011	**9:35AM**	**SBTC0150R042**	**SBTC0150R042S092811S007**	**4**	**0 - 0.7**	**OL**	**<0.5**	**1.6**	**9.9**	**16**
9/28/2011	**9:35AM**	**SBTC0150R042**	**SBTC0150R042S092811S007-split**	**4**	**0 - 0.7**	**OL**	**0.22**	**1.5**	**10**	**16**
9/28/2011	1:50PM	SBTC0150R049	SBTC0150R049S092811S007	4	0 - 0.7	OL	<0.5	1.4	9.6	13
9/28/2011	2:10PM	SBTC0150R050	SBTC0150R050S092811S008	4	0 - 0.8	OL	<0.5	1.8	9.3	18
9/28/2011	6:15PM	SBTC0150R054	SBTC0150R054S092811S006	4	0 - 0.6	OL	<0.5	1.1	11	16
10/5/2011	5:05PM	SBTC0150R056C	SBTC0150R056CS100511S003	4	0 - 0.3	OL	<0.5	1.6	10	16
10/5/2011	5:15PM	SBTC0150R056D	SBTC0150R056DS100511S010	4	0 - 1	OL	<0.5	1.6	10	14
10/4/2011	9:25AM	SBTC0150R057	SBTC0150R057S100411S004	4	0 - 0.4	OL	<0.5	1.5	7.9	13
10/4/2011	**10:25AM**	**SBTC0150R058**	**SBTC0150R058D100411S007**	**4**	**0 - 0.7**	**OL**	**<0.5**	**1.6**	**10**	**14**
10/4/2011	**10:25AM**	**SBTC0150R058**	**SBTC0150R058S100411S007**	**4**	**0 - 0.75**	**OL**	**<0.5**	**1.3**	**9**	**15**
10/4/2011	**10:25AM**	**SBTC0150R058**	**SBTC0150R058S100411S007-SPLIT**	**4**	**0 - 0.75**	**OL**	**0.29**	**1.5**	**10**	**17**
9/28/2011	6:05PM	SBTC0150R060	SBTC0150R060S092811S010	4	0 - 1	OL	<0.5	<1	4.2	6.6
9/29/2011	2:10PM	SBTC0150R066	SBTC0150R066S092911S008	4	0 - 0.8	OL	<0.5	1.4	10	16
9/29/2011	12:10PM	SBTC0150R066D	SBTC0150R066DS092911S008	4	0 - 0.87	OL	<0.5	1.6	12	15
9/29/2011	1:00PM	SBTC0150R068	SBTC0150R068S092911S004	4	0 - 0.4	OL	<0.5	1.3	10	16
9/29/2011	**2:40PM**	**SBTC0150R070**	**SBTC0150R070D092911S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**5**	**7.7**
9/29/2011	**2:40PM**	**SBTC0150R070**	**SBTC0150R070S092911S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**5.8**	**12**
9/30/2011	**8:00AM**	**SBTC0150R072**	**SBTC0150R072D093011S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1**	**9.2**	**19**
9/30/2011	**8:00AM**	**SBTC0150R072**	**SBTC0150R072S093011S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.1**	**8.9**	**16**
9/30/2011	**9:00AM**	**SBTC0150R074**	**SBTC0150R074S093011S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.1**	**8.5**	**18**
9/30/2011	**9:00AM**	**SBTC0150R074**	**SBTC0150R074S093011S010-split**	**4**	**0 - 1**	**OL**	**0.32**	**1.9**	**13**	**17**
9/29/2011	**4:20PM**	**SBTC0150R078**	**SBTC0150R078S092911S008**	**4**	**0 - 0.8**	**OL**	**<0.5**	**1.4**	**11**	**18**
9/29/2011	**4:20PM**	**SBTC0150R078**	**SBTC0150R078S092911S008-split**	**4**	**0 - 0.8**	**OL**	**0.33**	**1.4**	**11**	**19**
9/30/2011	9:55AM	SBTC0150R080D	SBTC0150R080DS093011S010	4	0 - 1	OL	<0.5	1.6	9.5	16
9/30/2011	10:20AM	SBTC0150R082	SBTC0150R082S093011S008	4	0 - 0.8	OL	<0.5	1.8	11	17
9/30/2011	**9:25AM**	**SBTC0150R084**	**SBTC0150R084S093011S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.1**	**10**	**18**
9/30/2011	**9:25AM**	**SBTC0150R084**	**SBTC0150R084S093011S010-split**	**4**	**0 - 1**	**OL**	**0.43**	**1.7**	**12**	**21**
9/30/2011	11:05AM	SBTC0150R086	SBTC0150R086S093011S010	4	0 - 1	OL	0.57	1.2	16	29
9/30/2011	1:45PM	SBTC0150R088	SBTC0150R088S093011S010	4	0 - 1	OL	<0.5	1.4	12	23
9/30/2011	**1:40PM**	**SBTC0150R090**	**SBTC0150R090D093011S007**	**4**	**0 - 0.7**	**OL**	**<0.5**	**1.5**	**11**	**18**
9/30/2011	**1:40PM**	**SBTC0150R090**	**SBTC0150R090S093011S007**	**4**	**0 - 0.7**	**OL**	**<0.5**	**1.5**	**10**	**16**
9/30/2011	**12:20PM**	**SBTC0150R092**	**SBTC0150R092S093011S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**9**	**16**
9/30/2011	**12:20PM**	**SBTC0150R092**	**SBTC0150R092S093011S010-split**	**4**	**0 - 1**	**OL**	**0.33**	**<1**	**11**	**15**
10/4/2011	11:30AM	SBTC0150R094A	SBTC0150R094AS100411S003	4	0 - 0.3	OL	<0.5	1	10	19
10/8/2011	**5:05PM**	**SBTC0150R094B**	**SBTC0150R094BS100811S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1**	**6.8**	**12**
10/8/2011	**5:05PM**	**SBTC0150R094B**	**SBTC0150R094BS100811S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.35**	**1.7**	**9.8**	**17**
9/30/2011	3:40PM	SBTC0150R098	SBTC0150R098S093011S006	4	0 - 0.6	OL	<0.5	1.5	9.5	15
3/3/2014	10:45AM	SBTC0150R502	SBTC0150R502S030314S020	4	1.5 - 2	OL	<0.85	4.1	15	19
3/7/2014	**8:55AM**	**SBTC0150R508**	**SBTC0150R508D030714S005**	**4**	**0 - 0.5**	**OL**	**<0.5**	**1.3**	**9.7**	**14**
3/7/2014	**8:55AM**	**SBTC0150R508**	**SBTC0150R508S030714S005**	**4**	**0 - 0.5**	**OL**	**<0.5**	**1.4**	**11**	**15**
3/10/2014	2:28PM	SBTC0150R509	SBTC0150R509S031014S008	4	0 - 0.8	OL	0.57	<1	8.8	15
3/12/2014	**11:12AM**	**SBTC0150R511**	**SBTC0150R511D031214S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.1**	**8**	**14**
3/12/2014	**11:12AM**	**SBTC0150R511**	**SBTC0150R511S031214S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.5**	**9.9**	**15**
10/10/2011	10:00AM	SBTC0175L002D	SBTC0175L002DS101011S010	4	0 - 1	OL	<0.5	<1	3.8	7.3
10/10/2011	**8:50AM**	**SBTC0175L006A**	**SBTC0175L006AS101011S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**7.2**	**12**
10/10/2011	**8:50AM**	**SBTC0175L006A**	**SBTC0175L006AS101011S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.4**	**<1**	**10**	**22**
10/4/2011	10:45AM	SBTC0175L008	SBTC0175L008S100411S010	4	0 - 1	OL	<0.5	1.5	10	15
10/4/2011	**8:25AM**	**SBTC0175L009**	**SBTC0175L009D100411S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**2.8**	**7.5**
10/4/2011	**8:25AM**	**SBTC0175L009**	**SBTC0175L009S100411S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**4.3**	**7**
10/4/2011	**8:25AM**	**SBTC0175L009**	**SBTC0175L009S100411S010-SPLIT**	**4**	**0 - 1**	**OL**	**<0.2**	**<1**	**4.2**	**8.3**
10/4/2011	9:10AM	SBTC0175L010	SBTC0175L010S100411S010	4	0 - 1	OL	<0.5	1.2	12	19
10/3/2011	5:45PM	SBTC0175L014	SBTC0175L014S100311S010	4	0 - 1	OL	0.59	1.2	16	30
10/3/2011	**5:05PM**	**SBTC0175L022**	**SBTC0175L022D100311S010**	**4**	**0 - 1**	**OL**	**<0.61**	**1.9**	**8.1**	**11**
10/3/2011	**5:05PM**	**SBTC0175L022**	**SBTC0175L022S100311S010**	**4**	**0 - 1**	**OL**	**<0.76**	**2.5**	**13**	**19**
10/3/2011	**5:05PM**	**SBTC0175L022**	**SBTC0175L022S100311S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.38**	**2.7**	**10**	**16**

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
10/3/2011	3:45PM	SBTC0175L024	SBTC0175L024S100311S007	4	0 - 0.7	OL	<0.5	1.2	13	20
10/3/2011	**2:00PM**	**SBTC0175L026**	**SBTC0175L026S100311S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.6**	**10**	**14**
10/3/2011	**2:00PM**	**SBTC0175L026**	**SBTC0178L026S100311S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.28**	**1.3**	**9.8**	**15**
10/3/2011	**1:07PM**	**SBTC0175L028**	**SBTC0175L028S100311S007**	**4**	**0 - 0.7**	**OL**	**<0.5**	**1.1**	**10**	**14**
10/3/2011	**1:07PM**	**SBTC0175L028**	**SBTC0175L028S100311S007-SPLIT**	**4**	**0 - 0.7**	**OL**	**0.24**	**1.1**	**11**	**17**
10/3/2011	11:25AM	SBTC0175L030	SBTC0175L030S100311S003	4	0 - 0.3	OL	<0.5	1.3	12	18
10/31/2011	**4:50PM**	**SBTC0175L030A**	**SBTC0175L030AS103111S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**9.2**	**15**
10/31/2011	**4:50PM**	**SBTC0175L030A**	**SBTC0175L030AS103111S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.43**	**1.1**	**14**	**21**
10/10/2011	2:25PM	SBTC0175L033	SBTC0175L033S101011S007	4	0 - 0.7	OL	<0.5	1.1	7.3	11
10/10/2011	5:40PM	SBTC0175L034	SBTC0175L034S101011S007	4	0 - 0.7	OL	<0.5	1.2	7.8	9.9
10/11/2011	10:20AM	SBTC0175L041	SBTC0175L041S101111S003	4	0 - 0.3	OL	0.83	1.5	22	23
10/11/2011	8:50AM	SBTC0175L042	SBTC0175L042S101111S007	4	0 - 0.7	OL	<0.5	1.7	11	16
10/11/2011	6:10PM	SBTC0175L046	SBTC0175L046S101111S006	4	0 - 0.6	OL	<0.5	1.2	9.8	17
10/11/2011	**1:15PM**	**SBTC0175L048**	**SBTC0175L048S101111S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**8.4**	**12**
10/11/2011	**12:00PM**	**SBTC0175L048**	**SBTC0175L048S101111S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.27**	**1.1**	**9.5**	**17**
10/11/2011	2:10PM	SBTC0175L050	SBTC0175L050S101111S008	4	0 - 0.8	OL	<0.5	1.4	12	21
10/12/2011	**8:20AM**	**SBTC0175L051**	**SBTC0175L051D101211S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**6.2**	**9.2**
10/12/2011	**8:20AM**	**SBTC0175L051**	**SBTC0175L051S101211S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**6**	**8.7**
10/12/2011	6:00PM	SBTC0175L052A	SBTC0175L052AS101211S002	4	0 - 0.25	OL	<0.5	<1	6.7	9.7
10/12/2011	9:20AM	SBTC0175L054	SBTC0175L054S101211S010	4	0 - 1	OL	<0.5	1.4	4.4	5.6
10/12/2011	9:50AM	SBTC0175L056	SBTC0175L056S101211S006	4	0 - 0.65	OL	<0.5	<1	5.3	9.4
10/26/2011	10:15AM	SBTC0175L058B	SBTC0175L058BS102611S010	4	0 - 1	OL	<0.57	4	14	15
10/13/2011	11:15AM	SBTC0175L064C	SBTC0175L064CS101311S010	4	0 - 1	OL	<0.59	2.6	15	28
10/13/2011	**10:30AM**	**SBTC0175L066B**	**SBTC0175L066BD101311S010**	**4**	**0 - 1**	**OL**	**<0.67**	**2.8**	**10**	**16**
10/13/2011	**10:30AM**	**SBTC0175L066B**	**SBTC0175L066BS101311S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.5**	**6.8**	**12**
10/13/2011	10:50AM	SBTC0175L066C	SBTC0175L066CS101311S005	4	0 - 0.55	OL	<0.5	2.3	11	21
10/12/2011	**3:10PM**	**SBTC0175L070**	**SBTC0175L070D101211S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**2.9**	**4.4**
10/12/2011	**3:10PM**	**SBTC0175L070**	**SBTC0175L070S101211S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**3.4**	**4.4**
10/14/2011	**5:00PM**	**SBTC0175L072B**	**SBTC0175L072BD101411S010**	**4**	**0 - 1**	**OL**	**<0.5**	**2.8**	**9.5**	**20**
10/14/2011	**5:00PM**	**SBTC0175L072B**	**SBTC0175L072BS101411S010**	**4**	**0 - 1**	**OL**	**0.52**	**2.2**	**13**	**29**
10/15/2011	9:20AM	SBTC0175L072E	SBTC0175L072ES101511S010	4	0 - 1	OL	0.51	2.8	23	32
10/15/2011	10:55AM	SBTC0175L072G	SBTC0175L072GS101511S005	4	0 - 0.5	OL	<0.5	3	12	17
10/12/2011	4:40PM	SBTC0175L073	SBTC0175L073S101211S009	4	0 - 0.9	OL	<0.5	1.4	5.2	6.8
10/12/2011	5:12PM	SBTC0175L074	SBTC0175L074S101211S010	4	0 - 1	OL	<0.5	1.4	4.2	6
10/13/2011	2:20PM	SBTC0175L090A	SBTC0175L090AS101311S010	4	0 - 1	OL	<0.5	3.9	9.6	16
10/14/2011	**9:15AM**	**SBTC0175L096**	**SBTC0175L096D101411S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.9**	**7.3**	**16**
10/14/2011	**9:15AM**	**SBTC0175L096**	**SBTC0175L096S101411S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.9**	**9.5**	**17**
10/25/2011	**11:00AM**	**SBTC0175L105**	**SBTC0175L105S102511S008**	**4**	**0 - 0.8**	**OL**	**<0.5**	**1.9**	**5.2**	**6.7**
10/28/2011	10:05AM	SBTC0175L107	SBTC0175L107S102811S010	4	0 - 1	OL	<0.54	3.7	6.8	12
10/28/2011	2:25PM	SBTC0175L108	SBTC0175L108S102811S010	4	0 - 1	OL	<0.5	1.7	14	22
10/28/2011	**11:00AM**	**SBTC0175L109**	**SBTC0175L109S102811S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.6**	**8.6**	**12**
10/28/2011	**11:00AM**	**SBTC0175L109**	**SBTC0175L109S102811S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.36**	**1.7**	**9**	**16**
10/28/2011	**5:00PM**	**SBTC0175L110**	**SBTC0175L110S102811S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.1**	**7.5**	**14**
10/28/2011	**5:00PM**	**SBTC0175L110**	**SBTC0175L110S102811S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.51**	**1.3**	**12**	**22**
10/29/2011	**4:45PM**	**SBTC0175L112**	**SBTC0175L112S102911S010**	**4**	**0.1 - 1**	**OL**	**<0.5**	**<1**	**7.4**	**7.8**
10/29/2011	**4:45PM**	**SBTC0175L112**	**SBTC0175L112S102911S010-SPLIT**	**4**	**0.1 - 1**	**OL**	**0.32**	**<1**	**11**	**11**
10/29/2011	10:20AM	SBTC0175L114	SBTC0175L114S102911S010	4	0 - 1	OL	<0.91	2.4	9.7	20
3/27/2014	1:25PM	SBTC0175L506	SBTC0175L506S032714S003	4	0.1 - 0.3	OL	<0.5	<1	7.5	12
10/1/2011	11:50AM	SBTC0175R014	SBTC0175R014S100111S010	4	0 - 1	OL	<0.5	<1	13	20
10/1/2011	**4:45PM**	**SBTC0175R026**	**SBTC0175R026S100111S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1**	**11**	**19**
10/1/2011	**4:45PM**	**SBTC0175R026**	**SBTC0175R026S100111S010-split**	**4**	**0 - 1**	**OL**	**4.5**	**12**	**110**	**210**
10/4/2011	6:10PM	SBTC0175R036	SBTC0175R036S100411S010	4	0 - 1	OL	<0.5	<1	5.1	5.3
10/5/2011	**9:55AM**	**SBTC0175R038**	**SBTC0175R038S100511S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.5**	**14**	**28**
10/5/2011	**9:55AM**	**SBTC0175R038**	**SBTC0175R038S100511S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.57**	**1.5**	**18**	**25**
10/5/2011	**10:35AM**	**SBTC0175R040**	**SBTC0175R040S100511S008**	**4**	**0 - 0.8**	**OL**	**<0.5**	**1.3**	**12**	**23**
10/5/2011	**10:35AM**	**SBTC0175R040**	**SBTC0175R040S100511S008-SPLIT**	**4**	**0 - 0.8**	**OL**	**0.39**	**2.9**	**14**	**20**
10/5/2011	**11:30AM**	**SBTC0175R044**	**SBTC0175R044S100511S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.5**	**8.6**	**14**
10/5/2011	**11:30AM**	**SBTC0175R044**	**SBTC0175R044S100511S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.35**	**2.3**	**12**	**17**
10/5/2011	6:04PM	SBTC0175R048	SBTC0175R048S100511S010	4	0 - 1	OL	<0.5	1.4	11	15
10/6/2011	**2:25PM**	**SBTC0175R054**	**SBTC0175R054S100611S010**	**4**	**0 - 1**	**OL**	**<0.5**	**<1**	**9.2**	**12**
10/6/2011	**2:25PM**	**SBTC0175R054**	**SBTC0175R054S100611S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.4**	**1.5**	**11**	**16**
10/6/2011	**3:15PM**	**SBTC0175R056**	**SBTC0175R056D100611S010**	**4**	**0 - 1**	**OL**	**<0.5**	**2.3**	**11**	**17**
10/6/2011	**3:15PM**	**SBTC0175R056**	**SBTC0175R056S100611S010**	**4**	**0 - 1**	**OL**	**<0.5**	**1.9**	**9.6**	**13**
10/7/2011	10:20AM	SBTC0175R078	SBTC0175R078S100711S004	4	0 - 0.4	OL	<0.5	2.4	12	19
10/7/2011	**12:58PM**	**SBTC0175R080**	**SBTC0175R080D100711S008**	**4**	**0 - 0.8**	**OL**	**<0.5**	**1.4**	**11**	**17**
10/7/2011	**12:58PM**	**SBTC0175R080**	**SBTC0175R080S100711S008**	**4**	**0 - 0.8**	**OL**	**<0.5**	**1.4**	**13**	**20**
10/7/2011	2:30PM	SBTC0175R084A	SBTC0175R084AS100711S010	4	0 - 1	OL	<0.5	2.6	9.5	13
10/7/2011	2:35PM	SBTC0175R086	SBTC0175R086S100711S006	4	0 - 0.6	OL	<0.5	1.3	10	16
10/8/2011	**4:15PM**	**SBTC0175R097**	**SBTC0175R097S100811S010**	**4**	**0 - 1**	**OL**	**<0.5**	**2.9**	**14**	**18**

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
10/8/2011	**4:15PM**	**SBTC0175R097**	**SBTC0175R097S100811S010-SPLIT**	**4**	**0 - 1**	**OL**	**0.31**	**2.1**	**11**	**17**
10/26/2011	**12:55PM**	**SBTC0175R100**	**SBTC0175R100D102611S010**	**4**	**0 - 1**	**OL**	**<0.63**	**3.1**	**8.3**	**15**
10/26/2011	**12:55PM**	**SBTC0175R100**	**SBTC0175R100S102611S010**	**4**	**0 - 1**	**OL**	**0.73**	**5.7**	**25**	**40**
10/26/2011	**1:30PM**	**SBTC0175R101**	**SBTC0175R101S102611S011**	**4**	**0.6 - 1.1**	**OL**	**<0.5**	**<1**	**5.9**	**5.9**
10/26/2011	**1:30PM**	**SBTC0175R101**	**SBTC0175R101S102611S011-SPLIT**	**4**	**0.6 - 1.1**	**OL**	**0.39**	**<1**	**9**	**9.2**
10/31/2011	4:20PM	SBTC0175R102A	SBTC0175R102AS103111S010	4	0 - 1	OL	0.53	2	18	26
10/31/2011	**10:00AM**	**SBTC0175R106**	**SBTC0175R106D103111S010**	**4**	**0 - 1**	**OL**	**<0.5**	**2.5**	**12**	**17**
10/31/2011	**10:00AM**	**SBTC0175R106**	**SBTC0175R106S103111S010**	**4**	**0 - 1**	**OL**	**<0.5**	**2.2**	**8.8**	**13**
10/31/2011	10:40AM	SBTC0175R107	SBTC0175R107S103111S010	4	0 - 1	OL	<0.5	4	9	16
10/31/2011	11:15AM	SBTC0175R108	SBTC0175R108S103111S010	4	0 - 1	OL	<0.5	1.3	8.7	17
3/27/2014	10:45AM	SBTC0175R506	SBTC0175R506S032714S009	4	0 - 0.9	OL	NA	2.2	NA	NA
2/27/2014	3:15PM	SBTC0125R513	SBTC0125R513S022714S024	4	1.9 - 2.4	PT	<0.62	2.4	10	18
9/24/2011	9:20AM	SBTC0125R034	SBTC0125R034S092411S009	4	0 - 0.9	SM	<0.5	<1	6.7	11
9/24/2011	1:55PM	SBTC0125R038	SBTC0125R038S092411S010	4	0 - 1	SM	<0.5	<1	12	19
9/24/2011	3:00PM	SBTC0125R040	SBTC0125R040S092411S010	4	0 - 1	SM	<0.5	<1	9.8	18
9/24/2011	4:00PM	SBTC0125R042	SBTC0125R042S092411S007	4	0 - 0.7	SM	<0.5	<1	19	24
10/5/2011	8:35AM	SBTC0150L050	SBTC0150L050S100511S004	4	0 - 0.4	SM	<0.5	1.1	9.3	14
10/28/2011	11:15AM	SBTC0150L064D	SBTC0150L064DS102811S006	4	0 - 0.6	SM	<0.5	<1	7.4	13
10/8/2011	7:55AM	SBTC0150L070A	SBTC0150L070AS100811S005	4	0 - 0.5	SM	<0.5	1.6	7.9	12
10/4/2011	11:30AM	SBTC0150R096A	SBTC0150R096AS100411S005	4	0 - 0.55	SM	<0.5	<1	12	17
3/6/2014	2:45PM	SBTC0150R507	SBTC0150R507S030614S023	4	1.5 - 2.3	SM	<0.5	<1	4.6	7.6
10/10/2011	6:15PM	SBTC0175L036	SBTC0175L036S101011S010	4	0 - 1	SM	<0.5	2.5	6.2	9.3
10/31/2011	9:05AM	SBTC0175R105	SBTC0175R105S103111S005	4	0 - 0.5	SM	<0.5	<1	6.4	10
10/1/2011	9:20AM	SBTC0150L025	SBTC0150L025S100111S003	4	0 - 0.3	SP	<0.5	<1	5.3	7.5
10/28/2011	11:15AM	SBTC0150L064D	SBTC0150L064DS102811S006	4	0 - 0.6	SP	<0.5	<1	7.4	13
9/27/2011	3:35PM	SBTC0150R012B	SBTC0150R012BS092711S010	4	0 - 1	SP	<0.5	<1	5.8	10
3/6/2014	2:45PM	SBTC0150R507	SBTC0150R507S030614S023	4	1.5 - 2.3	SP	<0.5	<1	4.6	7.6
10/7/2011	4:10PM	SBTC0175R066A	SBTC0175R066AS100711S010	4	0 - 1	SP	<0.5	2.4	17	19
10/31/2011	9:05AM	SBTC0175R105	SBTC0175R105S103111S005	4	0 - 0.5	SP	<0.5	<1	6.4	10
10/29/2011	4:25PM	SBTC0175R119	SBTC0175R119S102911S003	4	0 - 0.3	SP	<0.5	<1	2.6	4.3
3/6/2014	9:15AM	SBTC0150L505	SBTC0150L505S030614S012	4	0 - 1.2	SW	<0.5	1.5	9.2	15
9/28/2011	**2:45PM**	**SBTC0150R051**	**SBTC0150R051D092811S010**	**4**	**0 - 1**	**SW**	**<0.5**	**1.9**	**11**	**18**
9/28/2011	**2:45PM**	**SBTC0150R051**	**SBTC0150R051S092811S010**	**4**	**0 - 1**	**SW**	**<0.5**	**1.6**	**10**	**18**
9/28/2011	**2:45PM**	**SBTC0150R051**	**SBTC0150R051S092811S010-split**	**4**	**0 - 1**	**SW**	**0.22**	**2**	**13**	**18**
10/4/2011	11:30AM	SBTC0150R096A	SBTC0150R096AS100411S005	4	0 - 0.55	SW	<0.5	<1	12	17
10/28/2011	3:10PM	SBTC0175L111	SBTC0175L111S102811S007	4	0 - 0.7	SW	<0.5	<1	9.9	17
9/30/2011	4:30PM	SBTC0175R002D	SBTC0175R002DS093011S010	4	0 - 1	SW	<0.5	<1	11	12
10/14/2011	3:35 PM	SBTC0200L032	SBTC0200L032S101411S008	5	0 - 0.8 ft	CL	<0.5	1.7	14	22
10/17/2011	10:30 AM	SBTC0200L058	SBTC0200L058S101711S010	5	0 - 1 ft	CL	<0.5	1.4	12	19
10/19/2011	**8:55 AM**	**SBTC0200L068**	**SBTC0200L068D101911S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**1.2**	**11**	**18**
10/19/2011	**8:55 AM**	**SBTC0200L068**	**SBTC0200L068S101911S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**1.3**	**11**	**21**
10/19/2011	**8:55 AM**	**SBTC0200L068**	**SBTC0200L068S101911S010-SPLIT**	**5**	**0 - 1 ft**	**CL**	**0.4**	**1.4**	**11**	**18**
10/19/2011	9:40 AM	SBTC0200L070	SBTC0200L070S101911S009	5	0 - 0.9 ft	CL	<0.5	1.6	9.4	15
10/19/2011	**5:20 PM**	**SBTC0200L078**	**SBTC0200L078S101911S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**1.6**	**11**	**20**
10/19/2011	**5:20 PM**	**SBTC0200L078**	**SBTC0200R078S101911S010-SPLIT**	**5**	**0 - 1 ft**	**CL**	**0.45**	**1.8**	**14**	**20**
10/10/2011	**1:25 PM**	**SBTC0200R020**	**SBTC0200R020D101011S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**<1**	**7.8**	**13**
10/10/2011	**1:25 PM**	**SBTC0200R020**	**SBTC0200R020S101011S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**<1**	**6.4**	**11**
10/10/2011	**2:50 PM**	**SBTC0200R023**	**SBTC0200R023S101011S009**	**5**	**0 - 0.9 ft**	**CL**	**<0.5**	**<1**	**6.3**	**8.6**
10/10/2011	**2:50 PM**	**SBTC0200R023**	**SBTC0200R023S101011S009-SPLIT**	**5**	**0 - 0.9 ft**	**CL**	**0.26**	**1.2**	**9.6**	**16**
10/10/2011	3:30 PM	SBTC0200R026	SBTC0200R026S101011S010	5	0 - 1 ft	CL	<0.5	<1	4.2	7
10/10/2011	**4:15 PM**	**SBTC0200R028**	**SBTC0200R028D101011S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**<1**	**6.4**	**11**
10/10/2011	**4:15 PM**	**SBTC0200R028**	**SBTC0200R028S101011S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**1**	**6.8**	**12**
10/11/2011	**8:40 AM**	**SBTC0200R038**	**SBTC0200R038D101111S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**1.5**	**12**	**22**
10/11/2011	**8:40 AM**	**SBTC0200R038**	**SBTC0200R038S101111S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**1.9**	**12**	**22**
10/11/2011	**2:35 PM**	**SBTC0200R044**	**SBTC0200R044S101111S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**1.4**	**9.6**	**17**
10/11/2011	**12:00 PM**	**SBTC0200R044**	**SBTC0200R044S101111S010-SPLIT**	**5**	**0 - 1 ft**	**CL**	**0.42**	**1.8**	**11**	**21**
10/11/2011	**3:30 PM**	**SBTC0200R047**	**SBTC0200R047D101111S007**	**5**	**0 - 0.7 ft**	**CL**	**<0.5**	**<1**	**6.3**	**9.4**
10/11/2011	**3:30 PM**	**SBTC0200R047**	**SBTC0200R047S101111S007**	**5**	**0 - 0.7 ft**	**CL**	**<0.5**	**<1**	**7.6**	**11**
10/11/2011	**4:20 PM**	**SBTC0200R049**	**SBTC0200R049S101111S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**<1**	**5.1**	**8.9**
10/11/2011	**12:00 PM**	**SBTC0200R049**	**SBTC0200R049S101111S010-SPLIT**	**5**	**0 - 1 ft**	**CL**	**<0.2**	**1.3**	**6.7**	**12**
10/12/2011	**9:10 AM**	**SBTC0200R054**	**SBTC0200R054D101211S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**<1**	**8.1**	**12**
10/12/2011	**9:10 AM**	**SBTC0200R054**	**SBTC0200R054S101211S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**<1**	**8.1**	**12**
10/19/2011	**4:20 PM**	**SBTC0200R076**	**SBTC0200R076D101911S010**	**5**	**0 - 1 ft**	**CL**	**<0.71**	**1.8**	**15**	**27**
10/19/2011	**4:20 PM**	**SBTC0200R076**	**SBTC0200R076S101911S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**1.6**	**9.9**	**16**
10/19/2011	12:20 PM	SBTC0225R004C	SBTC0225R004CS101911S052	5	4.5 - 5.2 ft	CL	<0.5	<1	18	27
10/18/2011	**12:15 PM**	**SBTC0225R006L**	**SBTC0225R006LD101811S010**	**5**	**0 - 1 ft**	**CL**	**0.56**	**1.3**	**18**	**27**
10/18/2011	**12:15 PM**	**SBTC0225R006L**	**SBTC0225R006LS101811S010**	**5**	**0 - 1 ft**	**CL**	**0.5**	**1.2**	**17**	**24**
10/10/2011	6:20 PM	SBTC0200R035	SBTC0200R035S101011S002	5	0 - 0.25 ft	ML	<0.5	1.2	7	9.3
10/18/2011	2:10 PM	SBTC0200R061	SBTC0200R061S101811S010	5	0 - 1 ft	ML	<0.5	1.9	13	21

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
12/3/2013	4:16 PM	SBTC0200R501	SBTC0200R501S120313S006	5	0.4 - 0.6 ft	ML	<0.5	1.1	11	12
12/4/2013	8:20 AM	SBTC0200R502	SBTC0200R502S120413S006	5	0 - 0.6 ft	ML	<0.5	1.5	10	14
12/4/2013	8:25 AM	SBTC0200R502	SBTC0200R502S120413S010	5	0.6 - 1 ft	ML	0.93	2.9	35	42
10/17/2011	10:30 AM	SBTC0225L008	SBTC0225L008S101711S010	5	0 - 1 ft	ML	<0.5	3.4	15	19
10/17/2011	9:21 AM	SBTC0225L009	SBTC0225L009S101711S010	5	0 - 1 ft	ML	<0.5	1.2	8.6	13
10/15/2011	4:45 PM	SBTC0225L011	SBTC0225L011S101511S010	5	0 - 1 ft	ML	0.75	1.7	19	26
10/15/2011	8:03 AM	SBTC0225R001	SBTC0225R001S101511S010	5	0 - 1 ft	ML	<0.5	1.7	9.8	17
10/14/2011	**9:30 AM**	**SBTC0175L098**	**SBTC0175L098D101411S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.9**	**9.9**	**18**
10/14/2011	**9:30 AM**	**SBTC0175L098**	**SBTC0175L098S101411S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**2.5**	**11**	**19**
10/14/2011	**9:30 AM**	**SBTC0175L098**	**SBTC0175L098S101411S010-SPLIT**	**5**	**0 - 1 ft**	**OL**	**0.42**	**2.2**	**8.6**	**15**
10/14/2011	5:25 PM	SBTC0175L100A	SBTC0175L100AS101411S008	5	0 - 0.85 ft	OL	<0.5	1.4	12	20
10/8/2011	**2:40 PM**	**SBTC0175R094**	**SBTC0175R094D100811S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.6**	**10**	**16**
10/8/2011	**2:40 PM**	**SBTC0175R094**	**SBTC0175R094S100811S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.7**	**11**	**18**
10/10/2011	**2:40 PM**	**SBTC0175R094**	**SBTC0175R094S100811S010-SPLIT**	**5**	**0 - 1 ft**	**OL**	**0.22**	**1.3**	**9.6**	**14**
10/17/2011	8:55 AM	SBTC0175R096	SBTC0175R096S101711S009	5	0 - 0.9 ft	OL	<0.5	1.8	12	18
10/14/2011	3:10 PM	SBTC0200L004A	SBTC0200L004AS101411S010	5	0 - 1 ft	OL	<0.79	2.6	7.7	14
10/15/2011	2:00 PM	SBTC0200L006B	SBTC0200L006BS101511S010	5	0 - 1 ft	OL	<0.5	2.8	11	20
10/14/2011	1:10 PM	SBTC0200L008	SBTC0200L008S101411S007	5	0 - 0.7 ft	OL	<0.5	1.8	8.9	15
10/17/2011	**2:15 PM**	**SBTC0200L014**	**SBTC0200L014S101711S008**	**5**	**0 - 0.85 ft**	**OL**	**0.5**	**1.8**	**20**	**27**
10/17/2011	**2:15 PM**	**SBTC0200L014**	**SBTC0200L014S101711S008-split**	**5**	**0 - 0.85 ft**	**OL**	**0.49**	**1.7**	**17**	**25**
10/17/2011	11:35 AM	SBTC0200L016	SBTC0200L016S101711S005	5	0 - 0.5 ft	OL	<0.5	<1	8.4	11
10/13/2011	3:34 PM	SBTC0200L018	SBTC0200L018S101311S010	5	0 - 1 ft	OL	<0.5	1.7	16	20
10/13/2011	4:30 PM	SBTC0200L020	SBTC0200L020S101311S010	5	0 - 1 ft	OL	<0.5	3.1	13	22
10/13/2011	5:27 PM	SBTC0200L022	SBTC0200L022S101311S010	5	0 - 1 ft	OL	0.51	1.2	15	25
10/14/2011	**11:18 AM**	**SBTC0200L024**	**SBTC0200L024D101411S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.5**	**10**	**18**
10/14/2011	**11:18 AM**	**SBTC0200L024**	**SBTC0200L024S101411S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.5**	**12**	**20**
10/14/2011	1:25 PM	SBTC0200L026	SBTC0200L026S101411S010	5	0.3 - 1 ft	OL	<0.5	1.8	13	23
10/14/2011	**4:09 PM**	**SBTC0200L034**	**SBTC0200L034S101411S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.3**	**9.6**	**17**
10/14/2011	**4:09 PM**	**SBTC0200L034**	**SBTC0200L034S101411S010-SPLIT**	**5**	**0 - 1 ft**	**OL**	**0.27**	**1.5**	**8.5**	**15**
10/15/2011	**7:55 AM**	**SBTC0200L038**	**SBTC0200L038D101511S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.5**	**15**	**26**
10/15/2011	**7:55 AM**	**SBTC0200L038**	**SBTC0200L038S101511S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.4**	**13**	**23**
10/15/2011	11:20 AM	SBTC0200L044	SBTC0200L044S101511S010	5	0 - 1 ft	OL	<0.5	2.5	12	20
10/15/2011	**11:35 AM**	**SBTC0200L046**	**SBTC0200L046101511S010- SPLIT**	**5**	**0 - 1 ft**	**OL**	**0.36**	**1.5**	**11**	**20**
10/15/2011	**11:35 AM**	**SBTC0200L046**	**SBTC0200L046S101511S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.2**	**14**	**23**
10/15/2011	**1:25 PM**	**SBTC0200L048**	**SBTC0200L048S101511S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.2**	**9.7**	**16**
10/15/2011	**1:25 PM**	**SBTC0200L048**	**SBTC0200L048S101511S010-SPLIT**	**5**	**0 - 1 ft**	**OL**	**0.31**	**1.4**	**11**	**18**
10/15/2011	**2:55 PM**	**SBTC0200L050**	**SBTC0200L050D101511S008**	**5**	**0 - 0.8 ft**	**OL**	**<0.5**	**2.4**	**9.6**	**14**
10/15/2011	**2:55 PM**	**SBTC0200L050**	**SBTC0200L050S101511S008**	**5**	**0 - 0.8 ft**	**OL**	**<0.5**	**1.7**	**10**	**16**
10/15/2011	5:10 PM	SBTC0200L054	SBTC0200L054S101511S010	5	0 - 1 ft	OL	0.52	1.6	14	23
10/17/2011	**9:20 AM**	**SBTC0200L056**	**SBTC0200L056S101711S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.4**	**14**	**24**
10/17/2011	**8:55 AM**	**SBTC0200L056**	**SBTC0200L056S101711S010-split**	**5**	**0 - 1 ft**	**OL**	**0.43**	**1.4**	**12**	**23**
10/17/2011	**10:15 AM**	**SBTC0200L060**	**SBTC0200L060S010711S010-split**	**5**	**0 - 1 ft**	**OL**	**0.45**	**1.4**	**11**	**22**
10/17/2011	**10:15 AM**	**SBTC0200L060**	**SBTC0200L060S101711S010**	**5**	**0 - 1 ft**	**OL**	**0.51**	**2.5**	**12**	**19**
10/19/2011	2:22 PM	SBTC0200L072	SBTC0200L072S101911S010	5	0 - 1 ft	OL	<0.5	2.3	10	18
10/19/2011	3:00 PM	SBTC0200L074	SBTC0200L074S101911S010	5	0 - 1 ft	OL	0.51	1.7	14	24
10/19/2011	3:44 PM	SBTC0200L076	SBTC0200L076S101911S010	5	0 - 1 ft	OL	<0.5	1.3	7.8	13
10/20/2011	**9:50 AM**	**SBTC0200L082**	**SBTC0200L082D102011S005**	**5**	**0 - 0.5 ft**	**OL**	**<0.5**	**1.3**	**11**	**17**
10/20/2011	**9:50 AM**	**SBTC0200L082**	**SBTC0200L082S102011S005**	**5**	**0 - 0.5 ft**	**OL**	**<0.5**	**1.6**	**9.2**	**14**
10/20/2011	**10:50 AM**	**SBTC0200L084**	**SBTC0200L084S102011S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.5**	**11**	**18**
10/20/2011	**10:50 AM**	**SBTC0200L084**	**SBTC0200L084S102011S010-SPLIT**	**5**	**0 - 1 ft**	**OL**	**0.33**	**1.4**	**12**	**18**
10/21/2011	5:20 PM	SBTC0200L092A	SBTC0200L092AS102111S010	5	0 - 1 ft	OL	<1.2	4.2	3.9	3.4
10/21/2011	**2:40 PM**	**SBTC0200L098A**	**SBTC0200L098AD102111S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.7**	**10**	**30**
10/21/2011	**2:40 PM**	**SBTC0200L098A**	**SBTC0200L098AS102111S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.4**	**9.5**	**16**
10/21/2011	**2:40 PM**	**SBTC0200L098A**	**SBTC0200L098AS102111S010-split**	**5**	**0 - 1 ft**	**OL**	**0.32**	**2.3**	**9.2**	**15**
10/20/2011	11:21 AM	SBTC0200L104	SBTC0200L104S102011S003	5	0 - 0.3 ft	OL	<0.5	1.7	14	17
12/4/2013	2:35 PM	SBTC0200L504	SBTC0200L504S120413S014	5	0.9 - 1.4 ft	OL	<0.76	5.6	12	22
10/8/2011	4:25 PM	SBTC0200R006	SBTC0200R006S100811S010	5	0 - 1 ft	OL	<0.5	1.5	8.6	15
10/8/2011	5:45 PM	SBTC0200R008	SBTC0200R008S100811S006	5	0 - 0.6 ft	OL	<0.5	1.8	13	17
10/17/2011	11:45 AM	SBTC0200R014	SBTC0200R014S101711S010	5	0 - 1 ft	OL	<0.5	<1	11	16
10/10/2011	8:25 AM	SBTC0200R015	SBTC0200R015S101011S010	5	0 - 1 ft	OL	<0.5	1	9.4	12
10/10/2011	**11:00 AM**	**SBTC0200R016**	**SBTC0200R016D101011S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.1**	**9**	**13**
10/10/2011	**11:00 AM**	**SBTC0200R016**	**SBTC0200R016S101011S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.2**	**11**	**14**
10/10/2011	11:14 AM	SBTC0200R018	SBTC0200R018S101011S009	5	0 - 0.9 ft	OL	<0.5	<1	8.1	13
10/10/2011	2:43 PM	SBTC0200R022	SBTC0200R022S101011S004	5	0 - 0.4 ft	OL	<0.5	<1	6.8	11
10/10/2011	**3:15 PM**	**SBTC0200R024**	**SBTC0200R024D101011S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**<1**	**6.8**	**11**
10/10/2011	**3:15 PM**	**SBTC0200R024**	**SBTC0200R024S101011S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**<1**	**7.4**	**11**
10/10/2011	3:30 PM	SBTC0200R025	SBTC0200R025S101011S003	5	0 - 0.3 ft	OL	<0.5	<1	5.1	8.2
10/11/2011	9:25 AM	SBTC0200R030A	SBTC0200R030AS101111S006	5	0 - 0.65 ft	OL	<0.5	1.4	6.8	17
10/10/2011	5:00 PM	SBTC0200R033	SBTC0200R033S101011S009	5	0 - 0.9 ft	OL	<0.5	1	2.9	4.3

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
10/10/2011	5:35 PM	SBTC0200R034	SBTC0200R034S101011S009	5	0 - 0.95 ft	OL	<0.5	<1	6.3	9.9
10/11/2011	**7:50 AM**	**SBTC0200R036**	**SBTC0200R036D101111S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**2.4**	**13**	**24**
10/11/2011	**7:50 AM**	**SBTC0200R036**	**SBTC0200R036S101111S010**	**5**	**0.5 - 1 ft**	**OL**	**0.51**	**2.2**	**15**	**24**
10/11/2011	**10:05 AM**	**SBTC0200R040**	**SBTC0200R040S101111S009**	**5**	**0 - 0.95 ft**	**OL**	**<0.5**	**1.1**	**12**	**20**
10/11/2011	**12:00 PM**	**SBTC0200R040**	**SBTC0200R040S101111S009-SPLIT**	**5**	**0 - 0.95 ft**	**OL**	**0.49**	**1.3**	**12**	**23**
10/11/2011	**3:30 PM**	**SBTC0200R046**	**SBTC0200R046D101111S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.5**	**10**	**16**
10/11/2011	**3:30 PM**	**SBTC0200R046**	**SBTC0200R046S101111S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.1**	**9.6**	**18**
10/11/2011	4:05 PM	SBTC0200R048	SBTC0200R048S101111S010	5	0 - 1 ft	OL	<0.5	<1	7.5	13
10/11/2011	4:00 PM	SBTC0200R050	SBTC0200R050S101111S010	5	0 - 1 ft	OL	<0.5	1.1	11	18
10/11/2011	4:45 PM	SBTC0200R052	SBTC0200R052S101111S010	5	0 - 1 ft	OL	<0.5	1.2	11	20
10/12/2011	8:25 AM	SBTC0200R053	SBTC0200R053S101211S008	5	0 - 0.8 ft	OL	<0.5	1.4	8.1	11
10/11/2011	2:50 PM	SBTC0200R056	SBTC0200R056S101111S010	5	0 - 1 ft	OL	0.54	1.8	16	25
10/18/2011	10:40 AM	SBTC0200R058	SBTC0200R058S101811S010	5	0 - 1 ft	OL	<0.5	1.2	20	19
10/18/2011	11:50 AM	SBTC0200R059	SBTC0200R059S101811S010	5	0 - 1 ft	OL	<0.5	1.4	11	16
10/18/2011	**1:10 PM**	**SBTC0200R060**	**SBTC0200R060S101811S006**	**5**	**0 - 0.6 ft**	**OL**	**<0.5**	**1.6**	**11**	**18**
10/18/2011	**1:10 PM**	**SBTC0200R060**	**SBTC0200R060S101811S006-split**	**5**	**0 - 0.6 ft**	**OL**	**0.29**	**1.5**	**11**	**17**
10/18/2011	3:10 PM	SBTC0200R062	SBTC0200R062S101811S009	5	0 - 0.9 ft	OL	<0.5	1.1	9.1	17
10/18/2011	3:15 PM	SBTC0200R062	SBTC0200R062S101811S014	5	0.9 - 1.4 ft	OL	<0.5	<1	10	19
10/18/2011	4:40 PM	SBTC0200R063	SBTC0200R063S101811S010	5	0 - 1 ft	OL	<0.5	1.4	13	22
10/18/2011	5:00 PM	SBTC0200R065	SBTC0200R065S101811S010	5	0 - 1 ft	OL	<0.5	1.2	10	15
10/19/2011	1:09 PM	SBTC0200R067	SBTC0200R067S101911S010	5	0 - 1 ft	OL	<0.55	2.2	8	11
10/19/2011	1:01 PM	SBTC0200R068	SBTC0200R068S101911S009	5	0 - 0.9 ft	OL	<0.5	1.6	7.7	10
10/19/2011	2:54 PM	SBTC0200R070	SBTC0200R070S101911S010	5	0 - 1 ft	OL	<0.5	1.8	11	19
10/19/2011	**3:05 PM**	**SBTC0200R072**	**SBTC0200R072S101911S009**	**5**	**0 - 0.9 ft**	**OL**	**<0.5**	**2.3**	**14**	**23**
10/19/2011	**3:05 PM**	**SBTC0200R072**	**SBTC0200R072S101911S009-SPLIT**	**5**	**0 - 0.9 ft**	**OL**	**0.52**	**2**	**13**	**23**
10/19/2011	3:40 PM	SBTC0200R073	SBTC0200R073S101911S005	5	0 - 0.5 ft	OL	<0.5	2.1	15	23
10/19/2011	3:50 PM	SBTC0200R074	SBTC0200R074S101911S010	5	0 - 1 ft	OL	0.56	2.2	16	27
10/20/2011	9:50 AM	SBTC0200R078	SBTC0200R078S102011S010	5	0 - 1 ft	OL	<0.5	1.6	15	23
10/12/2011	**3:00 PM**	**SBTC0200R079**	**SBTC0200R079D101211S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**<1**	**9.7**	**12**
10/12/2011	**3:00 PM**	**SBTC0200R079**	**SBTC0200R079S101211S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**<1**	**8.3**	**12**
10/12/2011	**3:00 PM**	**SBTC0200R079**	**SBTC0200R079S101211S010-SPLIT**	**5**	**0 - 1 ft**	**OL**	**0.27**	**1**	**8.3**	**15**
10/12/2011	**2:15 PM**	**SBTC0200R080**	**SBTC0200R080S101211S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**<1**	**7.5**	**12**
10/12/2011	**2:15 PM**	**SBTC0200R080**	**SBTC0200R080S101211S010-SPLIT**	**5**	**0 - 1 ft**	**OL**	**0.31**	**1.1**	**11**	**19**
10/12/2011	**4:25 PM**	**SBTC0200R082**	**SBTC0200R082D101211S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**<1**	**6.6**	**9.8**
10/12/2011	**4:25 PM**	**SBTC0200R082**	**SBTC0200R082S101211S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**<1**	**6.3**	**9.3**
10/12/2011	**4:25 PM**	**SBTC0200R082**	**SBTC0200R082S101211S010-split**	**5**	**0 - 1 ft**	**OL**	**0.5**	**1.8**	**10**	**18**
10/12/2011	4:35 PM	SBTC0200R084	SBTC0200R084S101211S010	5	0 - 1 ft	OL	<0.5	1	4.7	7.1
10/19/2011	8:55 AM	SBTC0200R086A	SBTC0200R086AS101911S010	5	0 - 1 ft	OL	<0.5	<1	8.2	12
10/18/2011	5:35 PM	SBTC0200R088A	SBTC0200R088AS101811S005	5	0 - 0.5 ft	OL	0.54	2	15	27
10/18/2011	4:55 PM	SBTC0200R090A	SBTC0200R090AS101811S010	5	0 - 1 ft	OL	0.53	3.1	15	22
10/18/2011	**4:45 PM**	**SBTC0200R092A**	**SBTC0200R092AS101811S010**	**5**	**0 - 1 ft**	**OL**	**0.66**	**1.8**	**18**	**31**
10/18/2011	**4:45 PM**	**SBTC0200R092A**	**SBTC0200R092AS101811S010-split**	**5**	**0 - 1 ft**	**OL**	**0.44**	**1.9**	**11**	**22**
10/13/2011	1:12 PM	SBTC0200R094	SBTC0200R094S101311S007	5	0 - 0.7 ft	OL	<0.5	1.4	9.9	16
10/19/2011	**8:52 AM**	**SBTC0200R098B**	**SBTC0200R098BD101911S010**	**5**	**0 - 1 ft**	**OL**	**0.78**	**2.6**	**30**	**38**
10/19/2011	**8:52 AM**	**SBTC0200R098B**	**SBTC0200R098BS101911S010**	**5**	**0 - 1 ft**	**OL**	**0.81**	**3.3**	**35**	**37**
10/13/2011	1:06 PM	SBTC0200R099	SBTC0200R099S101311S004	5	0 - 0.4 ft	OL	<0.5	3.2	12	18
10/13/2011	**1:53 PM**	**SBTC0200R100**	**SBTC0200R100S101311S010**	**5**	**0 - 1 ft**	**OL**	**<0.7**	**2**	**14**	**24**
10/13/2011	**1:53 PM**	**SBTC0200R100**	**SBTC0200R100S101311S010-split**	**5**	**0 - 1 ft**	**OL**	**0.35**	**2.4**	**9.8**	**18**
10/18/2011	3:42 PM	SBTC0200R101	SBTC0200R101S101811S010	5	0 - 1 ft	OL	0.55	1.4	16	43
10/18/2011	**3:36 PM**	**SBTC0200R102**	**SBTC0200R102D101811S007**	**5**	**0 - 0.7 ft**	**OL**	**<0.5**	**4.6**	**9.6**	**14**
10/18/2011	**3:36 PM**	**SBTC0200R102**	**SBTC0200R102S101811S007**	**5**	**0 - 0.7 ft**	**OL**	**<0.5**	**5.8**	**10**	**15**
10/22/2011	**10:00 AM**	**SBTC0200R104F**	**SBTC0200R104FS102211S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**3.6**	**8.5**	**13**
10/22/2011	**10:00 AM**	**SBTC0200R104F**	**SBTC0200R104FS102211S010-split**	**5**	**0 - 1 ft**	**OL**	**0.38**	**4.8**	**11**	**16**
10/20/2011	**10:25 AM**	**SBTC0200R106**	**SBTC0200R016S102011S010-SPLIT**	**5**	**0 - 1 ft**	**OL**	**0.35**	**<1**	**8.2**	**19**
10/20/2011	**10:25 AM**	**SBTC0200R106**	**SBTC0200R106S102011S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.2**	**9.8**	**20**
10/17/2011	3:20 PM	SBTC0225L001	SBTC0225L001S101711S003	5	0 - 0.3 ft	OL	<0.5	2.8	11	17
10/17/2011	3:20 PM	SBTC0225L002	SBTC0225L002S101711S003	5	0 - 0.3 ft	OL	<0.5	3.2	10	15
10/17/2011	4:17 PM	SBTC0225L002A	SBTC0225L002AS101711S010	5	0 - 1 ft	OL	<0.5	2	13	18
10/17/2011	2:48 PM	SBTC0225L004	SBTC0225L004S101711S010	5	0 - 1 ft	OL	0.61	2.3	17	29
10/17/2011	11:55 AM	SBTC0225L006	SBTC0225L006S101711S010	5	0 - 1 ft	OL	<0.5	3.1	19	25
10/17/2011	10:24 AM	SBTC0225L007	SBTC0225L007S101711S005	5	0 - 0.5 ft	OL	<0.5	2.5	12	17
10/15/2011	**5:20 PM**	**SBTC0225L012**	**SBTC0225L012D101511S007**	**5**	**0 - 0.7 ft**	**OL**	**<0.5**	**1.9**	**12**	**18**
10/15/2011	**5:20 PM**	**SBTC0225L012**	**SBTC0225L012S101511S007**	**5**	**0 - 0.7 ft**	**OL**	**<0.5**	**2.4**	**14**	**16**
10/17/2011	1:19 PM	SBTC0225L015B	SBTC0225L015BS101711S010	5	0 - 1 ft	OL	<0.5	1.1	12	21
10/15/2011	**1:50 PM**	**SBTC0225R002**	**SBTC0225R002S101511S008**	**5**	**0 - 0.8 ft**	**OL**	**<0.5**	**4.8**	**11**	**14**
10/15/2011	**1:50 PM**	**SBTC0225R002**	**SBTC0225R002S101511S008-SPLIT**	**5**	**0 - 0.8 ft**	**OL**	**0.26**	**4.3**	**8.3**	**13**
10/15/2011	2:27 PM	SBTC0225R004A	SBTC0225R004AS101511S010	5	0 - 1 ft	OL	<0.5	1.4	17	23
10/20/2011	1:30 PM	SBTC0225R004D	SBTC0225R004DS102011S004	5	0 - 0.4 ft	OL	<0.5	3.1	8.9	11
10/18/2011	11:10 AM	SBTC0225R006I	SBTC0225R006IS101811S003	5	0 - 0.3 ft	OL	<0.5	2.3	14	17

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
10/18/2011	12:25 PM	SBTC0225R006M	SBTC0225R006MS101811S002	5	0 - 0.2 ft	OL	<0.5	1.5	14	18
10/15/2011	10:00 AM	SBTC0225R011	SBTC0225R011S101511S010	5	0 - 1 ft	OL	<0.5	1.4	15	24
10/17/2011	9:45 AM	SBTC0200R012	SBTC0200R012S101711S008	5	0 - 0.8 ft	SC	<0.5	<1	8.6	17
10/18/2011	**10:25 AM**	**SBTC0225R006F**	**SBTC0225R006FS101811S010**	**5**	**0 - 1 ft**	**SM**	**<0.5**	**1.3**	**12**	**15**
10/18/2011	**10:25 AM**	**SBTC0225R006F**	**SBTC0225R006FS101811S010-split**	**5**	**0 - 1 ft**	**SM**	**0.3**	**<1**	**10**	**15**
10/17/2011	1:45 PM	SBTC0200L010A	SBTC0200L010AS101711S008	5	0 - 0.8 ft	SP	<0.5	1	11	12
10/15/2011	1:50 PM	SBTC0200L048	SBTC0200L048S101511S043	5	4 - 4.3 ft	SW	<0.5	<1	5	10
2/25/2012	**1:58 PM**	**ESTC0200L230**	**ESTC0200L230D022512S015**	**5**	**1.5 - 1.5 ft**	**unknown**	**<0.57**	**<1.1**	**13**	**21**
2/25/2012	**1:58 PM**	**ESTC0200L230**	**ESTC0200L230S022512S015**	**5**	**1.5 - 1.5 ft**	**unknown**	**<0.62**	**<1.2**	**17**	**17**
2/25/2012	**1:58 PM**	**ESTC0200L230**	**ESTC0200L230S022512S015-SPLIT**	**5**	**1.5 - 1.5 ft**	**unknown**	**0.42**	**1.1**	**11**	**16**
2/25/2012	2:35 PM	ESTC0200L232	ESTC0200L232S022512S010	5	1 - 1 ft	unknown	<0.5	1.1	6.2	9.3
2/25/2012	2:56 PM	ESTC0200L234	ESTC0200L234S022512S020	5	2 - 2 ft	unknown	<0.5	4.9	13	13
2/25/2012	3:07 PM	ESTC0200L236	ESTC0200L236S022512S010	5	1 - 1 ft	unknown	0.5	<1	16	23
3/2/2012	4:23 PM	ESTC0200L245	ESTC0200L245S030212S005	5	0.5 - 0.5 ft	unknown	<0.5	1.8	13	21
3/2/2012	**4:34 PM**	**ESTC0200L246**	**ESTC0200L246S030212S010**	**5**	**1 - 1 ft**	**unknown**	**<0.5**	**3**	**12**	**24**
3/2/2012	**4:34 PM**	**ESTC0200L246**	**ESTC0200L246S030212S010-SPLIT**	**5**	**1 - 1 ft**	**unknown**	**0.42**	**2.7**	**9.1**	**18**
3/2/2012	5:36 PM	ESTC0200L247	ESTC0200L247S030212S015	5	1.5 - 1.5 ft	unknown	<0.5	2.1	13	20
3/2/2012	**6:18 PM**	**ESTC0200L248**	**ESTC0200L248S030212S005**	**5**	**0.5 - 0.5 ft**	**unknown**	**<0.5**	**4.5**	**14**	**22**
3/2/2012	**6:18 PM**	**ESTC0200L248**	**ESTC0200L248S030212S005-SPLIT**	**5**	**0.5 - 0.5 ft**	**unknown**	**0.58**	**7.6**	**12**	**25**
3/3/2012	**2:15 PM**	**ESTC0200L249**	**ESTC0200L249S030312S015**	**5**	**1.5 - 1.5 ft**	**unknown**	**<0.66**	**5.3**	**15**	**20**
3/3/2012	**2:15 PM**	**ESTC0200L249**	**ESTC0200L249S030312S015-SPLIT**	**5**	**1.5 - 1.5 ft**	**unknown**	**0.46**	**5.3**	**12**	**18**
2/25/2012	2:45 PM	ESTC0200R239	ESTC0200R239S022512S030	5	3 - 3 ft	unknown	<0.5	<1	7.1	6.9
2/27/2012	10:10 AM	ESTC0200R240	ESTC0200R240S022712S010	5	1 - 1 ft	unknown	<0.5	<1	7.9	16
2/27/2012	**11:55 AM**	**ESTC0200R241**	**ESTC0200R241S022712S015**	**5**	**1.5 - 1.5 ft**	**unknown**	**<0.62**	**3.1**	**11**	**18**
2/27/2012	**11:55 AM**	**ESTC0200R241**	**ESTC0200R241S022712S015-SPLIT**	**5**	**1.5 - 1.5 ft**	**unknown**	**0.41**	**3.4**	**10**	**17**
2/27/2012	12:05 PM	ESTC0200R242	ESTC0200R242S022712S015	5	1.5 - 1.5 ft	unknown	<0.5	<1	5.9	8.8
2/27/2012	2:14 PM	ESTC0200R243	ESTC0200R243S022712S010	5	1 - 1 ft	unknown	<0.5	2.6	8.8	13
2/27/2012	2:24 PM	ESTC0200R244	ESTC0200R244S022712S015	5	1.5 - 1.5 ft	unknown	<0.5	1.4	8.4	17
2/27/2012	2:54 PM	ESTC0200R246	ESTC0200R246S022712S005	5	0.5 - 0.5 ft	unknown	<0.5	<1	3.4	5.3
2/29/2012	**4:05 PM**	**ESTC0200R250**	**ESTC0200R250S022912S010**	**5**	**1 - 1 ft**	**unknown**	**<0.5**	**1.5**	**8.5**	**16**
2/29/2012	**4:05 PM**	**ESTC0200R250**	**ESTC0200R250S022912S010-SPLIT**	**5**	**1 - 1 ft**	**unknown**	**0.3**	**1.7**	**11**	**15**
3/1/2012	2:59 PM	ESTC0200R251	ESTC0200R251S030112S000	5	0 - 0 ft	unknown	<0.5	<1	5.5	5.6
3/1/2012	4:02 PM	ESTC0200R252	ESTC0200R252S030112S010	5	1 - 1 ft	unknown	<0.5	1.9	5.9	5.5
3/1/2012	4:36 PM	ESTC0200R253	ESTC0200R253S030112S020	5	2 - 2 ft	unknown	<0.5	1.5	15	22
3/1/2012	4:45 PM	ESTC0200R254	ESTC0200R254S030112S025	5	2.5 - 2.5 ft	unknown	<0.5	1.7	10	16
3/2/2012	1:09 PM	ESTC0200R258	ESTC0200R258S030212S010	5	1 - 1 ft	unknown	<0.5	1.7	10	20
3/2/2012	3:11 PM	ESTC0200R260	ESTC0200R260S030212S010	5	1 - 1 ft	unknown	<0.5	4.1	12	14
3/2/2012	3:25 PM	ESTC0200R262	ESTC0200R262S030212S015	5	1.5 - 1.5 ft	unknown	0.62	1.8	17	33
3/2/2012	3:35 PM	ESTC0200R263	ESTC0200R263S030212S020	5	2 - 2 ft	unknown	0.53	2.9	14	22
3/2/2012	5:50 PM	ESTC0200R266	ESTC0200R266S030212S015	5	1.5 - 1.5 ft	unknown	0.66	2.6	14	17
3/2/2012	6:00 PM	ESTC0200R267	ESTC0200R267S030212S015	5	1.5 - 1.5 ft	unknown	0.56	2	14	24
3/3/2012	2:06 PM	ESTC0200R269	ESTC0200R269S030312S015	5	1.5 - 1.5 ft	unknown	<0.5	<1	11	16
3/6/2012	3:57 PM	ESTC0225L251	ESTC0225L251S030612S015	5	1.5 - 1.5 ft	unknown	0.68	1.8	15	24
3/6/2012	4:27 PM	ESTC0225L252	ESTC0225L252S030612S005	5	0.5 - 0.5 ft	unknown	<0.5	1.8	20	26
3/7/2012	12:16 PM	ESTC0225L254	ESTC0225L254S030712S040	5	4 - 4 ft	unknown	0.9	4.9	17	33
3/7/2012	12:25 PM	ESTC0225L255	ESTC0225L255S030712S020	5	2 - 2 ft	unknown	0.6	2.3	13	29
3/7/2012	3:02 PM	ESTC0225L256	ESTC0225L256S030712S030	5	3 - 3 ft	unknown	0.66	<1	16	30
3/7/2012	3:11 PM	ESTC0225L258	ESTC0225L258S030712S020	5	2 - 2 ft	unknown	0.85	1.8	15	30
3/8/2012	10:50 AM	ESTC0225L259	ESTC0225L259S030812S015	5	1.5 - 1.5 ft	unknown	<0.5	2.4	12	20
3/9/2012	9:32 AM	ESTC0225L263	ESTC0225L263S030912S020	5	2 - 2 ft	unknown	<0.5	1.1	22	36
3/9/2012	3:37 PM	ESTC0225L267	ESTC0225L267S030912S025	5	2.5 - 2.5 ft	unknown	<0.5	<1	8.8	12
3/9/2012	3:41 PM	ESTC0225L268	ESTC0225L268S030912S020	5	2 - 2 ft	unknown	<0.5	<1	10	21
2/25/2012	9:20 AM	ESTC0225L300	ESTC0225L300S022512S020	5	2 - 2 ft	unknown	<0.5	<1	6.8	16
2/27/2012	**2:15 PM**	**ESTC0225R308**	**ESTC0225R308S022712S020**	**5**	**2 - 2 ft**	**unknown**	**0.8**	**2**	**19**	**32**
2/27/2012	**2:15 PM**	**ESTC0225R308**	**ESTC0225R308S022712S020-SPLIT**	**5**	**2 - 2 ft**	**unknown**	**0.66**	**3.2**	**14**	**25**
2/27/2012	12:45 PM	ESTC0225R309	ESTC0225R309S022712S015	5	1.5 - 1.5 ft	unknown	<0.5	<1	11	10
2/28/2012	12:40 PM	ESTC0225R313	ESTC0225R313S022812S015	5	1.5 - 1.5 ft	unknown	0.56	1.5	18	29
9/22/2010	11:20 AM	PRB4-092	SOB09221120DJJ1	5	0 - 0.5 ft	unknown	NA	NA	13	18
9/22/2010	1:55 PM	PRB4-094	SOB09221355JAH1	5	0 - 0.5 ft	unknown	NA	NA	6.3	9.5
9/22/2010	2:10 PM	PRB4-095	SOB09221410JAH1	5	0 - 0.5 ft	unknown	NA	NA	16	19
9/22/2010	2:35 PM	PRB4-096	SOB09221435JAH1	5	0 - 0.5 ft	unknown	NA	NA	12	20
9/22/2010	2:40 PM	PRB4-097	SOB09221440JAH1	5	0 - 0.5 ft	unknown	NA	NA	13	21
9/22/2010	3:00 PM	PRB4-098	SOB09221500JAH1	5	0 - 0.5 ft	unknown	NA	NA	10	17
9/22/2010	3:40 PM	PRB4-101	SOB09221540JAH1	5	0 - 0.5 ft	unknown	NA	NA	5	7.3
9/22/2010	3:55 PM	PRB4-102	SOB09221555JAH1	5	0 - 0.5 ft	unknown	NA	NA	8.4	14
9/23/2010	9:25 AM	PRB4-106	SOB09230925PDS1	5	0 - 0.5 ft	unknown	NA	NA	9.9	16
9/23/2010	**9:50 AM**	**PRB4-109**	**PRB4-109- SAMPLE SPLIT**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**7.9**	**7.7**
9/23/2010	**9:50 AM**	**PRB4-109**	**SOB09230950PDS1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**7.3**	**12**
9/23/2010	**9:50 AM**	**PRB4-109**	**SOB09230950PDS2**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**10**	**17**

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
9/23/2010	10:10 AM	PRB4-110	SOB09231010PDS1	5	0 - 0.5 ft	unknown	NA	NA	12	20
9/23/2010	10:25 AM	PRB4-111	SOB09231025PDS1	5	0 - 0.5 ft	unknown	NA	NA	13	21
9/23/2010	10:35 AM	PRB4-112	SOB09231035PDS1	5	0 - 0.5 ft	unknown	NA	NA	14	24
9/23/2010	9:00 AM	PRB4-114	SOB09230900RJM1	5	0 - 0.5 ft	unknown	NA	NA	11	15
9/23/2010	9:20 AM	PRB4-115	SOB09230920RJM1	5	0 - 0.5 ft	unknown	NA	NA	7.5	9.5
9/23/2010	9:40 AM	PRB4-116	SOB09230940RJM1	5	0 - 0.5 ft	unknown	NA	NA	11	13
9/23/2010	10:20 AM	PRB4-119	SOB09231020RJM1	5	0 - 0.5 ft	unknown	NA	NA	15	13
9/23/2010	12:10 PM	PRB4-121	SOB09231210MRM1	5	0 - 0.5 ft	unknown	NA	NA	11	14
9/23/2010	**11:55 AM**	**PRB4-123**	**PRB4-123- SAMPLE SPLIT**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**11**	**13**
9/23/2010	**11:55 AM**	**PRB4-123**	**SOB09231155MRM1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**12**	**12**
9/23/2010	2:50 PM	PRB4-127	SOB09231450RJM1	5	0 - 0.5 ft	unknown	NA	NA	12	13
9/23/2010	**3:10 PM**	**PRB4-130**	**SOB09231510JDB1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**18**	**27**
9/23/2010	**3:10 PM**	**PRB4-130**	**SOB09231510JDB2**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**17**	**24**
9/23/2010	11:10 AM	PRB4-131	SOB09231110MRM1	5	0 - 0.5 ft	unknown	NA	NA	7.5	10
10/17/2010	4:45 PM	SO10A	SO10A10171645JPM1	5	0 - 0.5 ft	unknown	NA	<1	11	12
10/17/2010	5:00 PM	SO10B	SO10B10171700JPM1	5	0 - 0.5 ft	unknown	NA	<1	9.9	11
10/17/2010	**5:15 PM**	**SO10C**	**CELL10-10A SAMPLE SPLIT-ML**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**11**	**9.2**
10/17/2010	**5:15 PM**	**SO10C**	**SO10C10171715JPM1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**<1.1**	**8.5**	**10**
10/17/2010	5:25 PM	SO10D	SO10D10171725JPM1	5	0 - 0.5 ft	unknown	NA	<1.1	9	11
10/17/2010	10:50 AM	SO11A	SO11A10171050JPM1	5	0 - 0.5 ft	unknown	NA	<1	8.5	8.3
10/17/2010	**11:05 AM**	**SO11B**	**SO11B10171105JPM1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**1.1**	**8.9**	**8.8**
10/17/2010	**11:05 AM**	**SO11B**	**SO11B10171105JPM2**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**1.3**	**10**	**8.6**
10/17/2010	11:35 AM	SO11C	SO11C10171135JPM1	5	0 - 0.5 ft	unknown	NA	<1.1	8.9	8.7
10/17/2010	10:30 AM	SO11D	SO11D10171030JPM1	5	0 - 0.5 ft	unknown	NA	<1	5.5	5.4
10/19/2010	9:05 AM	SO12A	SO12A10190905RLP1	5	0 - 0.5 ft	unknown	NA	<1	8.6	7.9
10/19/2010	9:10 AM	SO12B	SO12B10190910RLP1	5	0 - 0.5 ft	unknown	NA	<1.1	6.8	6.7
10/19/2010	**9:15 AM**	**SO12C**	**SO12C10190915RLP1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**<1.1**	**8.4**	**9.5**
10/19/2010	**9:15 AM**	**SO12C**	**SO12C10190915RLP2**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**<1**	**13**	**7.5**
10/19/2010	9:20 AM	SO12D	SO12D10190920RLP1	5	0 - 0.5 ft	unknown	NA	<1.1	8.6	9.8
10/19/2010	10:20 AM	SO9A	SO9A10191020RLP1	5	0 - 0.5 ft	unknown	NA	<1.1	9.7	10
10/19/2010	10:15 AM	SO9B	SO9B10191015RLP1	5	0 - 0.5 ft	unknown	NA	1	7.7	7.2
10/19/2010	10:25 AM	SO9C	SO9C10191025RLP1	5	0 - 0.5 ft	unknown	NA	<1.1	8.7	7.8
10/19/2010	10:30 AM	SO9D	SO9D10191030RLP1	5	0 - 0.5 ft	unknown	NA	<1	10	7.8
11/10/2010	**9:20 AM**	**SOY4-10-0920**	**SOB11100920RLP1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**<1**	**8.8**	**11**
11/10/2010	**9:20 AM**	**SOY4-10-0920**	**YD4-15-SS- SAMPLESPL IT-KC**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**11**	**11**
11/10/2010	9:35 AM	SOY4-10-0935	SOB11100935RLP1	5	0 - 0.5 ft	unknown	NA	1.1	16	17
11/10/2010	9:50 AM	SOY4-10-0950	SOB11100950RLP1	5	0 - 0.5 ft	unknown	NA	1.4	7.8	13
11/10/2010	9:55 AM	SOY4-10-0955	SOB11100955RLP1	5	0 - 0.5 ft	unknown	NA	2.8	13	17
11/10/2010	10:15 AM	SOY4-10-1015	SOB11101015RLP1	5	0 - 0.5 ft	unknown	NA	<1	6.8	14
11/10/2010	**10:20 AM**	**SOY4-10-1020**	**SOB11101020RLP1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**<1**	**9.1**	**16**
11/10/2010	**10:20 AM**	**SOY4-10-1020**	**YD4-8-SS- SAMPLESPL IT-KC**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**8.6**	**15**
11/10/2010	10:35 AM	SOY4-10-1035	SOB11101035RLP1	5	0 - 0.5 ft	unknown	NA	1	12	29
11/10/2010	**10:50 AM**	**SOY4-10-1050**	**SOB11101050RLP1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**1**	**11**	**20**
11/10/2010	**10:50 AM**	**SOY4-10-1050**	**SOB11101050RLP2**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**1**	**13**	**27**
11/10/2010	11:05 AM	SOY4-10-1105	SOB11101105RLP1	5	0 - 0.5 ft	unknown	NA	<1	16	27
11/10/2010	12:25 PM	SOY4-10-1225	SOB11101225RLP1	5	0 - 0.5 ft	unknown	NA	1.5	9.4	20
11/10/2010	12:40 PM	SOY4-10-1240	SOB11101240RLP1	5	0 - 0.5 ft	unknown	NA	<1	5.4	6.1
11/10/2010	**12:50 PM**	**SOY4-10-1250**	**SOB11101250RLP1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**<1**	**8.1**	**18**
11/10/2010	**12:50 PM**	**SOY4-10-1250**	**SOB11101250RLP2**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**<1**	**9.5**	**20**
11/10/2010	1:00 PM	SOY4-10-1300	SOB11101300RLP1	5	0 - 0.5 ft	unknown	NA	<1	11	17
11/10/2010	1:10 PM	SOY4-10-1310	SOB11101310RLP1	5	0 - 0.5 ft	unknown	NA	<1	7.1	8.7
11/10/2010	1:15 PM	SOY4-10-1315	SOB11101315RLP1	5	0 - 0.5 ft	unknown	NA	<1	9.5	15
11/10/2010	**1:30 PM**	**SOY4-10-1330**	**SOB11101330RLP1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**<1**	**8.3**	**13**
11/10/2010	**1:30 PM**	**SOY4-10-1330**	**SOB11101330RLP2**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**<1**	**9**	**16**
11/10/2010	**1:50 PM**	**SOY4-10-1350**	**SOB11101350RLP1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**1**	**8.7**	**11**
11/10/2010	**1:50 PM**	**SOY4-10-1350**	**YD4-24-SS- SAMPLESPL IT-KC**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**12**	**11**
11/10/2010	1:55 PM	SOY4-10-1355	SOB11101355RLP1	5	0 - 0.5 ft	unknown	NA	1.1	10	9.6
11/10/2010	2:05 PM	SOY4-10-1405	SOB11101405RLP1	5	0 - 0.5 ft	unknown	NA	<1	7.6	7.9
11/10/2010	2:15 PM	SOY4-10-1415	SOB11101415RLP1	5	0 - 0.5 ft	unknown	NA	<1	8.7	8.9
11/10/2010	2:30 PM	SOY4-10-1430	SOB11101430RLP1	5	0 - 0.5 ft	unknown	NA	<1	7.7	8
11/10/2010	2:35 PM	SOY4-10-1435	SOB11101435RLP1	5	0 - 0.5 ft	unknown	NA	<1	7.5	8.3
11/10/2010	2:45 PM	SOY4-10-1445	SOB11101445RLP1	5	0 - 0.5 ft	unknown	NA	<1	8.7	8.6
11/10/2010	3:00 PM	SOY4-10-1500	SOB11101500RLP1	5	0 - 0.5 ft	unknown	NA	<1	9.5	11
11/10/2010	3:05 PM	SOY4-10-1505	SOB11101505RLP1	5	0 - 0.5 ft	unknown	NA	<1	8.8	11
11/10/2010	**3:15 PM**	**SOY4-10-1515**	**SOB11101515RLP1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**1.2**	**11**	**9.7**
11/10/2010	**3:15 PM**	**SOY4-10-1515**	**YD4-28-SS- SAMPLESPL IT-KC**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**9.3**	**11**
11/10/2010	3:20 PM	SOY4-10-1520	SOB11101520RLP1	5	0 - 0.5 ft	unknown	NA	1.2	10	15
11/10/2010	3:30 PM	SOY4-10-1530	SOB11101530RLP1	5	0 - 0.5 ft	unknown	NA	1.9	9.9	9.1
11/10/2010	3:45 PM	SOY4-10-1545	SOB11101545RLP1	5	0 - 0.5 ft	unknown	NA	1.2	8.8	12

Attachment A
Background Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
11/10/2010	4:00 PM	SOY4-10-1600	SOB11101600RLP1	5	0 - 0.5 ft	unknown	NA	<1	8.5	8.2
11/10/2010	4:05 PM	SOY4-10-1605	SOB11101605RLP1	5	0 - 0.5 ft	unknown	NA	<1	9.1	11
11/10/2010	**4:15 PM**	**SOY4-10-1615**	**SOB11101615RLP1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**<1**	**8.6**	**8.3**
11/10/2010	**4:15 PM**	**SOY4-10-1615**	**YD4-17-SS- SAMPLESPL IT-KC**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**9.1**	**7.5**

Notes:

1. Bolded data without shading are from a location with duplicate and/or split sample groups and the unshaded data were not included in the statistical analysis.
2. Shaded data was selected to represent the soil metal concentrations at locations with duplicate and/or split samples groups. The sample with the higher overall metal concentrations or the sample having the highest vanadium concentration was selected for use in the statistical anayses.

ATTACHMENT B
FOREGROUND SOIL SAMPLE DATA SET

Attachment B
Foreground Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
7/18/2012	1:42 PM	SBSA0116	SBSA0116S071812S014	1	1 - 1.4 ft	ML	<0.5	<1	6.7	13
9/21/2012	12:53 PM	SSSA0025R0154	SSSA0025R0154S092112S015	1	1.5 - 1.5 ft	NA	<1.1	5.0	19	12
9/24/2012	2:10 PM	SSSA0025R0162	SSSA0025R0162S092412S015	1	1.5 - 1.5 ft	NA	<1.7	6.4	4.3	<2.8
7/20/2012	11:25 AM	SBSA0126	SBSA0126S072012S008	1	0 - 0.8 ft	OH	<0.5	2.5	11	13
7/18/2012	**1:37 PM**	**SBSA0116**	**SBSA0116S071812S007**	**1**	**0.4 - 0.7 ft**	**OL**	**<0.5**	**1.7**	**11**	**13**
7/18/2012	**1:37 PM**	**SBSA0116**	**SBSA0116S071812S007- SPLIT**	**1**	**0.4 - 0.7 ft**	**OL**	**0.35**	**2.2**	**11**	**16**
7/21/2012	1:44 PM	SBSA0130	SBSA0130S072112S005	1	0 - 0.5 ft	OL	<0.5	2.5	11	14
7/21/2012	4:35 PM	SBSA0131	SBSA0131S072112S007	1	0 - 0.7 ft	OL	<0.5	1.1	6.4	13
7/21/2012	**8:45 AM**	**SBSA0133**	**SBSA0133D072112S008**	**1**	**0 - 0.8 ft**	**OL**	**<0.5**	**2.4**	**7.4**	**10**
7/21/2012	**8:45 AM**	**SBSA0133**	**SBSA0133S072112S008**	**1**	**0 - 0.8 ft**	**OL**	**<0.5**	**1.5**	**5.7**	**8.2**
10/7/2011	9:20 AM	SBTC0000R205	SBTC0000R205S100711S010	1	0 - 1 ft	OL	<0.96	<1.9	5.4	10
7/21/2012	11:55 AM	SBSA0128	SBSA0128S072112S008	1	0 - 0.8 ft	PT	<0.82	3.3	8.2	13
7/20/2012	8:50 AM	SBSA0125	SBSA0125S072012S003	1	0 - 0.3 ft	SP	<0.5	<1	6.3	10
9/21/2012	12:53 PM	SSSA0025R0154	SSSA0025R0154S092112S015	1	1.5 - 1.5 ft	Unknown	<1.1	5	19	12
9/24/2012	2:10 PM	SSSA0025R0162	SSSA0025R0162S092412S015	1	1.5 - 1.5 ft	Unknown	<1.7	6.4	4.3	<2.8
9/24/2012	3:40 PM	SSSA0025R0167	SSSA0025R0167S092412S018	1	1.8 - 1.8 ft	Unknown	<0.5	<1	9.8	19
8/10/2011	**2:35 PM**	**SBTC0050R07**	**SBTC0050R07S081011S025**	**2**	**2 - 2.5 ft**	**CL**	**<0.5**	**2.7**	**9**	**12**
8/11/2011	**2:30 PM**	**SBTC0050R07**	**SBTC0050R07S081011S025-split**	**2**	**2 - 2.5 ft**	**CL**	**0.35**	**3.3**	**12**	**16**
8/11/2011	**2:35 PM**	**SBTC0050R12**	**SBTC0050R12S081111S005**	**2**	**0 - 0.5 ft**	**CL**	**<0.5**	**4.5**	**14**	**22**
8/11/2011	**11:30 AM**	**SBTC0050R12**	**SOTC0050R12S081111S005-split**	**2**	**0 - 0.5 ft**	**CL**	**0.39**	**4.8**	**12**	**19**
4/3/2014	9:18 AM	SBTC0050R504	SBTC0050R504S040314S005	2	0.25 - 0.5 ft	ML	0.59	3.9	15	17
8/18/2011	**2:00 PM**	**SBTC0025L102E**	**SBTC0025L102ED081811S005**	**2**	**0 - 0.5 ft**	**OL**	**<1**	**4.4**	**7.7**	**6.5**
8/18/2011	**2:00 PM**	**SBTC0025L102E**	**SBTC0025L102ES081811S005**	**2**	**0 - 0.5 ft**	**OL**	**<1.3**	**16**	**11**	**6.1**
8/18/2011	**2:00 PM**	**SBTC0025L102E**	**SBTC0025L102ES081811S005-SPLIT**	**2**	**0 - 0.5 ft**	**OL**	**0.21**	**1.8**	**6.7**	**8.3**
8/19/2011	11:49 AM	SBTC0025L23	SBTC0025L23S081911S005	2	0 - 0.5 ft	OL	<0.95	7.7	6.4	3.1
8/19/2011	**1:30 PM**	**SBTC0025L24**	**SBTC0025L24S081911S005**	**2**	**0 - 0.5 ft**	**OL**	**<0.5**	**<1**	**8.2**	**5.5**
8/19/2011	**1:30 PM**	**SBTC0025L24**	**SBTC0025L24S081911S005-SPLIT**	**2**	**0 - 0.5 ft**	**OL**	**<0.2**	**<1**	**9**	**5.7**
8/26/2011	**10:25 AM**	**SBTC0025L27**	**SBTC0025L27S082611S013**	**2**	**0 - 1.3 ft**	**OL**	**<0.88**	**5.6**	**14**	**9.7**
8/25/2011	**10:25 AM**	**SBTC0025L27**	**SBTC0025L27S082611S013-split**	**2**	**0 - 1.3 ft**	**OL**	**0.37**	**1.6**	**21**	**15**
10/9/2014	10:20 AM	SBTC0025L525	SBTC0025L525S100914S018	2	0 - 1.8 ft	OL	<1.1	2.5	37	44
10/14/2014	9:32 AM	SBTC0025L532	SBTC0025L532S101414S003	2	0 - 0.3 ft	OL	<0.9	5.2	23	19
10/14/2014	11:05 AM	SBTC0025L534	SBTC0025L534S101414S005	2	0 - 0.5 ft	OL	<0.66	2.2	13	13
8/31/2011	**9:40 AM**	**SBTC0025R103J**	**SBTC0025R103JD083111S013**	**2**	**0 - 1.3 ft**	**OL**	**<0.5**	**5.3**	**5.8**	**12**
8/31/2011	**9:40 AM**	**SBTC0025R103J**	**SBTC0025R103JS083111S013**	**2**	**0 - 1.3 ft**	**OL**	**<0.61**	**4.4**	**8.2**	**16**
9/14/2011	10:20 AM	SBTC0025R106J	SBTC0025R106JS091411S016	2	0 - 1.6 ft	OL	<0.5	3.2	17	19
8/30/2011	**7:42 AM**	**SBTC0025R16C**	**SBTC0025R16CS083011S009**	**2**	**0 - 0.9 ft**	**OL**	**<0.5**	**4.3**	**8.4**	**13**

Attachment B
Foreground Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
8/30/2011	**7:42 AM**	**SBTC0025R16C**	**SBTC0025R16CS083011S009-split**	**2**	**0 - 0.9 ft**	**OL**	**0.38**	**3.2**	**8.3**	**13**
8/22/2011	4:35 PM	SBTC0025R42	SBTC0025R42S082211S005	2	0 - 0.5 ft	OL	<0.59	1.7	12	15
10/10/2014	11:15 AM	SBTC0025R588	SBTC0025R588S101014S005	2	0 - 0.5 ft	OL	<0.53	5.9	9.1	13
8/5/2011	**10:30 AM**	**SBTC0050L05**	**SBTC0050L05D080511S005**	**2**	**0 - 0.5 ft**	**OL**	**<0.5**	**7.1**	**10**	**15**
8/5/2011	**10:30 AM**	**SBTC0050L05**	**SBTC0050L05S080511S005**	**2**	**0 - 0.5 ft**	**OL**	**<0.5**	**6.4**	**10**	**15**
9/1/2011	5:40 PM	SBTC0050L106F	SBTC0050L106FS090111S009	2	0 - 0.9 ft	OL	<0.5	2.9	9.8	12
9/2/2011	**10:35 AM**	**SBTC0050L109D**	**SBTC0050L109DS090211S006**	**2**	**0 - 0.6 ft**	**OL**	**<0.5**	**4.9**	**10**	**15**
9/2/2011	**10:35 AM**	**SBTC0050L109D**	**SBTC0050L109DS090211S006-split**	**2**	**0 - 0.6 ft**	**OL**	**0.32**	**6.2**	**9.3**	**13**
9/1/2011	**4:50 PM**	**SBTC0050L109E**	**SBTC0050L109ED090111S007**	**2**	**0 - 0.7 ft**	**OL**	**<0.5**	**2.9**	**8.8**	**14**
9/1/2011	**4:50 PM**	**SBTC0050L109E**	**SBTC0050L109ES090111S007**	**2**	**0 - 0.7 ft**	**OL**	**<0.5**	**2.2**	**8.7**	**11**
9/14/2011	**9:00 AM**	**SBTC0050L110G**	**SBTC0050L110GS091411S010**	**2**	**0 - 1 ft**	**OL**	**0.68**	**3.4**	**18**	**40**
9/14/2011	**9:00 AM**	**SBTC0050L110G**	**SBTC0050L110GS091411S010-split**	**2**	**0 - 1 ft**	**OL**	**0.67**	**2.9**	**12**	**25**
8/26/2011	2:10 PM	SBTC0050L16	SBTC0050L16S082611S007	2	0 - 0.7 ft	OL	<0.5	4.6	11	20
4/2/2014	1:20 PM	SBTC0050L501	SBTC0050L501S040214S005	2	0.3 - 0.5 ft	OL	<0.5	3.6	9.9	13
8/10/2011	2:30 PM	SBTC0050R07	SBTC0050R07S081011S005	2	0 - 0.5 ft	OL	<0.5	4.8	11	14
8/10/2011	4:15 PM	SBTC0050R10	SBTC0050R10S081011S005	2	0 - 0.5 ft	OL	<0.5	1.8	12	19
8/19/2011	7:20 AM	SBTC0050R106C	SBTC0050R106CS081911S005	2	0 - 0.5 ft	OL	<0.5	2.9	9.9	11
9/13/2011	5:15 PM	SBTC0050R107I	SBTC0050R107IS091311S005	2	0 - 0.5 ft	OL	<0.5	4.9	7.6	11
8/24/2011	11:50 AM	SBTC0050R108F	SBTC0050R108FS082411S005	2	0 - 0.5 ft	OL	<0.5	4.7	13	15
8/26/2011	4:45 PM	SBTC0050R10C	SBTC0050R10CS082611S007	2	0 - 0.7 ft	OL	<0.5	5.5	8.3	11
10/4/2011	**3:35 PM**	**SBTC0050R113**	**SBTC0050R113S100411S010**	**2**	**0 - 1 ft**	**OL**	**<0.5**	**2.5**	**10**	**14**
10/4/2011	**3:35 PM**	**SBTC0050R113**	**SBTC0050R113S100411S010-SPLIT**	**2**	**0 - 1 ft**	**OL**	**0.34**	**3.5**	**14**	**17**
8/26/2011	9:45 AM	SBTC0050R11B	SBTC0050R11BS082611S007	2	0 - 0.7 ft	OL	<0.5	3.1	10	13
8/23/2011	10:10 AM	SBTC0050R17	SBTC0050R17S082311S005	2	0 - 0.5 ft	OL	<0.5	2.8	13	21
8/23/2011	**11:05 AM**	**SBTC0050R18**	**SBTC0050R05S082311S005-split**	**2**	**0 - 0.5 ft**	**OL**	**0.34**	**1.6**	**13**	**17**
8/23/2011	**11:05 AM**	**SBTC0050R18**	**SBTC0050R18S082311S005**	**2**	**0 - 0.5 ft**	**OL**	**0.52**	**3.8**	**15**	**16**
8/23/2011	3:50 PM	SBTC0050R22	SBTC0050R22S082311S005	2	0 - 0.5 ft	OL	<0.5	2.3	13	21
8/23/2011	4:50 PM	SBTC0050R23	SBTC0050R23S082311S005	2	0 - 0.5 ft	OL	<0.5	4.5	13	20
8/26/2011	**3:55 PM**	**SBTC0050R26**	**SBTC0050R26S082611S009**	**2**	**0 - 0.9 ft**	**OL**	**<0.5**	**1.2**	**9.2**	**14**
8/25/2011	**3:55 PM**	**SBTC0050R26**	**SBTC0050R26S082611S009-split**	**2**	**0 - 0.9 ft**	**OL**	**0.28**	**<1**	**10**	**14**
10/14/2014	2:56 PM	SBTC0050R521	SBTC0050R521S101414S004	2	0 - 0.4 ft	OL	<0.5	2.2	7	8.7
10/14/2014	3:03 PM	SBTC0050R521	SBTC0050R521S101414S008	2	0.4 - 0.8 ft	OL	<0.5	1.8	9.2	13
8/29/2011	11:30 AM	SBTC0025R16D	SBTC0025R16DS082911S017	2	0 - 1.7 ft	PT	<0.55	3.4	7.5	15
8/29/2011	11:32 AM	SBTC0025R16D	SBTC0025R16DS082911S028	2	0 - 2.8 ft	PT	<0.5	6.1	10	16
10/15/2014	11:15 AM	SBTC0025R592	SBTC0025R592S101514S004	2	0 - 0.4 ft	PT	<0.81	<1.6	9.9	12
10/14/2014	3:03 PM	SBTC0050R521	SBTC0050R521S101414S008	2	0.4 - 0.8 ft	PT	<0.5	1.8	9.2	13

Attachment B
Foreground Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
9/12/2011	**4:30 PM**	**SBTC0025L114**	**SBTC0025L114D091211S006**	**2**	**0 - 0.6 ft**	**SM**	**<0.5**	**3.8**	**8.3**	**9.9**
9/12/2011	**4:30 PM**	**SBTC0025L114**	**SBTC0025L114S091211S006**	**2**	**0 - 0.6 ft**	**SM**	**<0.5**	**2.8**	**7.5**	**10**
4/3/2014	1:27 PM	SBTC0050R505	SBTC0050R505S040314S018	2	1.6 - 1.8 ft	SM	<0.5	6.8	14	20
11/16/2011	12:43 PM	ESTC0050R078	ESTC0050R078S111611S010	2	1 - 1 ft	Unknown	<0.5	1.9	10	17
10/15/2010	4:55 PM	PE-1E10151655	SO1E10151655MJM1	2	0 - 0.5 ft	Unknown	NA	<1	7.8	19
10/16/2010	6:30 PM	PE-3H10161830	SO3H10161830JPM1	2	0 - 0.5 ft	Unknown	NA	<2.7	7	18
10/15/2010	4:05 PM	SO1C	SO1C10151605	2	0 - 0.5 ft	Unknown	NA	<1	3.8	12
10/15/2010	5:20 PM	SO1D	SO1D10151720MJM1	2	0 - 0.5 ft	Unknown	NA	<1	4.8	15
10/15/2010	5:05 PM	SO1E	SO1E10151705	2	0 - 0.5 ft	Unknown	NA	1.6	9.6	24
10/15/2010	4:40 PM	SO1K	SO1K10151640MJM1	2	0 - 0.5 ft	Unknown	NA	1.3	8.6	22
10/15/2010	2:20 PM	SO2Z	SO2Z10151420MSM1	2	0 - 0.5 ft	Unknown	NA	<1	5.8	17
10/16/2010	6:55 PM	SO3C	SO3C10161855JPM1	2	0 - 0.5 ft	Unknown	NA	<3	5.5	15
10/16/2010	6:50 PM	SO3D	SO3D10161850JPM1	2	0 - 0.5 ft	Unknown	NA	<2.8	7.5	19
10/16/2010	6:40 PM	SO3G	SO3G10161840JPM1	2	0 - 0.5 ft	Unknown	NA	<3.1	7.9	20
10/21/2010	**6:15 PM**	**SO4A**	**EOS-CELL4-A4- SAMPLESPLI T-EVW**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**NA**	**4.6**	**8.5**
10/21/2010	**6:15 PM**	**SO4A**	**SO4A10211815RWS1**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**<1.1**	**5.5**	**11**
10/21/2010	**6:30 PM**	**SO4B**	**SO4B10211830RWS1**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**<1**	**6.3**	**16**
10/21/2010	**6:30 PM**	**SO4B**	**SO4B10211830RWS2**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**<1.1**	**7.8**	**19**
11/7/2010	**9:38 AM**	**SO5-07-0938**	**A-MATTROAD-WEST- SAMPLE SPLIT-E**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**NA**	**4.4**	**10**
11/7/2010	**9:38 AM**	**SO5-07-0938**	**SOA11070938TMR1**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**<1**	**5.1**	**14**
11/7/2010	**9:38 AM**	**SO5-07-0938**	**SOA11070938TMR2**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**<1**	**4.3**	**12**
11/7/2010	9:55 AM	SO5-07-0955	SOA11070955TMR3	2	0 - 0.5 ft	Unknown	NA	<1	4.5	11
11/4/2010	3:00 PM	SO5B	SO5B11041519CGO1	2	0 - 0.5 ft	Unknown	NA	1.4	23	25
11/20/2010	2:22 PM	SO6C	SO6C1120101422TMR1	2	0 - 0.5 ft	Unknown	<0.5	<1	NA	13
11/20/2010	2:38 PM	SO6E	SO6E1120101438TMR1	2	0 - 0.5 ft	Unknown	<0.5	<1	NA	22
11/20/2010	2:49 PM	SO6F	SO6F1120101449TMR1	2	0 - 0.5 ft	Unknown	<0.5	<1	NA	19
11/20/2010	3:15 PM	SO6H	SO6H1120101515TMR1	2	0 - 0.5 ft	Unknown	<0.5	<1	NA	14
11/20/2010	3:26 PM	SO6I	SO6I1120101526TMR1	2	0 - 0.5 ft	Unknown	<0.5	<1	NA	21
11/20/2010	3:32 PM	SO6J	SO6J1120101532TMR1	2	0 - 0.5 ft	Unknown	<0.5	<1	NA	19
11/20/2010	3:37 PM	SO6K	SO6K1120101537TMR1	2	0 - 0.5 ft	Unknown	<0.5	<1	NA	18
11/20/2010	3:44 PM	SO6L	SO6L1120101544TMR1	2	0 - 0.5 ft	Unknown	<0.5	<1	NA	16
11/20/2010	3:48 PM	SO6M	SO6M1120101548TMR1	2	0 - 0.5 ft	Unknown	<0.5	2.8	NA	21
10/20/2010	2:00 PM	SO8C	SO8C10201400DUP1	2	0 - 0.5 ft	Unknown	NA	<1	5.6	17
10/20/2010	1:00 PM	SO8E	SO8E10201350DUP1	2	0 - 0.5 ft	Unknown	NA	<1	4	9.8
10/20/2010	**12:45 PM**	**SO8F**	**SO8F10201245DUP1**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**3.6**	**7.1**	**16**
10/20/2010	**12:45 PM**	**SO8F**	**SO8F10201245DUP2**	**2**	**0 - 0.5 ft**	**Unknown**	**NA**	**3.1**	**7.8**	**16**

Attachment B
Foreground Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
10/20/2010	1:25 PM	SO8H	SO8H10201325DUP1	2	0 - 0.5 ft	Unknown	NA	<1.1	6.5	16
10/20/2010	1:30 PM	SO8I	SO8I10201330DUP1	2	0 - 0.5 ft	Unknown	NA	1.6	7.2	16
10/20/2010	1:30 PM	SO8I	SO8I10201330DUP3	2	0 - 0.5 ft	Unknown	NA	1.3	7.8	18
10/20/2010	1:40 PM	SO8J	SO8J10201340DUP1	2	0 - 0.5 ft	Unknown	NA	2.4	7.8	17
10/20/2010	1:45 PM	SO8K	SO8K10201345DUP1	2	0 - 0.5 ft	Unknown	NA	1.2	5.6	12
10/20/2010	2:05 PM	SO8L	SO8L10201405DUP1	2	0 - 0.5 ft	Unknown	NA	1.2	6.3	15
10/20/2010	2:15 PM	SO8N	SO8N10201415DUP1	2	0 - 0.5 ft	Unknown	NA	<1.1	4.7	10
6/1/2011	3:57 PM	SSSYA2A	SSSYA2AS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	7.8	16
6/1/2011	**3:48 PM**	**SSSYA2B**	**SSSYA2BS060111SX**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**6.6**	**15**
6/1/2011	**3:48 PM**	**SSSYA2B**	**SSSYA2BS060111SX- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.25**	**<1**	**5.8**	**15**
6/1/2011	**3:12 PM**	**SSSYA2F**	**SSSYA2FS060111SX**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**9.3**	**17**
6/1/2011	**3:12 PM**	**SSSYA2F**	**SSSYA2FS060111SX- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.41**	**<1**	**9.3**	**23**
6/1/2011	2:37 PM	SSSYA2G	SSSYA2GS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	7.8	14
6/1/2011	2:15 PM	SSSYA2H	SSSYA2HS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	7.5	11
6/1/2011	1:50 PM	SSSYA2L	SSSYA2LS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	14	19
6/1/2011	3:24 PM	SSSYA2Q	SSSYA2QS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	11	22
6/1/2011	3:07 PM	SSSYA2R	SSSYA2RS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	11	19
6/1/2011	3:20 PM	SSSYA2S	SSSYA2SS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	9.3	20
6/1/2011	3:04 PM	SSSYA2T	SSSYA2TS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	12	23
6/1/2011	2:56 PM	SSSYA2U	SSSYA2US060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	8.9	15
6/1/2011	**2:49 PM**	**SSSYA2V**	**SSSYA2VS060111SX**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**9.1**	**16**
6/1/2011	**2:49 PM**	**SSSYA2V**	**SSSYA2VS060111SX- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.3**	**<1**	**8.9**	**19**
6/1/2011	2:45 PM	SSSYA2W	SSSYA2WS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	12	21
6/1/2011	2:28 PM	SSSYA2X	SSSYA2XS060111SX	2	0 - 0.5 ft	Unknown	<0.5	<1	14	23
7/14/2011	9:35 AM	SSSYAA6	SSSYAA6S071411S005	2	0 - 0.5 ft	Unknown	<0.5	<1	4.5	12
5/20/2011	2:45 PM	SSSYAB2	SSSYAB2S052011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	7.5	14
5/20/2011	2:55 PM	SSSYAC2	SSSYAC2S052011S005	2	0 - 0.5 ft	Unknown	<0.5	1.8	13	13
5/20/2011	**2:10 PM**	**SSSYAC3**	**SSSYAC3D052011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**4.2**	**13**
5/20/2011	**2:10 PM**	**SSSYAC3**	**SSSYAC3S052011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**5.7**	**13**
7/14/2011	11:10 AM	SSSYAC6	SSSYAC6S071411S005	2	0 - 0.5 ft	Unknown	<0.5	<1	3.9	8.5
5/20/2011	**1:25 PM**	**SSSYAE2**	**SSSYAE2S052011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**9**	**20**
5/20/2011	**1:25 PM**	**SSSYAE2**	**SSSYAE2S052011S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.29**	**<1**	**8.8**	**19**
5/20/2011	1:35 PM	SSSYAE3	SSSYAE3S052011S005	2	0 - 0.5 ft	Unknown	<0.5	1.8	13	28
5/20/2011	1:15 PM	SSSYAH1	SSSYAH1S052011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	11	18
7/14/2011	12:40 PM	SSSYAJ1	SSSYAJ1S071411S005	2	0 - 0.5 ft	Unknown	<0.5	<1	4	11
7/14/2011	**12:55 PM**	**SSSYAJ2**	**SSSYAJ2S071411S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**7.1**	**11**

Attachment B
Foreground Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
7/14/2011	**12:55 PM**	**SSSYAJ2**	**SSSYAJ2S071411S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.2**	**<1**	**6**	**14**
7/14/2011	**3:50 PM**	**SSSYAJ3**	**SSSYAJ3S071411S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**1.5**	**11**	**26**
7/14/2011	**3:50 PM**	**SSSYAJ3**	**SSSYAJ3S071411S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.2**	**<1**	**7.2**	**17**
5/20/2011	11:30 AM	SSSYAK3	SSSYAK3S052011S005	2	0 - 0.5 ft	Unknown	<0.5	1.5	12	19
5/20/2011	10:40 AM	SSSYAL1	SSSYAL1S052011S005	2	0 - 0.5 ft	Unknown	<0.5	1.8	9.4	18
5/20/2011	10:15 AM	SSSYAL2	SSSYAL2S052011S005	2	0 - 0.5 ft	Unknown	<0.5	1.7	14	29
5/20/2011	11:15 AM	SSSYAL3	SSSYAL3S052011S005	2	0 - 0.5 ft	Unknown	<0.5	1.3	8.9	12
5/20/2011	**11:00 AM**	**SSSYAN1**	**SSSYAN1S052011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**8**	**15**
5/20/2011	**11:00 AM**	**SSSYAN1**	**SSSYAN1S052011S005- split**	**2**	**0 - 0.5 ft**	**Unknown**	**0.34**	**<1**	**13**	**18**
5/20/2011	12:45 PM	SSSYAN3	SSSYAN3S052011S005	2	0 - 0.5 ft	Unknown	<0.5	1.1	6.2	13
5/20/2011	12:55 PM	SSSYAN4	SSSYAN4S052011S005	2	0 - 0.5 ft	Unknown	<0.5	<1	7	12
5/20/2011	**8:40 AM**	**SSSYAO2**	**SSSYAO2D052011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**<1**	**10**	**11**
5/20/2011	**8:40 AM**	**SSSYAO2**	**SSSYAO2S052011S005**	**2**	**0 - 0.5 ft**	**Unknown**	**<0.5**	**1.1**	**11**	**12**
5/20/2011	9:05 AM	SSSYAO3	SSSYAO3S052011S005	2	0 - 0.5 ft	Unknown	<0.5	1.7	11	20
5/19/2011	1:25 PM	SSSYASE0200002	SSSYASE0200002S051911S005	2	0 - 0.5 ft	Unknown	<0.5	1.4	11	14
9/12/2011	10:00 AM	SBTC0075L001	SBTC0075L001S091211S006	3	0 - 0.6 ft	CL	<0.5	3.6	7.6	9.2
1/16/2014	9:30 AM	SBTC0075R502	SBTC0075R502S011614S006	3	0 - 0.6 ft	ML	<0.52	2.9	9.7	17
1/28/2014	**10:15 AM**	**SBTC0075R512**	**SBTC0075R512D012814S010**	**3**	**0.1 - 1 ft**	**ML**	**<0.5**	**5**	**9.8**	**13**
1/28/2014	**10:15 AM**	**SBTC0075R512**	**SBTC0075R512S012814S010**	**3**	**0.1 - 1 ft**	**ML**	**<0.55**	**6.3**	**13**	**19**
1/22/2014	1:30 PM	SBTC0100L502	SBTC0100L502S012214S011	3	1 - 1.1 ft	ML	NA	---	NA	NA
1/30/2014	9:15 AM	SBTC0100L509	SBTC0100L509S013014S019	3	1.3 - 1.9 ft	ML	<0.7	<1.4	5.7	8.8
9/13/2011	5:40 PM	SBTC0075L018	SBTC0075L018S091311S005	3	0 - 0.5 ft	OL	<0.5	2.3	5.4	8.3
9/14/2011	**10:10 AM**	**SBTC0075L026**	**SBTC0075L026S091411S009**	**3**	**0 - 0.9 ft**	**OL**	**<0.55**	**3.6**	**13**	**21**
9/14/2011	**10:10 AM**	**SBTC0075L026**	**SBTC0075L026S091411S009-split**	**3**	**0 - 0.9 ft**	**OL**	**0.6**	**4.3**	**12**	**18**
9/21/2011	**5:45 PM**	**SBTC0075L040B**	**SBTC0075L040BD092111S010**	**3**	**0 - 1 ft**	**OL**	**0.5**	**4.1**	**13**	**21**
9/21/2011	**5:45 PM**	**SBTC0075L040B**	**SBTC0075L040BS092111S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**5.3**	**12**	**22**
9/21/2011	**5:45 PM**	**SBTC0075L040B**	**SBTC0075L040BS092111S010-split**	**3**	**0 - 1 ft**	**OL**	**0.44**	**3.8**	**11**	**16**
9/20/2011	10:20 AM	SBTC0075L069	SBTC0075L069S092011S003	3	0 - 0.3 ft	OL	<0.5	5	14	16
1/30/2014	1:35 PM	SBTC0075L508	SBTC0075L508S013014S007	3	0.2 - 0.7 ft	OL	<0.5	2.8	8.7	10
2/5/2014 1	11:25 AM	SBTC0075L514	SBTC0075L514S020514S003	3	0 - 0.3 ft	OL	<0.5	3.1	11	15
9/13/2011	9:05 AM	SBTC0075R021	SBTC0075R021S091311S006	3	0 - 0.6 ft	OL	<0.5	1.8	9	14
9/15/2011	**4:45 PM**	**SBTC0075R044**	**SBTC0075R044S091511S010**	**3**	**0 - 1 ft**	**OL**	**<0.5**	**4.8**	**5.9**	**7.1**
9/15/2011	**4:45 PM**	**SBTC0075R044**	**SBTC0075R044S091511S010-split**	**3**	**0 - 1 ft**	**OL**	**0.23**	**7.1**	**8.4**	**9.4**
9/20/2011	4:00 PM	SBTC0075R046A	SBTC0075R046AS092011S006	3	0 - 0.6 ft	OL	<0.56	3.9	8.6	13
1/16/2014	9:30 AM	SBTC0075R502	SBTC0075R502S011614S006	3	0 - 0.6 ft	OL	<0.52	2.9	9.7	17

Attachment B
Foreground Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
2/17/2014	2:05 PM	SBTC0075R509R1	SBTC0075R509R1S021714S007	3	0.5 - 0.7 ft	OL	<0.5	11	7.2	9.5
1/28/2014	**10:15 AM**	**SBTC0075R512**	**SBTC0075R512D012814S010**	**3**	**0.1 - 1 ft**	**OL**	**<0.5**	**5**	**9.8**	**13**
1/28/2014	**10:15 AM**	**SBTC0075R512**	**SBTC0075R512S012814S010**	**3**	**0.1 - 1 ft**	**OL**	**<0.55**	**6.3**	**13**	**19**
2/5/2014	9:10 AM	SBTC0075R516	SBTC0075R516S020514S005	3	0 - 0.5 ft	OL	<0.5	4	8.7	16
2/5/2014	9:20 AM	SBTC0075R516	SBTC0075R516S020514S010	3	0.7 - 1 ft	OL	<0.5	1.5	5.5	8.5
9/17/2011	1:15 PM	SBTC0100L023	SBTC0100L023S091711S007	3	0 - 0.7 ft	OL	<0.5	2.8	8.4	19
9/19/2011	11:15 AM	SBTC0100L046	SBTC0100L046S091911S007	3	0 - 0.7 ft	OL	<0.86	2.3	8	18
9/23/2011	**5:25 PM**	**SBTC0100L078**	**SBTC0100L078S092311S010**	**3**	**0 - 1 ft**	**OL**	**<0.55**	**2.6**	**13**	**23**
9/23/2011	**5:25 PM**	**SBTC0100L078**	**SBTC0100L078S092311S010-split**	**3**	**0 - 1 ft**	**OL**	**<0.2**	**2.4**	**8.2**	**13**
9/16/2011	4:05 PM	SBTC0100R002	SBTC0100R002S091611S010	3	0 - 1 ft	OL	<0.5	2.3	15	23
9/19/2011	8:28 AM	SBTC0100R017	SBTC0100R017S091911S010	3	0 - 1 ft	OL	0.86	<1.7	8.3	15
9/20/2011	4:15 PM	SBTC0100R046	SBTC0100R046S092011S010	3	0 - 1 ft	OL	<0.5	3.5	11	12
10/13/2011	6:07 PM	SBTC0100R096B	SBTC0100R096BS101311S006	3	0 - 0.6 ft	OL	<0.5	5.5	13	21
10/14/2011	8:15 AM	SBTC0100R096C	SBTC0100R096CS101411S003	3	0 - 0.3 ft	OL	<0.5	3.2	7.5	11
2/5/2014	10:05 AM	SBTC0100R524	SBTC0100R524S020514S010	3	0 - 1 ft	OL	<0.68	2.3	4.1	5
2/5/2014	10:05 AM	SBTC0100R524	SBTC0100R524S020514S010	3	0 - 1 ft	OL	<0.68	2.3	4.1	5
1/9/2012	10:50 AM	SBTC0100R592E	SBTC0100R592ES010912S010	3	0 - 1 ft	OL	<0.5	6.6	8.5	13
9/22/2011	2:55 PM	SBTC0125R006A	SBTC0125R006AS092211S010	3	0 - 1 ft	OL	<0.5	4.8	7.9	9.3
9/22/2011	6:20 PM	SBTC0125R012C	SBTC0125R012CS092211S003	3	0 - 0.3 ft	OL	<0.5	4	7.2	11
1/30/2014	9:15 AM	SBTC0100L509	SBTC0100L509S013014S019	3	1.3 - 1.9 ft	SC	<0.7	<1.4	5.7	8.8
9/14/2011	5:20 PM	SBTC0075R060	SBTC0075R060S091411S010	3	0 - 1 ft	SM	<0.5	3.3	7.2	10
2/17/2014	2:15 PM	SBTC0075R509R1	SBTC0075R509R1S021714S012	3	1 - 1.2 ft	SM	<0.5	2	5	6.9
2/5/2014	9:20 AM	SBTC0075R516	SBTC0075R516S020514S010	3	0.7 - 1 ft	SM	<0.5	1.5	5.5	8.5
9/13/2011	11:35 AM	SBTC0075L012	SBTC0075L012S091311S010	3	0 - 1 ft	SW	<0.5	<1	4.9	5.1
1/11/2012	2:50 PM	ESTC0075R134	ESTC0075R134S011112S015	3	1.5 - 1.5 ft	Unknown	<0.5	3.8	8.1	14
1/20/2012	4:31 PM	ESTC0100L138	ESTC0100L138S012012S005	3	0.5 - 0.5 ft	Unknown	<1.6	3.3	5.1	6.5
1/20/2012	**3:37 PM**	**ESTC0100R154**	**ESTC0100R154S012012S020**	**3**	**2 - 2 ft**	**Unknown**	**<0.5**	**8.1**	**8.9**	**11**
1/20/2012	**3:37 PM**	**ESTC0100R154**	**ESTC0100R154S012012S020-SPLIT**	**3**	**2 - 2 ft**	**Unknown**	**0.29**	**5.8**	**8.7**	**15**
1/20/2012	4:51 PM	ESTC0100R157	ESTC0100R157S012012S005	3	0.5 - 0.5 ft	Unknown	<0.5	5.6	8.2	11
1/11/2013	10:05 AM	SSTC0100L02	SSTC0100L02S011113SX	3	0.0-0.5 ft	Unknown	<1.6	4.2	10	12
1/11/2013	10:45 AM	SSTC0100R01	SSTC0100R01S011113SX	3	0.0-0.5 ft	Unknown	<0.97	2.6	9.3	12
1/10/2013	11:46 AM	SSTC0125R05	SSTC0125R05S011013SX	3	0.0-0.5 ft	Unknown	<0.55	< 1.4	8.3	12
10/24/2011	10:18 AM	C-STAGING-03-10241	TC- STAGING-03S102411S X	3	0 - 0.5 ft	Unknown	<0.5	3.5	9.3	11
10/24/2011	10:24 AM	C-STAGING-04-10241	TC- STAGING-04S102411S X	3	0 - 0.5 ft	Unknown	<0.5	3.6	11	13
10/5/2011	8:10AM	SBTC0150L052	SBTC0150L052S100511S010	4	0 - 1	CL	<0.5	1.4	9.9	16
9/30/2011	4:05PM	SBTC0150R102D	SBTC0150R102DS093011S005	4	0 - 0.5	CL	<0.5	2.2	16	25

Attachment B
Foreground Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
10/4/2011	1:10PM	SBTC0175R006A	SBTC0175R006AS100411S003	4	0 - 0.35	CL	<0.5	1.5	11	18
10/5/2011	2:50PM	SBTC0150L063	SBTC0150L063S100511S007	4	0 - 0.7	ML	<0.5	5	11	19
3/11/2014	2:00PM	SBTC0150L512	SBTC0150L512S031114S025	4	2.35 - 2.5	ML	<0.5	<1	11	20
10/29/2011	**3:15PM**	**SBTC0175R115**	**SBTC0175R115D102911S010**	**4**	**0 - 1**	**ML**	**<0.5**	**<1**	**6.7**	**10**
10/29/2011	**3:15PM**	**SBTC0175R115**	**SBTC0175R115S102911S010**	**4**	**0 - 1**	**ML**	**<0.5**	**<1**	**6.1**	**11**
3/4/2014	9:20AM	SBTC0125R518	SBTC0125R518S030414S010	4	0 - 1	OL	<0.5	1.4	8.7	12
10/8/2011	1:35PM	SBTC0150L064A	SBTC0150L064AS100811S010	4	0 - 1	OL	<0.5	1.4	10	15
10/8/2011	**3:20PM**	**SBTC0150L064B**	**SBTC0150L064BD100811S009**	**4**	**0 - 0.9**	**OL**	**<0.5**	**<1**	**13**	**21**
10/8/2011	**3:20PM**	**SBTC0150L064B**	**SBTC0150L064BS100811S009**	**4**	**0 - 0.9**	**OL**	**<0.5**	**<1**	**12**	**21**
10/6/2011	11:00AM	SBTC0150L065	SBTC0150L065S100611S010	4	0 - 1	OL	<0.5	1.6	9	15
10/7/2011	11:24AM	SBTC0150L070	SBTC0150L070S100711S010	4	0 - 1	OL	<0.5	1.8	12	19
10/7/2011	11:15AM	SBTC0150L090	SBTC0150L090S100711S007	4	0 - 0.7	OL	<0.5	<1	16	20
10/8/2011	11:50AM	SBTC0150L099	SBTC0150L099S100811S010	4	0 - 1	OL	0.55	2.7	19	32
9/27/2011	3:35PM	SBTC0150R013	SBTC0150R013S092711S010	4	0 - 1	OL	<0.5	<1	9.5	18
9/26/2011	3:45PM	SBTC0150R026	SBTC0150R026S092611S010	4	0 - 1	OL	0.55	1.8	15	21
9/28/2011	11:00AM	SBTC0150R040	SBTC0150R040S092811S010	4	0 - 1	OL	<0.5	1.9	10	14
10/8/2011	10:40AM	SBTC0175L006	SBTC0175L006S100811S005	4	0 - 0.5	OL	<0.5	1.6	14	22
10/10/2011	1:30PM	SBTC0175L032	SBTC0175L032S101011S007	4	0 - 0.7	OL	<0.5	<1	5.8	7.6
3/13/2014	3:05PM	SBTC0175L503	SBTC0175L503S031314S005	4	0.3 - 0.5	OL	<0.5	1.8	12	13
10/6/2011	2:10PM	SBTC0175R059	SBTC0175R059S100611S003	4	0 - 0.35	OL	<0.5	<1	5.4	8.2
10/6/2011	2:10PM	SBTC0175R066	SBTC0175R066S100611S010	4	0 - 1	OL	<0.5	1.6	9.4	15
10/7/2011	4:44PM	SBTC0175R083	SBTC0175R083S100711S004	4	0 - 0.4	OL	<0.5	2.3	12	20
10/15/2011	4:20PM	SBTC0175R088	SBTC0175R088S101511S010	4	0 - 1	OL	0.51	6.3	11	23
10/29/2011	9:05AM	SBTC0175R120	SBTC0175R120S102911S007	4	0 - 0.7	OL	<0.5	<1	7.8	12
3/4/2014	9:20AM	SBTC0125R518	SBTC0125R518S030414S010	4	0 - 1	SM	<0.5	1.4	8.7	12
10/15/2011	**5:20PM**	**SBTC0175R090**	**SBTC0175R090D101511S010**	**4**	**0 - 1**	**SP**	**<0.5**	**<1**	**9.7**	**9.9**
10/15/2011	**5:20PM**	**SBTC0175R090**	**SBTC0175R090S101511S010**	**4**	**0 - 1**	**SP**	**<0.5**	**1.6**	**13**	**11**
10/29/2011	9:35AM	SBTC0175R123	SBTC0175R123S102911S010	4	0 - 1	SP	<0.5	<1	9.1	12
10/11/2011	9:20 AM	SBTC0200R029A	SBTC0200R029AS101111S010	5	0 - 1 ft	CL	<0.5	1.7	12	22
10/13/2011	**1:30 PM**	**SBTC0200R086**	**SBTC0200R086S101311S010**	**5**	**0 - 1 ft**	**CL**	**<0.5**	**1.3**	**7.7**	**12**
10/13/2011	**1:30 PM**	**SBTC0200R086**	**SBTC0200R086S101311S010-SPLIT**	**5**	**0 - 1 ft**	**CL**	**<0.2**	**1.2**	**7.8**	**12**
11/22/2013	2:32 PM	SBTC0225R501	SBTC0225R501S112213S015	5	1.35 - 1.5 ft	ML	0.57	2.5	17	28
11/22/2013	2:34 PM	SBTC0225R501	SBTC0225R501S112213S020	5	1.7 - 2 ft	ML	<0.5	1.2	9.6	15
10/17/2011	12:20 PM	SBTC0200L012	SBTC0200L012S101711S006	5	0 - 0.6 ft	OL	<0.5	<1	12	13
10/13/2011	**6:25 PM**	**SBTC0200R098**	**SBTC0200R098D101311S009**	**5**	**0 - 0.9 ft**	**OL**	**0.51**	**2**	**16**	**25**
10/13/2011	**6:25 PM**	**SBTC0200R098**	**SBTC0200R098S101311S009**	**5**	**0 - 0.9 ft**	**OL**	**0.69**	**2.2**	**24**	**34**

Attachment B
Foreground Soil Sample Data Set
Enbridge Oil Spill Site
Marshall, Michigan

Date and Time		Location ID	Sample ID	Reach	Sample Interval	USCS Code from Enbridge Tables	Beryllium mg/kg	Molybdenum mg/kg	Nickel mg/kg	Vanadium mg/kg
10/13/2011	**6:25 PM**	**SBTC0200R098**	**SBTC0200R098S101311S009-SPLIT**	**5**	**0 - 0.9 ft**	**OL**	**0.46**	**2.3**	**13**	**20**
10/18/2011	**9:55 AM**	**SBTC0225R006D**	**SBTC0225R006DD101811S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.6**	**15**	**24**
10/18/2011	**9:55 AM**	**SBTC0225R006D**	**SBTC0225R006DS101811S010**	**5**	**0 - 1 ft**	**OL**	**<0.5**	**1.4**	**15**	**24**
10/18/2011	10:38 AM	SBTC0225R006G	SBTC0225R006GS101811S010	5	0 - 1 ft	OL	0.59	1.6	17	27
10/15/2011	10:15 AM	SBTC0225R008	SBTC0225R008S101511S010	5	0 - 1 ft	OL	0.61	2.2	19	30
10/24/2011	**11:30 AM**	**SBTC0175R090A**	**SBTC0175R090AD102411S010**	**5**	**0 - 1 ft**	**SP**	**<0.5**	**<1**	**8**	**9.3**
10/24/2011	**11:30 AM**	**SBTC0175R090A**	**SBTC0175R090AS102411S010**	**5**	**0 - 1 ft**	**SP**	**<0.5**	**<1**	**8.2**	**10**
2/25/2012	2:15 PM	ESTC0200L231	ESTC0200L231S022512S015	5	1.5 - 1.5 ft	unknown	0.51	<1	15	25
3/3/2012	2:36 PM	ESTC0200R270	ESTC0200R270S030312S010	5	1 - 1 ft	unknown	<0.5	4.7	10	12
9/22/2010	**2:10 PM**	**PRB4-095**	**PRB4-095- SAMPLE SPLIT**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**15**	**18**
9/20/2010	**2:20 PM**	**PRB4-095**	**SOB09201420RAH1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**5.9**	**9.2**
11/10/2010	**9:00 AM**	**SOY4-10-0900**	**SOB11100900RLP1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**4.2**	**9.5**	**14**
11/10/2010	**9:00 AM**	**SOY4-10-0900**	**YD4-7-SS- SAMPLESPL IT-KC**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**NA**	**9.2**	**12**
11/10/2010	**9:05 AM**	**SOY4-10-0905**	**SOB11100905RLP1**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**1.3**	**11**	**14**
11/10/2010	**9:05 AM**	**SOY4-10-0905**	**SOB11100905RLP2**	**5**	**0 - 0.5 ft**	**unknown**	**NA**	**1.3**	**11**	**14**
11/10/2010	3:10 PM	SOY4-10-1510	SOB11101510RLP1	5	0 - 0.5 ft	unknown	NA	1.1	11	16

Notes:

1. Bolded data without shading are from a location with duplicate and/or split sample groups and the unshaded data were not included in the statistical analysis.

2. Shaded data was selected to represent the soil metal concentrations at locations with duplicate and/or split samples groups. The sample with the higher overall metal concentrations or the sample having the highest vanadium concentration was selected for use in the statistical anayses.

ATTACHMENT C
PROUCL OUTPUT FOR BACKGROUND AND FOREGROUND DATA EVALUATION

ATTACHMENT C1
BACKGROUND GOODNESS OF FIT PROUCL OUTPUT

Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects

User Selected Options	
Date/Time of Computation	3/3/2015 10:47
From File	Background_Foreground WORKING_a.xls
Full Precision	OFF
Confidence Coefficient	0.95

BerB (ch)

Raw Statistics

Number of Valid Observations	1
Number of Distinct Observations	1
Minimum	0.5
Maximum	0.5

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable BerB (ch) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

BerB (cl)

Raw Statistics

Number of Valid Observations	58
Number of Distinct Observations	18
Minimum	0.2
Maximum	0.92
Mean of Raw Data	0.509
Standard Deviation of Raw Data	0.111
Khat	18.41
Theta hat	0.0276
Kstar	17.47
Theta star	0.0291
Mean of Log Transformed Data	-0.703
Standard Deviation of Log Transformed Data	0.252

Normal GOF Test Results

Correlation Coefficient R	0.825
Approximate Shapiro Wilk Test Statistic	0.713
Approximate Shapiro Wilk P Value	1.83E-14
Lilliefors Test Statistic	0.365
Lilliefors Critical (0.05) Value	0.116

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.833
A-D Test Statistic	9.111
A-D Critical (0.05) Value	0.749
K-S Test Statistic	0.398
K-S Critical(0.05) Value	0.117

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.788
Approximate Shapiro Wilk Test Statistic	0.649

Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.412
Lilliefors Critical (0.05) Value	0.116

Data not Lognormal at (0.05) Significance Level

BerB (gc)

Raw Statistics

Number of Valid Observations	1
Number of Distinct Observations	1
Minimum	0.5
Maximum	0.5

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable BerB (gc) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

BerB (gm)

Raw Statistics

Number of Valid Observations	1
Number of Distinct Observations	1
Minimum	0.5
Maximum	0.5

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable BerB (gm) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

BerB (gw)

Raw Statistics

Number of Valid Observations	2
Number of Distinct Observations	1
Minimum	0.5
Maximum	0.5

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable BerB (gw) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

BerB (ml)

Raw Statistics

Number of Valid Observations	82
Number of Distinct Observations	8
Minimum	0.2
Maximum	0.93

Mean of Raw Data	0.497
Standard Deviation of Raw Data	0.095
Khat	24.54
Theta hat	0.0202
Kstar	23.65
Theta star	0.021
Mean of Log Transformed Data	-0.721
Standard Deviation of Log Transformed Data	0.217

Normal GOF Test Results

Correlation Coefficient R	0.669
Approximate Shapiro Wilk Test Statistic	0.491
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.441
Lilliefors Critical (0.05) Value	0.0978

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.674
A-D Test Statistic	21.51
A-D Critical (0.05) Value	0.75
K-S Test Statistic	0.467
K-S Critical(0.05) Value	0.0983

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.656
Approximate Shapiro Wilk Test Statistic	0.467
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.477
Lilliefors Critical (0.05) Value	0.0978

Data not Lognormal at (0.05) Significance Level

BerB (oh)

Raw Statistics

Number of Valid Observations	3
Number of Distinct Observations	2
Minimum	0.5
Maximum	0.71
Mean of Raw Data	0.57
Standard Deviation of Raw Data	0.121
Khat	35.52
Theta hat	0.016
Kstar	N/A
Theta star	N/A
Mean of Log Transformed Data	-0.576
Standard Deviation of Log Transformed Data	0.202

Normal GOF Test Results

Correlation Coefficient R	0.866
Shapiro Wilk Test Statistic	0.75
Shapiro Wilk Critical (0.05) Value	0.767
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.385
Lilliefors Critical (0.05) Value	0.512

Data appear Approximate Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	N/A
A-D Test Statistic	N/A
A-D Critical (0.05) Value	N/A
K-S Test Statistic	N/A
K-S Critical(0.05) Value	N/A

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.866
Shapiro Wilk Test Statistic	0.75
Shapiro Wilk Critical (0.05) Value	0.767
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.385
Lilliefors Critical (0.05) Value	0.512

Data appear Approximate_Lognormal at (0.05) Significance Level

BerB (ol)

Raw Statistics

Number of Valid Observations	554
Number of Missing Observations	3
Number of Distinct Observations	65
Minimum	0.2
Maximum	2.1
Mean of Raw Data	0.538
Standard Deviation of Raw Data	0.163
Khat	15.49
Theta hat	0.0347
Kstar	15.41
Theta star	0.0349
Mean of Log Transformed Data	-0.652
Standard Deviation of Log Transformed Data	0.242

Normal GOF Test Results

Correlation Coefficient R	0.753
Approximate Shapiro Wilk Test Statistic	0.596
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.347
Lilliefors Critical (0.05) Value	0.0376

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.8
A-D Test Statistic	83.24
A-D Critical (0.05) Value	0.753
K-S Test Statistic	0.334
K-S Critical(0.05) Value	0.0391

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.835
Approximate Shapiro Wilk Test Statistic	0.714
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.341
Lilliefors Critical (0.05) Value	0.0376

Data not Lognormal at (0.05) Significance Level

BerB (pt)

Raw Statistics

Number of Valid Observations	8
Number of Distinct Observations	5
Minimum	0.5
Maximum	1.2
Mean of Raw Data	0.84
Standard Deviation of Raw Data	0.326
Khat	7.427
Theta hat	0.113
Kstar	4.725
Theta star	0.178
Mean of Log Transformed Data	-0.243
Standard Deviation of Log Transformed Data	0.4

Normal GOF Test Results

Correlation Coefficient R	0.914
Shapiro Wilk Test Statistic	0.799
Shapiro Wilk Critical (0.05) Value	0.818
Approximate Shapiro Wilk P Value	0.0639
Lilliefors Test Statistic	0.25
Lilliefors Critical (0.05) Value	0.313

Data appear Approximate Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.903
A-D Test Statistic	0.734
A-D Critical (0.05) Value	0.717
K-S Test Statistic	0.25
K-S Critical(0.05) Value	0.295

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.924
Shapiro Wilk Test Statistic	0.816
Shapiro Wilk Critical (0.05) Value	0.818
Approximate Shapiro Wilk P Value	0.0947
Lilliefors Test Statistic	0.231
Lilliefors Critical (0.05) Value	0.313

Data appear Approximate_Lognormal at (0.05) Significance Level

BerB (sc)

Raw Statistics

Number of Valid Observations	2
Number of Distinct Observations	1
Minimum	0.5
Maximum	0.5

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable BerB (sc) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

BerB (sm)

Raw Statistics	
Number of Valid Observations	36
Number of Missing Observations	1
Number of Distinct Observations	6
Minimum	0.33
Maximum	0.93
Mean of Raw Data	0.506
Standard Deviation of Raw Data	0.0824
Khat	49.76
Theta hat	0.0102
Kstar	45.63
Theta star	0.0111
Mean of Log Transformed Data	-0.692
Standard Deviation of Log Transformed Data	0.137

Normal GOF Test Results

Correlation Coefficient R	0.607
Shapiro Wilk Test Statistic	0.423
Shapiro Wilk Critical (0.05) Value	0.935
Approximate Shapiro Wilk P Value	3.82E-14
Lilliefors Test Statistic	0.473
Lilliefors Critical (0.05) Value	0.148

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.632
A-D Test Statistic	8.908
A-D Critical (0.05) Value	0.745
K-S Test Statistic	0.458
K-S Critical(0.05) Value	0.146

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.658
Shapiro Wilk Test Statistic	0.492
Shapiro Wilk Critical (0.05) Value	0.935
Approximate Shapiro Wilk P Value	6.29E-13
Lilliefors Test Statistic	0.449
Lilliefors Critical (0.05) Value	0.148

Data not Lognormal at (0.05) Significance Level

BerB (sp)

Raw Statistics	
Number of Valid Observations	27
Number of Missing Observations	1
Number of Distinct Observations	1
Minimum	0.5
Maximum	0.5

Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable BerB (sp) was not processed!

If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

BerB (sw)

Raw Statistics

Number of Valid Observations	15
Number of Missing Observations	1
Number of Distinct Observations	4
Minimum	0.2
Maximum	0.5
Mean of Raw Data	0.457
Standard Deviation of Raw Data	0.102
Khat	14.36
Theta hat	0.0318
Kstar	11.53
Theta star	0.0396
Mean of Log Transformed Data	-0.819
Standard Deviation of Log Transformed Data	0.305

Normal GOF Test Results

Correlation Coefficient R	0.688
Shapiro Wilk Test Statistic	0.482
Shapiro Wilk Critical (0.05) Value	0.881
Approximate Shapiro Wilk P Value	5.72E-07
Lilliefors Test Statistic	0.465
Lilliefors Critical (0.05) Value	0.229

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.622
A-D Test Statistic	3.992
A-D Critical (0.05) Value	0.736
K-S Test Statistic	0.469
K-S Critical(0.05) Value	0.221

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.677
Shapiro Wilk Test Statistic	0.47
Shapiro Wilk Critical (0.05) Value	0.881
Approximate Shapiro Wilk P Value	4.23E-07
Lilliefors Test Statistic	0.46
Lilliefors Critical (0.05) Value	0.229

Data not Lognormal at (0.05) Significance Level

BerB (unknown)

Raw Statistics

Number of Valid Observations	257
Number of Missing Observations	116
Number of Distinct Observations	43
Minimum	0.2
Maximum	16
Mean of Raw Data	0.734
Standard Deviation of Raw Data	1.532
Khat	1.88
Theta hat	0.391
Kstar	1.861
Theta star	0.395
Mean of Log Transformed Data	-0.598
Standard Deviation of Log Transformed Data	0.497

Normal GOF Test Results

Correlation Coefficient R	0.396
Approximate Shapiro Wilk Test Statistic	0.188
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.399
Lilliefors Critical (0.05) Value	0.0553

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.561
A-D Test Statistic	3.89E+28
A-D Critical (0.05) Value	0.767
K-S Test Statistic	0.382
K-S Critical(0.05) Value	0.0579

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.725
Approximate Shapiro Wilk Test Statistic	0.554
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.362
Lilliefors Critical (0.05) Value	0.0553

Data not Lognormal at (0.05) Significance Level

MolB (ch)

Raw Statistics

Number of Valid Observations	1
Number of Distinct Observations	1
Minimum	1.4
Maximum	1.4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable MolB (ch) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

MolB (cl) Lognormal assumed based on correlation coefficient >0.9

Raw Statistics

Number of Valid Observations	58
Number of Distinct Observations	26
Minimum	1
Maximum	26
Mean of Raw Data	2.612
Standard Deviation of Raw Data	3.594
Khat	1.784
Theta hat	1.465
Kstar	1.703
Theta star	1.534
Mean of Log Transformed Data	0.654
Standard Deviation of Log Transformed Data	0.644

Normal GOF Test Results

Correlation Coefficient R	0.624
Approximate Shapiro Wilk Test Statistic	0.432

Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.327
Lilliefors Critical (0.05) Value	0.116

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.794
A-D Test Statistic	4.295
A-D Critical (0.05) Value	0.765
K-S Test Statistic	0.213
K-S Critical(0.05) Value	0.119

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.918
Approximate Shapiro Wilk Test Statistic	0.849
Approximate Shapiro Wilk P Value	9.14E-08
Lilliefors Test Statistic	0.163
Lilliefors Critical (0.05) Value	0.116

Data not Lognormal at (0.05) Significance Level

MolB (gc)

Raw Statistics

Number of Valid Observations	1
Number of Distinct Observations	1
Minimum	1
Maximum	1

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable MolB (gc) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

MolB (gm)

Raw Statistics

Number of Valid Observations	1
Number of Distinct Observations	1
Minimum	4.3
Maximum	4.3

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable MolB (gm) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

MolB (gw)

Raw Statistics

Number of Valid Observations	2
Number of Distinct Observations	2
Minimum	1

Maximum	4.3

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable MolB (gw) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

MolB (ml) Lognormal assumed based on correlation coefficient >0.9

Raw Statistics

Number of Valid Observations	82
Number of Distinct Observations	25
Minimum	1
Maximum	13
Mean of Raw Data	1.995
Standard Deviation of Raw Data	1.912
Khat	2.57
Theta hat	0.776
Kstar	2.484
Theta star	0.803
Mean of Log Transformed Data	0.484
Standard Deviation of Log Transformed Data	0.561

Normal GOF Test Results

Correlation Coefficient R	0.708
Approximate Shapiro Wilk Test Statistic	0.528
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.301
Lilliefors Critical (0.05) Value	0.0978

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.844
A-D Test Statistic	5.745
A-D Critical (0.05) Value	0.761
K-S Test Statistic	0.219
K-S Critical(0.05) Value	0.0996

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.905
Approximate Shapiro Wilk Test Statistic	0.813
Approximate Shapiro Wilk P Value	8.88E-15
Lilliefors Test Statistic	0.194
Lilliefors Critical (0.05) Value	0.0978

Data not Lognormal at (0.05) Significance Level+A596:A62A579:A620

MolB (oh)

Raw Statistics

Number of Valid Observations	3
Number of Distinct Observations	2
Minimum	1
Maximum	2.7
Mean of Raw Data	1.567
Standard Deviation of Raw Data	0.981

Khat	4.402
Theta hat	0.356
Kstar	N/A
Theta star	N/A
Mean of Log Transformed Data	0.331
Standard Deviation of Log Transformed Data	0.573

Normal GOF Test Results

Correlation Coefficient R	0.866
Shapiro Wilk Test Statistic	0.75
Shapiro Wilk Critical (0.05) Value	0.767
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.385
Lilliefors Critical (0.05) Value	0.512

Data appear Approximate Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	N/A
A-D Test Statistic	N/A
A-D Critical (0.05) Value	N/A
K-S Test Statistic	N/A
K-S Critical(0.05) Value	N/A

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.866
Shapiro Wilk Test Statistic	0.75
Shapiro Wilk Critical (0.05) Value	0.767
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.385
Lilliefors Critical (0.05) Value	0.512

Data appear Approximate_Lognormal at (0.05) Significance Level

MolB (ol)	Lognormal assumed based on correlation coefficient >0.9

Raw Statistics

Number of Valid Observations	557
Number of Distinct Observations	76
Minimum	1
Maximum	67
Mean of Raw Data	3.072
Standard Deviation of Raw Data	4.412
Khat	2.067
Theta hat	1.486
Kstar	2.057
Theta star	1.493
Mean of Log Transformed Data	0.861
Standard Deviation of Log Transformed Data	0.622

Normal GOF Test Results

Correlation Coefficient R	0.557
Approximate Shapiro Wilk Test Statistic	0.351
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.319
Lilliefors Critical (0.05) Value	0.0375

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.695
A-D Test Statistic	1.80E+28
A-D Critical (0.05) Value	0.767
K-S Test Statistic	0.133
K-S Critical(0.05) Value	0.0396

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.967
Approximate Shapiro Wilk Test Statistic	0.929
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.083
Lilliefors Critical (0.05) Value	0.0375

Data not Lognormal at (0.05) Significance Level

MolB (pt)

Raw Statistics

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	1.7
Maximum	20
Mean of Raw Data	5.35
Standard Deviation of Raw Data	6.06
Khat	1.63
Theta hat	3.283
Kstar	1.102
Theta star	4.856
Mean of Log Transformed Data	1.34
Standard Deviation of Log Transformed Data	0.775

Normal GOF Test Results

Correlation Coefficient R	0.766
Shapiro Wilk Test Statistic	0.613
Shapiro Wilk Critical (0.05) Value	0.818
Approximate Shapiro Wilk P Value	1.84E-04
Lilliefors Test Statistic	0.372
Lilliefors Critical (0.05) Value	0.313

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.911
A-D Test Statistic	0.801
A-D Critical (0.05) Value	0.727
K-S Test Statistic	0.266
K-S Critical(0.05) Value	0.299

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.924
Shapiro Wilk Test Statistic	0.868
Shapiro Wilk Critical (0.05) Value	0.818
Approximate Shapiro Wilk P Value	0.113
Lilliefors Test Statistic	0.202
Lilliefors Critical (0.05) Value	0.313

Data appear Lognormal at (0.05) Significance Level

MolB (sc)

Raw Statistics

Number of Valid Observations	2
Number of Distinct Observations	1
Minimum	1
Maximum	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable MolB (sc) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

MolB (sm)

Raw Statistics

Number of Valid Observations	37
Number of Distinct Observations	12
Minimum	1
Maximum	11
Mean of Raw Data	1.473
Standard Deviation of Raw Data	1.667
Khat	2.899
Theta hat	0.508
Kstar	2.682
Theta star	0.549
Mean of Log Transformed Data	0.205
Standard Deviation of Log Transformed Data	0.462

Normal GOF Test Results

Correlation Coefficient R	0.526
Shapiro Wilk Test Statistic	0.314
Shapiro Wilk Critical (0.05) Value	0.936
Approximate Shapiro Wilk P Value	2.22E-16
Lilliefors Test Statistic	0.388
Lilliefors Critical (0.05) Value	0.146

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.675
A-D Test Statistic	7.529
A-D Critical (0.05) Value	0.755
K-S Test Statistic	0.338
K-S Critical(0.05) Value	0.146

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.706
Shapiro Wilk Test Statistic	0.525
Shapiro Wilk Critical (0.05) Value	0.936
Approximate Shapiro Wilk P Value	1.07E-12
Lilliefors Test Statistic	0.347
Lilliefors Critical (0.05) Value	0.146

Data not Lognormal at (0.05) Significance Level

MolB (sp)

Raw Statistics

Number of Valid Observations	28
Number of Distinct Observations	8
Minimum	1
Maximum	4
Mean of Raw Data	1.346
Standard Deviation of Raw Data	0.847
Khat	4.624
Theta hat	0.291
Kstar	4.152
Theta star	0.324
Mean of Log Transformed Data	0.185
Standard Deviation of Log Transformed Data	0.419

Normal GOF Test Results

Correlation Coefficient R	0.68
Shapiro Wilk Test Statistic	0.471
Shapiro Wilk Critical (0.05) Value	0.924
Approximate Shapiro Wilk P Value	1.65E-10
Lilliefors Test Statistic	0.409
Lilliefors Critical (0.05) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.793
A-D Test Statistic	6.86
A-D Critical (0.05) Value	0.749
K-S Test Statistic	0.424
K-S Critical(0.05) Value	0.166

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.706
Shapiro Wilk Test Statistic	0.503
Shapiro Wilk Critical (0.05) Value	0.924
Approximate Shapiro Wilk P Value	4.62E-10
Lilliefors Test Statistic	0.421
Lilliefors Critical (0.05) Value	0.167

Data not Lognormal at (0.05) Significance Level

MolB (sw)

Raw Statistics

Number of Valid Observations	16
Number of Distinct Observations	8
Minimum	1
Maximum	2.7
Mean of Raw Data	1.375
Standard Deviation of Raw Data	0.482
Khat	10.52
Theta hat	0.131
Kstar	8.589
Theta star	0.16
Mean of Log Transformed Data	0.27
Standard Deviation of Log Transformed Data	0.308

Normal GOF Test Results

Correlation Coefficient R	0.891
Shapiro Wilk Test Statistic	0.797
Shapiro Wilk Critical (0.05) Value	0.887

Approximate Shapiro Wilk P Value	0.0021
Lilliefors Test Statistic	0.219
Lilliefors Critical (0.05) Value	0.222
Data appear Approximate Normal at (0.05) Significance Level	

Gamma GOF Test Results

Correlation Coefficient R	0.941
A-D Test Statistic	0.999
A-D Critical (0.05) Value	0.739
K-S Test Statistic	0.247
K-S Critical(0.05) Value	0.215
Data not Gamma Distributed at (0.05) Significance Level	

Lognormal GOF Test Results

Correlation Coefficient R	0.924
Shapiro Wilk Test Statistic	0.845
Shapiro Wilk Critical (0.05) Value	0.887
Approximate Shapiro Wilk P Value	0.0127
Lilliefors Test Statistic	0.247
Lilliefors Critical (0.05) Value	0.222
Data not Lognormal at (0.05) Significance Level	

MolB (unknown)

Raw Statistics

Number of Valid Observations	330
Number of Missing Observations	43
Number of Distinct Observations	43
Minimum	1
Maximum	53
Mean of Raw Data	2.119
Standard Deviation of Raw Data	4.61
Khat	1.477
Theta hat	1.434
Kstar	1.466
Theta star	1.445
Mean of Log Transformed Data	0.376
Standard Deviation of Log Transformed Data	0.628

Normal GOF Test Results

Correlation Coefficient R	0.457
Approximate Shapiro Wilk Test Statistic	0.242
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.404
Lilliefors Critical (0.05) Value	0.0488
Data not Normal at (0.05) Significance Level	

Gamma GOF Test Results

Correlation Coefficient R	0.648
A-D Test Statistic	48.97
A-D Critical (0.05) Value	0.773
K-S Test Statistic	0.301
K-S Critical(0.05) Value	0.051
Data not Gamma Distributed at (0.05) Significance Level	

Lognormal GOF Test Results

Correlation Coefficient R	0.81
Approximate Shapiro Wilk Test Statistic	0.659

Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.294
Lilliefors Critical (0.05) Value	0.0488

Data not Lognormal at (0.05) Significance Level

NickB (ch)

Raw Statistics

Number of Valid Observations	1
Number of Distinct Observations	1
Minimum	12
Maximum	12

Warning: This data set only has 1 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable NickB (ch) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

NickB (cl)

Raw Statistics

Number of Valid Observations	58
Number of Distinct Observations	30
Minimum	4.2
Maximum	33
Mean of Raw Data	12.74
Standard Deviation of Raw Data	5.019
Khat	7.728
Theta hat	1.649
Kstar	7.34
Theta star	1.736
Mean of Log Transformed Data	2.479
Standard Deviation of Log Transformed Data	0.362

Normal GOF Test Results

Correlation Coefficient R	0.928
Approximate Shapiro Wilk Test Statistic	0.877
Approximate Shapiro Wilk P Value	3.18E-06
Lilliefors Test Statistic	0.111
Lilliefors Critical (0.05) Value	0.116

Data appear Approximate Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.966
A-D Test Statistic	0.572
A-D Critical (0.05) Value	0.752
K-S Test Statistic	0.0968
K-S Critical(0.05) Value	0.117

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.985
Approximate Shapiro Wilk Test Statistic	0.982
Approximate Shapiro Wilk P Value	0.763
Lilliefors Test Statistic	0.0833
Lilliefors Critical (0.05) Value	0.116

Data appear Lognormal at (0.05) Significance Level

NickB (gc)

Raw Statistics

Number of Valid Observations	1
Number of Distinct Observations	1
Minimum	7.2
Maximum	7.2

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable NickB (gc) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

NickB (gm)

Raw Statistics

Number of Valid Observations	1
Number of Distinct Observations	1
Minimum	13
Maximum	13

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable NickB (gm) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

NickB (gw)

Raw Statistics

Number of Valid Observations	2
Number of Distinct Observations	2
Minimum	7.2
Maximum	13

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable NickB (gw) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

NickB (ml)

Raw Statistics

Number of Valid Observations	82
Number of Distinct Observations	40
Minimum	4.6
Maximum	35
Mean of Raw Data	10.65
Standard Deviation of Raw Data	4.64
Khat	6.856

Theta hat	1.554
Kstar	6.614
Theta star	1.611
Mean of Log Transformed Data	2.291
Standard Deviation of Log Transformed Data	0.377

Normal GOF Test Results

Correlation Coefficient R	0.907
Approximate Shapiro Wilk Test Statistic	0.845
Approximate Shapiro Wilk P Value	6.21E-12
Lilliefors Test Statistic	0.165
Lilliefors Critical (0.05) Value	0.0978

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.957
A-D Test Statistic	0.715
A-D Critical (0.05) Value	0.753
K-S Test Statistic	0.111
K-S Critical(0.05) Value	0.0987

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.99
Approximate Shapiro Wilk Test Statistic	0.98
Approximate Shapiro Wilk P Value	0.601
Lilliefors Test Statistic	0.0835
Lilliefors Critical (0.05) Value	0.0978

Data appear Lognormal at (0.05) Significance Level

NickB (oh)

Raw Statistics

Number of Valid Observations	3
Number of Distinct Observations	3
Minimum	8.9
Maximum	20
Mean of Raw Data	12.97
Standard Deviation of Raw Data	6.116
Khat	7.56
Theta hat	1.715
Kstar	N/A
Theta star	N/A
Mean of Log Transformed Data	2.495
Standard Deviation of Log Transformed Data	0.438

Normal GOF Test Results

Correlation Coefficient R	0.907
Shapiro Wilk Test Statistic	0.824
Shapiro Wilk Critical (0.05) Value	0.767
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.353
Lilliefors Critical (0.05) Value	0.512

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	N/A
A-D Test Statistic	N/A

A-D Critical (0.05) Value	N/A
K-S Test Statistic	N/A
K-S Critical(0.05) Value	N/A

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.925
Shapiro Wilk Test Statistic	0.855
Shapiro Wilk Critical (0.05) Value	0.767
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.336
Lilliefors Critical (0.05) Value	0.512

Data appear Lognormal at (0.05) Significance Level

NickB (ol) Lognormal assumed based on correlation coefficient >0.9

Raw Statistics

Number of Valid Observations	554
Number of Missing Observations	3
Number of Distinct Observations	75
Minimum	2.9
Maximum	35
Mean of Raw Data	10.87
Standard Deviation of Raw Data	3.77
Khat	9.077
Theta hat	1.198
Kstar	9.029
Theta star	1.204
Mean of Log Transformed Data	2.33
Standard Deviation of Log Transformed Data	0.339

Normal GOF Test Results

Correlation Coefficient R	0.95
Approximate Shapiro Wilk Test Statistic	0.909
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.13
Lilliefors Critical (0.05) Value	0.0376

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.975
A-D Test Statistic	3.36
A-D Critical (0.05) Value	0.754
K-S Test Statistic	0.0876
K-S Critical(0.05) Value	0.0392

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.987
Approximate Shapiro Wilk Test Statistic	0.971
Approximate Shapiro Wilk P Value	4.54E-06
Lilliefors Test Statistic	0.0772
Lilliefors Critical (0.05) Value	0.0376

Data not Lognormal at (0.05) Significance Level

NickB (pt)

Raw Statistics

Number of Valid Observations	8

Number of Distinct Observations	7
Minimum	8.2
Maximum	27
Mean of Raw Data	12.48
Standard Deviation of Raw Data	6.158
Khat	6.698
Theta hat	1.863
Kstar	4.27
Theta star	2.922
Mean of Log Transformed Data	2.447
Standard Deviation of Log Transformed Data	0.386

Normal GOF Test Results

Correlation Coefficient R	0.819
Shapiro Wilk Test Statistic	0.692
Shapiro Wilk Critical (0.05) Value	0.818
Approximate Shapiro Wilk P Value	0.00135
Lilliefors Test Statistic	0.341
Lilliefors Critical (0.05) Value	0.313

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.891
A-D Test Statistic	0.765
A-D Critical (0.05) Value	0.718
K-S Test Statistic	0.282
K-S Critical(0.05) Value	0.295

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.899
Shapiro Wilk Test Statistic	0.821
Shapiro Wilk Critical (0.05) Value	0.818
Approximate Shapiro Wilk P Value	0.0377
Lilliefors Test Statistic	0.255
Lilliefors Critical (0.05) Value	0.313

Data appear Lognormal at (0.05) Significance Level

NickB (sc)

Raw Statistics

Number of Valid Observations	2
Number of Distinct Observations	2
Minimum	8.6
Maximum	11

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable NickB (sc) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

NickB (sm)

Raw Statistics

Number of Valid Observations	36
Number of Missing Observations	1

Number of Distinct Observations	29
Minimum	3.9
Maximum	23
Mean of Raw Data	9.108
Standard Deviation of Raw Data	4.43
Khat	5.494
Theta hat	1.658
Kstar	5.054
Theta star	1.802
Mean of Log Transformed Data	2.115
Standard Deviation of Log Transformed Data	0.422

Normal GOF Test Results

Correlation Coefficient R	0.912
Shapiro Wilk Test Statistic	0.835
Shapiro Wilk Critical (0.05) Value	0.935
Approximate Shapiro Wilk P Value	3.38E-05
Lilliefors Test Statistic	0.196
Lilliefors Critical (0.05) Value	0.148

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.968
A-D Test Statistic	1.022
A-D Critical (0.05) Value	0.75
K-S Test Statistic	0.15
K-S Critical(0.05) Value	0.147

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.979
Shapiro Wilk Test Statistic	0.953
Shapiro Wilk Critical (0.05) Value	0.935
Approximate Shapiro Wilk P Value	0.175
Lilliefors Test Statistic	0.122
Lilliefors Critical (0.05) Value	0.148

Data appear Lognormal at (0.05) Significance Level

NickB (sp)

Raw Statistics

Number of Valid Observations	27
Number of Missing Observations	1
Number of Distinct Observations	23
Minimum	2.6
Maximum	17
Mean of Raw Data	7.874
Standard Deviation of Raw Data	3.135
Khat	7.05
Theta hat	1.117
Kstar	6.292
Theta star	1.252
Mean of Log Transformed Data	1.991
Standard Deviation of Log Transformed Data	0.392

Normal GOF Test Results

Correlation Coefficient R	0.958
Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical (0.05) Value	0.923

Approximate Shapiro Wilk P Value	0.0621
Lilliefors Test Statistic	0.141
Lilliefors Critical (0.05) Value	0.171

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.988
A-D Test Statistic	0.282
A-D Critical (0.05) Value	0.746
K-S Test Statistic	0.104
K-S Critical(0.05) Value	0.168

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.985
Shapiro Wilk Test Statistic	0.982
Shapiro Wilk Critical (0.05) Value	0.923
Approximate Shapiro Wilk P Value	0.904
Lilliefors Test Statistic	0.0799
Lilliefors Critical (0.05) Value	0.171

Data appear Lognormal at (0.05) Significance Level

NickB (sw)

Raw Statistics

Number of Valid Observations	15
Number of Missing Observations	1
Number of Distinct Observations	13
Minimum	5
Maximum	19
Mean of Raw Data	9.613
Standard Deviation of Raw Data	3.654
Khat	7.943
Theta hat	1.21
Kstar	6.399
Theta star	1.502
Mean of Log Transformed Data	2.199
Standard Deviation of Log Transformed Data	0.371

Normal GOF Test Results

Correlation Coefficient R	0.955
Shapiro Wilk Test Statistic	0.919
Shapiro Wilk Critical (0.05) Value	0.881
Approximate Shapiro Wilk P Value	0.173
Lilliefors Test Statistic	0.124
Lilliefors Critical (0.05) Value	0.229

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.978
A-D Test Statistic	0.245
A-D Critical (0.05) Value	0.738
K-S Test Statistic	0.0987
K-S Critical(0.05) Value	0.222

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.984

Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical (0.05) Value	0.881
Approximate Shapiro Wilk P Value	0.783
Lilliefors Test Statistic	0.11
Lilliefors Critical (0.05) Value	0.229

Data appear Lognormal at (0.05) Significance Level

NickB (unknown) Lognormal assumed based on correlation coefficient >0.9

Raw Statistics

Number of Valid Observations	352
Number of Missing Observations	21
Number of Distinct Observations	81
Minimum	2.6
Maximum	40
Mean of Raw Data	10.19
Standard Deviation of Raw Data	5.226
Khat	4.92
Theta hat	2.072
Kstar	4.88
Theta star	2.089
Mean of Log Transformed Data	2.217
Standard Deviation of Log Transformed Data	0.452

Normal GOF Test Results

Correlation Coefficient R	0.902
Approximate Shapiro Wilk Test Statistic	0.819
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.134
Lilliefors Critical (0.05) Value	0.0472

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.958
A-D Test Statistic	1.982
A-D Critical (0.05) Value	0.757
K-S Test Statistic	0.077
K-S Critical(0.05) Value	0.0486

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.993
Approximate Shapiro Wilk Test Statistic	0.977
Approximate Shapiro Wilk P Value	0.0394
Lilliefors Test Statistic	0.0615
Lilliefors Critical (0.05) Value	0.0472

Data not Lognormal at (0.05) Significance Level

VanB (ch)

Raw Statistics

Number of Valid Observations	1
Number of Distinct Observations	1
Minimum	22
Maximum	22

Warning: This data set only has 1 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable VanB (ch) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

VanB (cl)

Raw Statistics	
Number of Valid Observations	58
Number of Distinct Observations	22
Minimum	7
Maximum	54
Mean of Raw Data	20.53
Standard Deviation of Raw Data	8.86
Khat	6.592
Theta hat	3.115
Kstar	6.263
Theta star	3.279
Mean of Log Transformed Data	2.944
Standard Deviation of Log Transformed Data	0.39

Normal GOF Test Results

Correlation Coefficient R	0.921
Approximate Shapiro Wilk Test Statistic	0.859
Approximate Shapiro Wilk P Value	3.27E-07
Lilliefors Test Statistic	0.144
Lilliefors Critical (0.05) Value	0.116

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.965
A-D Test Statistic	0.859
A-D Critical (0.05) Value	0.753
K-S Test Statistic	0.133
K-S Critical(0.05) Value	0.117

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.983
Approximate Shapiro Wilk Test Statistic	0.971
Approximate Shapiro Wilk P Value	0.356
Lilliefors Test Statistic	0.118
Lilliefors Critical (0.05) Value	0.116

Data appear Approximate_Lognormal at (0.05) Significance Level

VanB (gc)

Raw Statistics	
Number of Valid Observations	1
Number of Distinct Observations	1
Minimum	9.8
Maximum	9.8

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable VanB (gc) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

VanB (gm)

Raw Statistics

Number of Valid Observations	1
Number of Distinct Observations	1
Minimum	11
Maximum	11

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable VanB (gm) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

VanB (gw)

Raw Statistics

Number of Valid Observations	2
Number of Distinct Observations	2
Minimum	9.8
Maximum	11

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable VanB (gw) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

VanB (ml)

Raw Statistics

Number of Valid Observations	82
Number of Distinct Observations	24
Minimum	6.3
Maximum	42
Mean of Raw Data	16.53
Standard Deviation of Raw Data	5.835
Khat	9.552
Theta hat	1.73
Kstar	9.211
Theta star	1.794
Mean of Log Transformed Data	2.752
Standard Deviation of Log Transformed Data	0.323

Normal GOF Test Results

Correlation Coefficient R	0.932
Approximate Shapiro Wilk Test Statistic	0.883
Approximate Shapiro Wilk P Value	1.46E-08
Lilliefors Test Statistic	0.13
Lilliefors Critical (0.05) Value	0.0978

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.967
A-D Test Statistic	0.751
A-D Critical (0.05) Value	0.751
K-S Test Statistic	0.091
K-S Critical(0.05) Value	0.0986

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.988
Approximate Shapiro Wilk Test Statistic	0.984
Approximate Shapiro Wilk P Value	0.773
Lilliefors Test Statistic	0.0789
Lilliefors Critical (0.05) Value	0.0978

Data appear Lognormal at (0.05) Significance Level

VanB (oh)

Raw Statistics

Number of Valid Observations	3
Number of Distinct Observations	3
Minimum	13
Maximum	24
Mean of Raw Data	17.33
Standard Deviation of Raw Data	5.859
Khat	14.2
Theta hat	1.22
Kstar	N/A
Theta star	N/A
Mean of Log Transformed Data	2.817
Standard Deviation of Log Transformed Data	0.321

Normal GOF Test Results

Correlation Coefficient R	0.939
Shapiro Wilk Test Statistic	0.881
Shapiro Wilk Critical (0.05) Value	0.767
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.321
Lilliefors Critical (0.05) Value	0.512

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	N/A
A-D Test Statistic	N/A
A-D Critical (0.05) Value	N/A
K-S Test Statistic	N/A
K-S Critical(0.05) Value	N/A

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.956
Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical (0.05) Value	0.767
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.3
Lilliefors Critical (0.05) Value	0.512

Data appear Lognormal at (0.05) Significance Level

VanB (ol) Lognormal assumed based on correlation coefficient >0.9

Raw Statistics	
Number of Valid Observations	554
Number of Missing Observations	3
Number of Distinct Observations	74
Minimum	3.4
Maximum	52
Mean of Raw Data	16.28
Standard Deviation of Raw Data	6.437
Khat	6.588
Theta hat	2.471
Kstar	6.553
Theta star	2.484
Mean of Log Transformed Data	2.712
Standard Deviation of Log Transformed Data	0.405

Normal GOF Test Results

Correlation Coefficient R	0.972
Approximate Shapiro Wilk Test Statistic	0.944
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.0997
Lilliefors Critical (0.05) Value	0.0376
Data not Normal at (0.05) Significance Level	

Gamma GOF Test Results

Correlation Coefficient R	0.995
A-D Test Statistic	1.215
A-D Critical (0.05) Value	0.755
K-S Test Statistic	0.0547
K-S Critical(0.05) Value	0.0393
Data not Gamma Distributed at (0.05) Significance Level	

Lognormal GOF Test Results

Correlation Coefficient R	0.992
Approximate Shapiro Wilk Test Statistic	0.976
Approximate Shapiro Wilk P Value	0.00228
Lilliefors Test Statistic	0.0803
Lilliefors Critical (0.05) Value	0.0376
Data not Lognormal at (0.05) Significance Level	

VanB (pt)

Raw Statistics	
Number of Valid Observations	8
Number of Distinct Observations	7
Minimum	8.1
Maximum	21
Mean of Raw Data	14.09
Standard Deviation of Raw Data	4.426
Khat	11.1
Theta hat	1.269
Kstar	7.021
Theta star	2.006
Mean of Log Transformed Data	2.6
Standard Deviation of Log Transformed Data	0.329

Normal GOF Test Results

Correlation Coefficient R	0.988
Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical (0.05) Value	0.818

Approximate Shapiro Wilk P Value	0.933
Lilliefors Test Statistic	0.167
Lilliefors Critical (0.05) Value	0.313

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.985
A-D Test Statistic	0.226
A-D Critical (0.05) Value	0.715
K-S Test Statistic	0.203
K-S Critical(0.05) Value	0.294

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.986
Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Critical (0.05) Value	0.818
Approximate Shapiro Wilk P Value	0.905
Lilliefors Test Statistic	0.201
Lilliefors Critical (0.05) Value	0.313

Data appear Lognormal at (0.05) Significance Level

VanB (sc)

Raw Statistics

Number of Valid Observations	2
Number of Distinct Observations	2
Minimum	11
Maximum	17

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable VanB (sc) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

VanB (sm)

Raw Statistics

Number of Valid Observations	36
Number of Missing Observations	1
Number of Distinct Observations	17
Minimum	7.6
Maximum	110
Mean of Raw Data	18.08
Standard Deviation of Raw Data	16.42
Khat	3.627
Theta hat	4.986
Kstar	3.343
Theta star	5.409
Mean of Log Transformed Data	2.751
Standard Deviation of Log Transformed Data	0.444

Normal GOF Test Results

Correlation Coefficient R	0.607
Shapiro Wilk Test Statistic	0.41
Shapiro Wilk Critical (0.05) Value	0.935

Approximate Shapiro Wilk P Value	2.30E-14
Lilliefors Test Statistic	0.304
Lilliefors Critical (0.05) Value	0.148
Data not Normal at (0.05) Significance Level	

Gamma GOF Test Results

Correlation Coefficient R	0.718
A-D Test Statistic	2.878
A-D Critical (0.05) Value	0.753
K-S Test Statistic	0.199
K-S Critical(0.05) Value	0.148
Data not Gamma Distributed at (0.05) Significance Level	

Lognormal GOF Test Results

Correlation Coefficient R	0.883
Shapiro Wilk Test Statistic	0.814
Shapiro Wilk Critical (0.05) Value	0.935
Approximate Shapiro Wilk P Value	8.85E-06
Lilliefors Test Statistic	0.149
Lilliefors Critical (0.05) Value	0.148
Data not Lognormal at (0.05) Significance Level	

VanB (sp)

Raw Statistics

Number of Valid Observations	27
Number of Missing Observations	1
Number of Distinct Observations	18
Minimum	4.3
Maximum	23
Mean of Raw Data	13.2
Standard Deviation of Raw Data	4.778
Khat	7.095
Theta hat	1.861
Kstar	6.331
Theta star	2.085
Mean of Log Transformed Data	2.508
Standard Deviation of Log Transformed Data	0.406

Normal GOF Test Results

Correlation Coefficient R	0.995
Shapiro Wilk Test Statistic	0.984
Shapiro Wilk Critical (0.05) Value	0.923
Approximate Shapiro Wilk P Value	0.933
Lilliefors Test Statistic	0.0851
Lilliefors Critical (0.05) Value	0.171
Data appear Normal at (0.05) Significance Level	

Gamma GOF Test Results

Correlation Coefficient R	0.989
A-D Test Statistic	0.188
A-D Critical (0.05) Value	0.746
K-S Test Statistic	0.0892
K-S Critical(0.05) Value	0.168
Data appear Gamma Distributed at (0.05) Significance Level	

Lognormal GOF Test Results

Correlation Coefficient R	0.979

Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical (0.05) Value	0.923
Approximate Shapiro Wilk P Value	0.331
Lilliefors Test Statistic	0.111
Lilliefors Critical (0.05) Value	0.171
Data appear Lognormal at (0.05) Significance Level	

VanB (sw)

Raw Statistics

Number of Valid Observations	15
Number of Missing Observations	1
Number of Distinct Observations	13
Minimum	5.2
Maximum	28
Mean of Raw Data	14.07
Standard Deviation of Raw Data	5.912
Khat	6.158
Theta hat	2.286
Kstar	4.971
Theta star	2.831
Mean of Log Transformed Data	2.561
Standard Deviation of Log Transformed Data	0.431

Normal GOF Test Results

Correlation Coefficient R	0.969
Shapiro Wilk Test Statistic	0.945
Shapiro Wilk Critical (0.05) Value	0.881
Approximate Shapiro Wilk P Value	0.42
Lilliefors Test Statistic	0.155
Lilliefors Critical (0.05) Value	0.229
Data appear Normal at (0.05) Significance Level	

Gamma GOF Test Results

Correlation Coefficient R	0.989
A-D Test Statistic	0.228
A-D Critical (0.05) Value	0.738
K-S Test Statistic	0.147
K-S Critical(0.05) Value	0.222
Data appear Gamma Distributed at (0.05) Significance Level	

Lognormal GOF Test Results

Correlation Coefficient R	0.985
Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical (0.05) Value	0.881
Approximate Shapiro Wilk P Value	0.885
Lilliefors Test Statistic	0.126
Lilliefors Critical (0.05) Value	0.229
Data appear Lognormal at (0.05) Significance Level	

VanB (unknown) Lognormal assumed based on correlation coefficient >0.9

Raw Statistics

Number of Valid Observations	372
Number of Missing Observations	1
Number of Distinct Observations	68
Minimum	3.2
Maximum	40
Mean of Raw Data	15.3
Standard Deviation of Raw Data	6.659

Khat	5.47
Theta hat	2.797
Kstar	5.428
Theta star	2.819
Mean of Log Transformed Data	2.634
Standard Deviation of Log Transformed Data	0.445

Normal GOF Test Results

Correlation Coefficient R	0.972
Approximate Shapiro Wilk Test Statistic	0.932
Approximate Shapiro Wilk P Value	0
Lilliefors Test Statistic	0.106
Lilliefors Critical (0.05) Value	0.0459
Data not Normal at (0.05) Significance Level	

Gamma GOF Test Results

Correlation Coefficient R	0.996
A-D Test Statistic	0.772
A-D Critical (0.05) Value	0.757
K-S Test Statistic	0.0542
K-S Critical(0.05) Value	0.0472
Data not Gamma Distributed at (0.05) Significance Level	

Lognormal GOF Test Results

Correlation Coefficient R	0.995
Approximate Shapiro Wilk Test Statistic	0.977
Approximate Shapiro Wilk P Value	0.0276
Lilliefors Test Statistic	0.0612
Lilliefors Critical (0.05) Value	0.0459
Data not Lognormal at (0.05) Significance Level	

ATTACHMENT C2
BACKGROUND SOIL NONPARAMETRIC BTV PROUCL OUTPUT

Background Statistics for Uncensored Full Data Sets

User Selected Options		used 1/2DL for nondetects
Date/Time of Computation	3/4/2015 14:45	
From File	WorkSheet.xls	
Full Precision	OFF	
Confidence Coefficient	95%	
Coverage	95%	
New or Future K Observations	1	
Number of Bootstrap Operations	2000	

BerBND (cl)

General Statistics			
Total Number of Observations	58	Number of Distinct Observations	17
Minimum	0.1	First Quartile	0.25
Second Largest	0.8	Median	0.25
Maximum	0.92	Third Quartile	0.279
Mean	0.326	SD	0.165
Coefficient of Variation	0.506	Skewness	1.8
Mean of logged Data	-1.217	SD of logged Data	0.424
Critical Values for Background Threshold Values (BTVs)			
Tolerance Factor K (For UTL)	2.024	d2max (for USL)	3.014
Normal GOF Test			
Shapiro Wilk Test Statistic	0.662	Normal GOF Test	
5% Shapiro Wilk P Value	1.11E-16	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.402	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.116	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Background Statistics Assuming Normal Distribution			
95% UTL with 95% Coverage	0.66	90% Percentile (z)	0.538
95% UPL (t)	0.604	95% Percentile (z)	0.598
95% USL	0.823	99% Percentile (z)	0.71
Gamma GOF Test			
A-D Test Statistic	9.25	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.394	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.117	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	5.327	k star (bias corrected MLE)	5.063
Theta hat (MLE)	0.0612	Theta star (bias corrected MLE)	0.0644
nu hat (MLE)	618	nu star (bias corrected)	587.3
MLE Mean (bias corrected)	0.326	MLE Sd (bias corrected)	0.145
Background Statistics Assuming Gamma Distribution			
95% Wilson Hilferty (WH) Approx. Gamma UPL	0.597	90% Percentile	0.52
95% Hawkins Wixley (HW) Approx. Gamma UPL	0.598	95% Percentile	0.595
95% WH Approx. Gamma UTL with 95% Coverage	0.672	99% Percentile	0.754
95% HW Approx. Gamma UTL with 95% Coverage	0.677		
95% WH USL	0.927	95% HW USL	0.952
Lognormal GOF Test			

Shapiro Wilk Test Statistic	0.719	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk P Value	3.26E-14	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.379	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.116	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	0.698	90% Percentile (z)	0.51
95% UPL (t)	0.605	95% Percentile (z)	0.595
95% USL	1.062	99% Percentile (z)	0.794

Nonparametric Distribution Free Background Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	57	95% UTL with 95% Coverage	0.8
Approximate f	1.5	Confidence Coefficient (CC) achieved by UTL	0.793
95% Percentile Bootstrap UTL with 95% Coverage	0.818	95% BCA Bootstrap UTL with 95% Coverage	0.8
95% UPL	0.686	90% Percentile	0.583
90% Chebyshev UPL	0.825	95% Percentile	0.629
95% Chebyshev UPL	1.051	99% Percentile	0.852
95% USL	0.92		

Note: The use of USL to estimate a BTV is recommended only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

MolBND (sm)

General Statistics

Total Number of Observations	37	Number of Distinct Observations	12
Minimum	0.5	First Quartile	0.5
Second Largest	2.7	Median	0.5
Maximum	11	Third Quartile	1.2
Mean	1.135	SD	1.779
Coefficient of Variation	1.567	Skewness	5.02
Mean of logged Data	-0.263	SD of logged Data	0.72

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.14	d2max (for USL)	2.835

Normal GOF Test

Shapiro Wilk Test Statistic	0.393	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.936	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.361	Lilliefors GOF Test
5% Lilliefors Critical Value	0.146	Data Not Normal at 5% Significance Level
Data Not Normal at 5% Significance Level		

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	4.941	90% Percentile (z)	3.415
95% UPL (t)	4.178	95% Percentile (z)	4.061
95% USL	6.178	99% Percentile (z)	5.273

Gamma GOF Test

A-D Test Statistic	5.655	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.768	Data Not Gamma Distributed at 5% Significance Level

K-S Test Statistic	0.39	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.148	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics			
k hat (MLE)	1.425	k star (bias corrected MLE)	1.328
Theta hat (MLE)	0.796	Theta star (bias corrected MLE)	0.855
nu hat (MLE)	105.5	nu star (bias corrected)	98.26
MLE Mean (bias corrected)	1.135	MLE Sd (bias corrected)	0.985

Background Statistics Assuming Gamma Distribution			
95% Wilson Hilferty (WH) Approx. Gamma UPL	2.967	90% Percentile	2.437
95% Hawkins Wixley (HW) Approx. Gamma UPL	2.866	95% Percentile	3.081
95% WH Approx. Gamma UTL with 95% Coverage	3.796	99% Percentile	4.548
95% HW Approx. Gamma UTL with 95% Coverage	3.716		
95% WH USL	5.446	95% HW USL	5.478

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.661	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.936	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.4	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.146	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			

Background Statistics assuming Lognormal Distribution			
95% UTL with 95% Coverage	3.589	90% Percentile (z)	1.934
95% UPL (t)	2.635	95% Percentile (z)	2.513
95% USL	5.922	99% Percentile (z)	4.105

Nonparametric Distribution Free Background Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for Background Threshold Values			
Order of Statistic, r	37	95% UTL with 95% Coverage	11
Approximate f	1.947	Confidence Coefficient (CC) achieved by UTL	0.85
95% Percentile Bootstrap UTL with 95% Coverage	11	95% BCA Bootstrap UTL with 95% Coverage	4.36
95% UPL	3.53	90% Percentile	2.02
90% Chebyshev UPL	6.543	95% Percentile	2.54
95% Chebyshev UPL	8.992	99% Percentile	8.012
95% USL	11		

Note: The use of USL to estimate a BTV is recommended only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

MolBND (sp)

General Statistics			
Total Number of Observations	28	Number of Distinct Observations	9
Minimum	0.5	First Quartile	0.5
Second Largest	3.9	Median	0.5
Maximum	4	Third Quartile	1.025
Mean	0.989	SD	1.014
Coefficient of Variation	1.025	Skewness	2.236
Mean of logged Data	-0.31	SD of logged Data	0.684

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.246	d2max (for USL)	2.714

Normal GOF Test

Shapiro Wilk Test Statistic	0.554	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.924	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.4	Lilliefors GOF Test
5% Lilliefors Critical Value	0.167	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	3.266	90% Percentile (z)	2.288
95% UPL (t)	2.747	95% Percentile (z)	2.657
95% USL	3.741	99% Percentile (z)	3.348

Gamma GOF Test

A-D Test Statistic	5.246	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.76	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.429	Kolmogrov-Smirnoff Gamma GOF Test
5% K-S Critical Value	0.168	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.822	k star (bias corrected MLE)	1.65
Theta hat (MLE)	0.543	Theta star (bias corrected MLE)	0.599
nu hat (MLE)	102	nu star (bias corrected)	92.42
MLE Mean (bias corrected)	0.989	MLE Sd (bias corrected)	0.77

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	2.511	90% Percentile	2.014
95% Hawkins Wixley (HW) Approx. Gamma UPL	2.482	95% Percentile	2.497
95% WH Approx. Gamma UTL with 95% Coverage	3.287	99% Percentile	3.579
95% HW Approx. Gamma UTL with 95% Coverage	3.307		
95% WH USL	4.123	95% HW USL	4.225

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.616	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.924	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.427	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.167	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	3.41	90% Percentile (z)	1.763
95% UPL (t)	2.402	95% Percentile (z)	2.26
95% USL	4.699	99% Percentile (z)	3.603

Nonparametric Distribution Free Background Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	28	95% UTL with 95% Coverage	4
Approximate f	1.474	Confidence Coefficient (CC) achieved by UTL	0.762
95% Percentile Bootstrap UTL with 95% Coverage	4	95% BCA Bootstrap UTL with 95% Coverage	4
95% UPL	3.955	90% Percentile	2.52
90% Chebyshev UPL	4.084	95% Percentile	3.515
95% Chebyshev UPL	5.486	99% Percentile	3.973

95% USL	4

Note: The use of USL to estimate a BTV is recommended only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

MolBND (unknown)

General Statistics

Total Number of Observations	330	Number of Distinct Observations	53
		Number of Missing Observations	43
Minimum	0.5	First Quartile	0.5
Second Largest	53	Median	0.5
Maximum	53	Third Quartile	1.7
Mean	1.79	SD	4.688
Coefficient of Variation	2.619	Skewness	8.96
Mean of logged Data	-0.0526	SD of logged Data	0.891

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	1.791	d2max (for USL)	3.58

Normal GOF Test

Shapiro Wilk Test Statistic	0.271	Normal GOF Test
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.392	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0488	Data Not Normal at 5% Significance Level
Data Not Normal at 5% Significance Level		

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	10.19	90% Percentile (z)	7.798
95% UPL (t)	9.535	95% Percentile (z)	9.501
95% USL	18.57	99% Percentile (z)	12.7

Gamma GOF Test

A-D Test Statistic	38.27	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.788	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.293	Kolmogrov-Smirnoff Gamma GOF Test
5% K-S Critical Value	0.0517	Data Not Gamma Distributed at 5% Significance Level
Data Not Gamma Distributed at 5% Significance Level		

Gamma Statistics

k hat (MLE)	0.919	k star (bias corrected MLE)	0.912
Theta hat (MLE)	1.949	Theta star (bias corrected MLE)	1.962
nu hat (MLE)	606.2	nu star (bias corrected)	602.1
MLE Mean (bias corrected)	1.79	MLE Sd (bias corrected)	1.874

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	4.839	90% Percentile	4.216
95% Hawkins Wixley (HW) Approx. Gamma UPL	4.586	95% Percentile	5.54
95% WH Approx. Gamma UTL with 95% Coverage	5.33	99% Percentile	8.636
95% HW Approx. Gamma UTL with 95% Coverage	5.078		
95% WH USL	14.86	95% HW USL	15.59

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.736	Shapiro Wilk Lognormal GOF Test

5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.309	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.0488	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	4.678	90% Percentile (z)	2.971
95% UPL (t)	4.133	95% Percentile (z)	4.106
95% USL	23.01	99% Percentile (z)	7.535

Nonparametric Distribution Free Background Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	319	95% UTL with 95% Coverage	5.3
Approximate f	1.399	Confidence Coefficient (CC) achieved by UTL	0.902
95% Percentile Bootstrap UTL with 95% Coverage	5.3	95% BCA Bootstrap UTL with 95% Coverage	5.3
95% UPL	4.735	90% Percentile	3.6
90% Chebyshev UPL	15.88	95% Percentile	4.6
95% Chebyshev UPL	22.26	99% Percentile	21.87
95% USL	53		

Note: The use of USL to estimate a BTV is recommended only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

VanB_sm

General Statistics

Total Number of Observations	36	Number of Distinct Observations	17
		Number of Missing Observations	1
Minimum	7.6	First Quartile	12.75
Second Largest	28	Median	14
Maximum	110	Third Quartile	19
Mean	18.08	SD	16.42
Coefficient of Variation	0.908	Skewness	5.278
Mean of logged Data	2.751	SD of logged Data	0.444

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.148	d2max (for USL)	2.824

Normal GOF Test

Shapiro Wilk Test Statistic	0.41	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.935	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.304	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.148	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	53.36	90% Percentile (z)	39.13
95% UPL (t)	46.21	95% Percentile (z)	45.09
95% USL	64.45	99% Percentile (z)	56.29

Gamma GOF Test

A-D Test Statistic	2.878	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level	

K-S Test Statistic	0.199	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.148	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	3.627	k star (bias corrected MLE)	3.343
Theta hat (MLE)	4.986	Theta star (bias corrected MLE)	5.409
nu hat (MLE)	261.1	nu star (bias corrected)	240.7
MLE Mean (bias corrected)	18.08	MLE Sd (bias corrected)	9.889
Background Statistics Assuming Gamma Distribution			
95% Wilson Hilferty (WH) Approx. Gamma UPL	36.39	90% Percentile	31.34
95% Hawkins Wixley (HW) Approx. Gamma UPL	35.52	95% Percentile	36.8
95% WH Approx. Gamma UTL with 95% Coverage	43.34	99% Percentile	48.57
95% HW Approx. Gamma UTL with 95% Coverage	42.47		
95% WH USL	55.78	95% HW USL	55.22
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.814	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.935	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.149	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.148	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			
Background Statistics assuming Lognormal Distribution			
95% UTL with 95% Coverage	40.61	90% Percentile (z)	27.64
95% UPL (t)	33.47	95% Percentile (z)	32.48
95% USL	54.8	99% Percentile (z)	43.95
Nonparametric Distribution Free Background Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Upper Limits for Background Threshold Values			
Order of Statistic, r	36	95% UTL with 95% Coverage	110
Approximate f	1.895	Confidence Coefficient (CC) achieved by UTL	0.842
95% Percentile Bootstrap UTL with 95% Coverage	110	95% BCA Bootstrap UTL with 95% Coverage	48.5
95% UPL	40.3	90% Percentile	23.5
90% Chebyshev UPL	68.03	95% Percentile	25
95% Chebyshev UPL	90.65	99% Percentile	81.3
95% USL	110		

Note: The use of USL to estimate a BTV is recommended only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

ATTACHMENT C3
BACKGROUND-FOREGROUND SOIL TWO SAMPLE HYPOTHESES TEST RESULTS

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: MolF_ol
Sample 2 Data: MolB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	89	557
Number of Non-Detects	10	52
Number of Detect Data	79	505
Minimum Non-Detect	1	1
Maximum Non-Detect	1.9	2.8
Percent Non-detects	11.24%	9.34%
Minimum Detect	1.1	1
Maximum Detect	16	67
Mean of Detects	3.528	3.271
Median of Detects	2.9	2.4
SD of Detects	2.298	4.587

Sample 1 vs Sample 2 Gehan Test

H0: Mean/Median of Sample 1 <= Mean/Median of background

Gehan z Test Value	1.868
Critical z (0.05)	1.645
P-Value	0.0309

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: MolF_ol
Sample 2 Data: MolB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	89	554
Number of Missing Observations	0	3
Number of Non-Detects	10	52
Number of Detect Data	79	502
Minimum Non-Detect	1	1
Maximum Non-Detect	1.9	2.8
Percent Non-detects	11.24%	9.39%
Minimum Detect	1.1	1
Maximum Detect	16	17
Mean of Detects	3.528	2.958
Median of Detects	2.9	2.4
SD of Detects	2.298	1.979

Sample 1 vs Sample 2 Gehan Test

H0: Mean/Median of Sample 1 <= Mean/Median of background

Gehan z Test Value	1.96
Critical z (0.05)	1.645
P-Value	0.025

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Tarone-Ware Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: MolF_ol
Sample 2 Data: MolB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	89	554
Number of Missing Observations	0	3
Number of Non-Detects	10	52
Number of Detects	79	502
Minimum Non-Detect	1	1
Maximum Non-Detect	1.9	2.8
Percent Non-detects	11.24%	9.39%
Minimum Detect	1.1	1
Maximum Detect	16	17
Mean of Detects	3.528	2.958
Median of Detects	2.9	2.4
SD of Detects	2.298	1.979

Sample 1 vs Sample 2 Tarone-Ware Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

TW Statistic	2.183
TW Critical Value (0.05)	1.645
P-Value	0.0145

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: MolF_ol
Sample 2 Data: MolB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	89	554
Number of Missing Observations	0	3
Number of Non-Detects	10	52
Number of Detect Data	79	502
Minimum Non-Detect	1	1
Maximum Non-Detect	1.9	2.8
Percent Non-detects	11.24%	9.39%
Minimum Detect	1.1	1
Maximum Detect	16	17
Mean of Detects	3.528	2.958
Median of Detects	2.9	2.4
SD of Detects	2.298	1.979

WMW test is meant for a Single Detection Limit Case
Use of Gehan or T-W test is suggested when multiple detection limits are present
All observations <= 2.8 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	31293
Standardized WMW U-Stat	1.879
Mean (U)	24653
SD(U) - Adj ties	1627
Approximate U-Stat Critical Value (0.05)	1.645

P-Value (Adjusted for Ties) 0.0301

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

t-Test Sample 1 vs Sample 2 Comparison for Uncensored Full Data Sets without NDs

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Sample 1 Mean <= Sample 2 Mean (Form 1)
Alternative Hypothesis	Sample 1 Mean > the Sample 2 Mean

Sample 1 Data: MolF_ol
Sample 2 Data: MolB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	89	554
Number of Missing Observations	0	3
Number of Distinct Observations	43	73
Minimum	1	1
Maximum	16	17
Mean	3.262	2.787
Median	2.6	2.2
SD	2.293	1.96
SE of Mean	0.243	0.0833

Sample 1 vs Sample 2 Two-Sample t-Test

H0: Mean of Sample 1 - Mean of Sample 2 <= 0

Method	DF	t-Test Value	Critical t (0.05)	P-Value
Pooled (Equal Variance)	641	2.068	1.647	0.02
Welch-Satterthwaite (Unequal Vari	109.6	1.847	1.659	0.034

Pooled SD 2.009

Conclusion with Alpha = 0.050
Student t (Pooled) Test: Reject H0, Conclude Sample 1 > Sample 2
Welch-Satterthwaite Test: Reject H0, Conclude Sample 1 > Sample 2

Test of Equality of Variances

Variance of Sample 1	5.258
Variance of Sample 2	3.843

Numerator DF	Denominator DF	F-Test Value	P-Value
88	553	1.368	0.041

Conclusion with Alpha = 0.05
Two variances are not equal

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without ND

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: MolF_ol
Sample 2 Data: MolB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	89	554
Number of Missing Observations	0	3
Number of Distinct Observations	43	73
Minimum	1	1
Maximum	16	17
Mean	3.262	2.787
Median	2.6	2.2
SD	2.293	1.96

SE of Mean	0.243	0.0833

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	32420
Standardized WMW U-Stat	2.314
Mean (U)	24653
SD(U) - Adj ties	1626
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.0103

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

t-Test Sample 1 vs Sample 2 Comparison for Uncensored Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Sample 1 Mean <= Sample 2 Mean (Form 1)
Alternative Hypothesis	Sample 1 Mean > the Sample 2 Mean

Sample 1 Data: MolF_ol
Sample 2 Data: MolB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	89	557
Number of Distinct Observations	43	76
Minimum	1	1
Maximum	16	67
Mean	3.262	3.072
Median	2.6	2.2
SD	2.293	4.412
SE of Mean	0.243	0.187

Sample 1 vs Sample 2 Two-Sample t-Test

H0: Mean of Sample 1 - Mean of Sample 2 <= 0

Method	DF	t-Test Value	Critical t (0.05)	P-Value
Pooled (Equal Variance)	644	0.397	1.647	0.346
Welch-Satterthwaite (Unequal Vari	211.2	0.618	1.652	0.268

Pooled SD 4.186

Conclusion with Alpha = 0.050
Student t (Pooled) Test: Do Not Reject H0, Conclude Sample 1 <= Sample 2
Welch-Satterthwaite Test: Do Not Reject H0, Conclude Sample 1 <= Sample 2

Test of Equality of Variances

Variance of Sample 1	5.258
Variance of Sample 2	19.47

Numerator DF	Denominator DF	F-Test Value	P-Value
556	88	3.702	0

Conclusion with Alpha = 0.05
Two variances are not equal

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without ND

User Selected Options	
Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: MolF_ol
Sample 2 Data: MolB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	89	557
Number of Distinct Observations	43	76
Minimum	1	1
Maximum	16	67
Mean	3.262	3.072
Median	2.6	2.2
SD	2.293	4.412
SE of Mean	0.243	0.187

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	32420
Standardized WMW U-Stat	2.221
Mean (U)	24787
SD(U) - Adj ties	1634
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.0132

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: MolF_ol
Sample 2 Data: MolB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	89	557
Number of Non-Detects	10	52
Number of Detect Data	79	505
Minimum Non-Detect	1	1
Maximum Non-Detect	1.9	2.8
Percent Non-detects	11.24%	9.34%
Minimum Detect	1.1	1
Maximum Detect	16	67
Mean of Detects	3.528	3.271
Median of Detects	2.9	2.4
SD of Detects	2.298	4.587

Sample 1 vs Sample 2 Gehan Test

H0: Mean/Median of Sample 1 <= Mean/Median of background

Gehan z Test Value	1.868
Critical z (0.05)	1.645
P-Value	0.0309

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

t-Test Sample 1 vs Sample 2 Comparison for Uncensored Full Data Sets without NDs

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Sample 1 Mean <= Sample 2 Mean (Form 1)
Alternative Hypothesis	Sample 1 Mean > the Sample 2 Mean

Sample 1 Data: LN_MolF
Sample 2 Data: LN_MoLB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	94	557
Number of Missing Observations	21	21
Number of Distinct Observations	45	76
Minimum	0	0
Maximum	2.773	4.205
Mean	1.001	0.861
Median	0.974	0.788
SD	0.59	0.622
SE of Mean	0.0609	0.0263

Sample 1 vs Sample 2 Two-Sample t-Test

H0: Mean of Sample 1 - Mean of Sample 2 <= 0

Method	DF	t-Test Value	Critical t (0.05)	P-Value
Pooled (Equal Variance)	649	2.028	1.647	0.021
Welch-Satterthwaite (Unequal Vari	130.3	2.104	1.657	0.019

Pooled SD 0.617

Conclusion with Alpha = 0.050
Student t (Pooled) Test: Reject H0, Conclude Sample 1 > Sample 2
Welch-Satterthwaite Test: Reject H0, Conclude Sample 1 > Sample 2

Test of Equality of Variances

Variance of Sample 1	0.349
Variance of Sample 2	0.387

Numerator DF	Denominator DF	F-Test Value	P-Value
556	93	1.109	0.543

Conclusion with Alpha = 0.05
Two variances appear to be equal

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without ND

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: LN_MolF
Sample 2 Data: LN_MoLB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	94	557
Number of Missing Observations	21	21
Number of Distinct Observations	45	76
Minimum	0	0
Maximum	2.773	4.205
Mean	1.001	0.861
Median	0.974	0.788
SD	0.59	0.622
SE of Mean	0.0609	0.0263

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	34602
Standardized WMW U-Stat	2.348
Mean (U)	26179
SD(U) - Adj ties	1686
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.00944

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########

From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: LN_MolF
Sample 2 Data: LN_MoLB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	94	557
Number of Missing Observations	21	21
Number of Non-Detects	11	52
Number of Detect Data	83	505
Minimum Non-Detect	0	0
Maximum Non-Detect	0.642	1.03
Percent Non-detects	11.70%	9.34%
Minimum Detect	0.0953	0
Maximum Detect	2.773	4.205
Mean of Detects	1.114	0.94
Median of Detects	1.065	0.875
SD of Detects	0.526	0.595

Sample 1 vs Sample 2 Gehan Test

H0: Mean/Median of Sample 1 <= Mean/Median of background

Gehan z Test Value	1.945
Critical z (0.05)	1.645
P-Value	0.0259

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Tarone-Ware Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: LN_MolF
Sample 2 Data: LN_MoLB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	94	557
Number of Missing Observations	21	21
Number of Non-Detects	11	52
Number of Detects	83	505
Minimum Non-Detect	0	0
Maximum Non-Detect	0.642	1.03
Percent Non-detects	11.70%	9.34%
Minimum Detect	0.0953	0
Maximum Detect	2.773	4.205
Mean of Detects	1.114	0.94
Median of Detects	1.065	0.875
SD of Detects	0.526	0.595

Sample 1 vs Sample 2 Tarone-Ware Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

TW Statistic	2.182
TW Critical Value (0.05)	1.645
P-Value	0.0146

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########

From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: LN_MolF
Sample 2 Data: LN_MoLB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	94	557
Number of Missing Observations	21	21
Number of Non-Detects	11	52
Number of Detect Data	83	505
Minimum Non-Detect	0	0
Maximum Non-Detect	0.642	1.03
Percent Non-detects	11.70%	9.34%
Minimum Detect	0.0953	0
Maximum Detect	2.773	4.205
Mean of Detects	1.114	0.94
Median of Detects	1.065	0.875
SD of Detects	0.526	0.595

WMW test is meant for a Single Detection Limit Case
Use of Gehan or T-W test is suggested when multiple detection limits are present
All observations <= 1.03 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	33450
Standardized WMW U-Stat	1.923
Mean (U)	26179
SD(U) - Adj ties	1687
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.0273

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

t-Test Sample 1 vs Sample 2 Comparison for Uncensored Full Data Sets without NDs

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Sample 1 Mean <= Sample 2 Mean (Form 1)
Alternative Hypothesis	Sample 1 Mean > the Sample 2 Mean

Sample 1 Data: LN_MolF
Sample 2 Data: LN_MoLB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	94	554
Number of Missing Observations	21	24
Number of Distinct Observations	45	73
Minimum	0	0
Maximum	2.773	2.833
Mean	1.001	0.844
Median	0.974	0.788
SD	0.59	0.579
SE of Mean	0.0609	0.0246

Sample 1 vs Sample 2 Two-Sample t-Test

H0: Mean of Sample 1 - Mean of Sample 2 <= 0

Method	DF	t-Test Value	Critical t (0.05)	P-Value
Pooled (Equal Variance)	646	2.419	1.647	0.008
Welch-Satterthwaite (Unequal Vari	125.2	2.385	1.657	0.009

Pooled SD 0.580

Conclusion with Alpha = 0.050
Student t (Pooled) Test: Reject H0, Conclude Sample 1 > Sample 2
Welch-Satterthwaite Test: Reject H0, Conclude Sample 1 > Sample 2

Test of Equality of Variances

Variance of Sample 1	0.349
Variance of Sample 2	0.335

Numerator DF	Denominator DF	F-Test Value	P-Value
93	553	1.041	0.77

Conclusion with Alpha = 0.05
Two variances appear to be equal

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without ND

User Selected Options	
Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: LN_MolF
Sample 2 Data: LN_MoLB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	94	554
Number of Missing Observations	21	24
Number of Distinct Observations	45	73
Minimum	0	0
Maximum	2.773	2.833
Mean	1.001	0.844
Median	0.974	0.788
SD	0.59	0.579
SE of Mean	0.0609	0.0246

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	34602
Standardized WMW U-Stat	2.444
Mean (U)	26038
SD(U) - Adj ties	1678
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.00727

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

t-Test Sample 1 vs Sample 2 Comparison for Uncensored Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Sample 1 Mean <= Sample 2 Mean (Form 1)
Alternative Hypothesis	Sample 1 Mean > the Sample 2 Mean

Sample 1 Data: NickF_ol
Sample 2 Data: MolB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	89	557
Number of Distinct Observations	42	76
Minimum	4.1	1
Maximum	37	67
Mean	11.19	3.072
Median	10	2.2
SD	4.779	4.412
SE of Mean	0.507	0.187

Sample 1 vs Sample 2 Two-Sample t-Test

H0: Mean of Sample 1 - Mean of Sample 2 <= 0

Method	DF	t-Test Value	Critical t (0.05)	P-Value
Pooled (Equal Variance)	644	15.928	1.647	0
Welch-Satterthwaite (Unequal Vari	113.3	15.031	1.658	0

Pooled SD 4.464

Conclusion with Alpha = 0.050
Student t (Pooled) Test: Reject H0, Conclude Sample 1 > Sample 2
Welch-Satterthwaite Test: Reject H0, Conclude Sample 1 > Sample 2

Test of Equality of Variances

Variance of Sample 1	22.84
Variance of Sample 2	19.47

Numerator DF	Denominator DF	F-Test Value	P-Value
88	556	1.173	0.297

Conclusion with Alpha = 0.05
Two variances appear to be equal

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without ND

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: MolF_ol
Sample 2 Data: MolB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	89	557
Number of Distinct Observations	43	76
Minimum	1	1
Maximum	16	67
Mean	3.262	3.072
Median	2.6	2.2
SD	2.293	4.412
SE of Mean	0.243	0.187

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	32420
Standardized WMW U-Stat	2.221
Mean (U)	24787
SD(U) - Adj ties	1634
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.0132

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: MolF_ol
Sample 2 Data: MolB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	89	557
Number of Non-Detects	10	52

Number of Detect Data	79	505
Minimum Non-Detect	1	1
Maximum Non-Detect	1.9	2.8
Percent Non-detects	11.24%	9.34%
Minimum Detect	1.1	1
Maximum Detect	16	67
Mean of Detects	3.528	3.271
Median of Detects	2.9	2.4
SD of Detects	2.298	4.587

Sample 1 vs Sample 2 Gehan Test

H0: Mean/Median of Sample 1 <= Mean/Median of background

Gehan z Test Value	1.868
Critical z (0.05)	1.645
P-Value	0.0309

Conclusion with Alpha = 0.05
Reject H0, Conclude Sample 1 > Sample 2
P-Value < alpha (0.05)

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: NickF_ol
Sample 2 Data: NickB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	89	554
Number of Missing Observations	0	3
Number of Non-Detects	0	0
Number of Detect Data	89	554
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	4.1	2.9
Maximum Detect	37	35
Mean of Detects	11.19	10.87
Median of Detects	10	10
SD of Detects	4.779	3.77

Sample 1 vs Sample 2 Gehan Test

H0: Mean/Median of Sample 1 <= Mean/Median of background

Gehan z Test Value	-0.764
Critical z (0.05)	1.645
P-Value	0.778

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Tarone-Ware Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: NickF_ol
Sample 2 Data: NickB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	89	554
Number of Missing Observations	0	3
Number of Non-Detects	0	0
Number of Detects	89	554

Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	4.1	2.9
Maximum Detect	37	35
Mean of Detects	11.19	10.87
Median of Detects	10	10
SD of Detects	4.779	3.77

Sample 1 vs Sample 2 Tarone-Ware Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

TW Statistic	-0.227
TW Critical Value (0.05)	1.645
P-Value	0.59

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: NickF_ol
Sample 2 Data: NickB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	89	554
Number of Missing Observations	0	3
Number of Non-Detects	0	0
Number of Detect Data	89	554
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	4.1	2.9
Maximum Detect	37	35
Mean of Detects	11.19	10.87
Median of Detects	10	10
SD of Detects	4.779	3.77

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	28441
Standardized WMW U-Stat	-0.134
Mean (U)	24653
SD(U) - Adj ties	1623
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.553

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: NickF_uk
Sample 2 Data: NickB_uk

Raw Statistics

	Sample 1	Sample 2

Number of Valid Data	81	352
Number of Missing Observations	9	21
Number of Non-Detects	0	0
Number of Detect Data	81	352
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	3.8	2.6
Maximum Detect	23	40
Mean of Detects	8.949	10.19
Median of Detects	8.6	9.245
SD of Detects	3.632	5.226

Sample 1 vs Sample 2 Gehan Test

H0: Mean/Median of Sample 1 <= Mean/Median of background

Gehan z Test Value	-2.255
Critical z (0.05)	1.645
P-Value	0.988

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Tarone-Ware Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: NickF_uk
Sample 2 Data: NickB_uk

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	81	352
Number of Missing Observations	9	21
Number of Non-Detects	0	0
Number of Detects	81	352
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	3.8	2.6
Maximum Detect	23	40
Mean of Detects	8.949	10.19
Median of Detects	8.6	9.245
SD of Detects	3.632	5.226

Sample 1 vs Sample 2 Tarone-Ware Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

TW Statistic	-1.609
TW Critical Value (0.05)	1.645
P-Value	0.946

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: NickF_uk
Sample 2 Data: NickB_uk

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	81	352
Number of Missing Observations	9	21
Number of Non-Detects	0	0
Number of Detect Data	81	352
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	3.8	2.6
Maximum Detect	23	40
Mean of Detects	8.949	10.19
Median of Detects	8.6	9.245
SD of Detects	3.632	5.226

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	15637
Standardized WMW U-Stat	-1.912
Mean (U)	14256
SD(U) - Adj ties	1015
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.972

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: VanF_ol
Sample 2 Data: VanB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	89	554
Number of Missing Observations	0	3
Number of Non-Detects	0	0
Number of Detect Data	89	554
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	3.1	3.4
Maximum Detect	44	52
Mean of Detects	15.94	16.28
Median of Detects	15	15
SD of Detects	6.983	6.437

Sample 1 vs Sample 2 Gehan Test

H0: Mean/Median of Sample 1 <= Mean/Median of background

Gehan z Test Value	-1.438
Critical z (0.05)	1.645
P-Value	0.925

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Tarone-Ware Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: VanF_ol
Sample 2 Data: VanB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	89	554
Number of Missing Observations	0	3
Number of Non-Detects	0	0
Number of Detects	89	554
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	3.1	3.4
Maximum Detect	44	52
Mean of Detects	15.94	16.28
Median of Detects	15	15
SD of Detects	6.983	6.437

Sample 1 vs Sample 2 Tarone-Ware Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

TW Statistic	-0.76
TW Critical Value (0.05)	1.645
P-Value	0.776

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	########
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: VanF_ol
Sample 2 Data: VanB_ol

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	89	554
Number of Missing Observations	0	3
Number of Non-Detects	0	0
Number of Detect Data	89	554
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non-detects	0.00%	0.00%
Minimum Detect	3.1	3.4
Maximum Detect	44	52
Mean of Detects	15.94	16.28
Median of Detects	15	15
SD of Detects	6.983	6.437

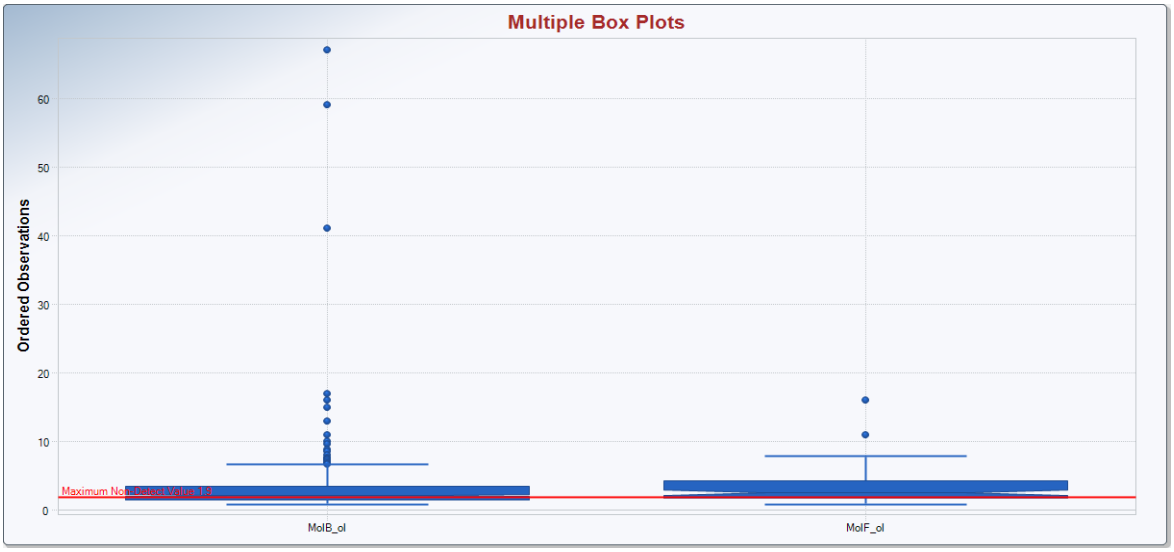
Wilcoxon-Mann-Whitney (WMW) Test

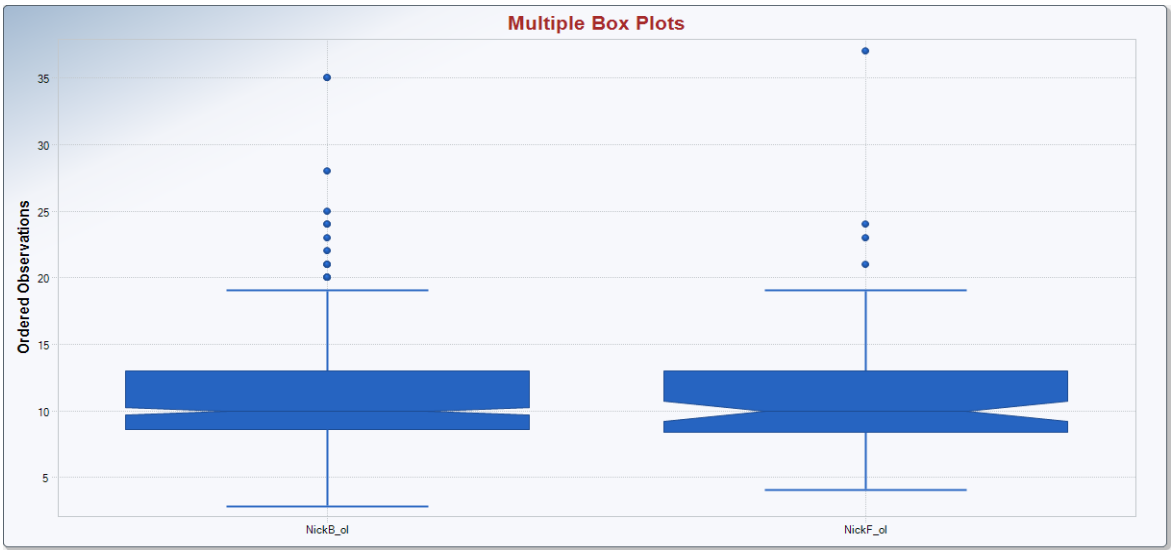
H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

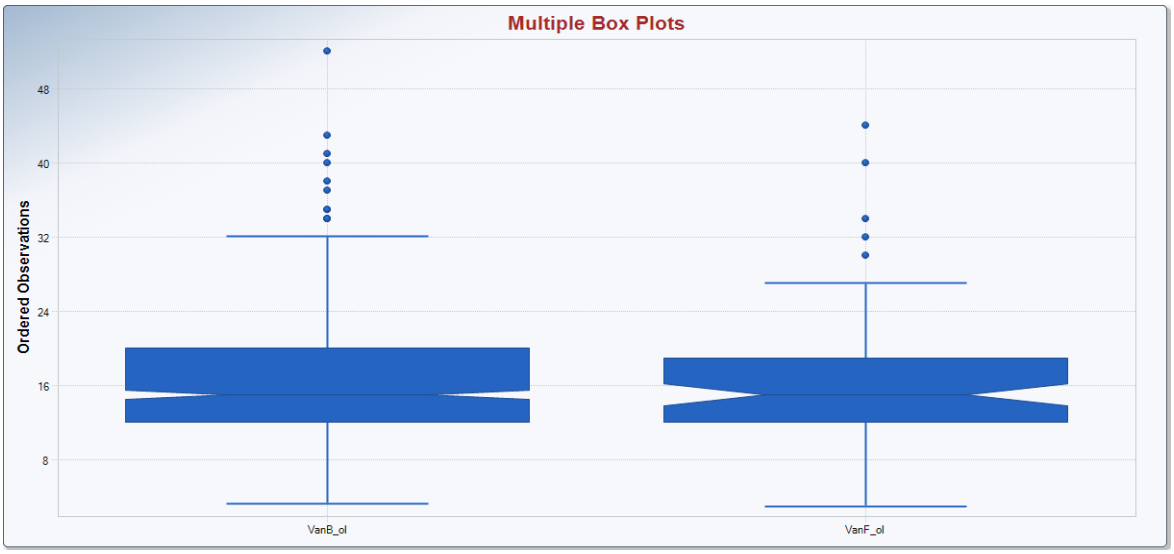
Sample 1 Rank Sum W-Stat	27444
Standardized WMW U-Stat	-0.748
Mean (U)	24653
SD(U) - Adj ties	1624
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.773

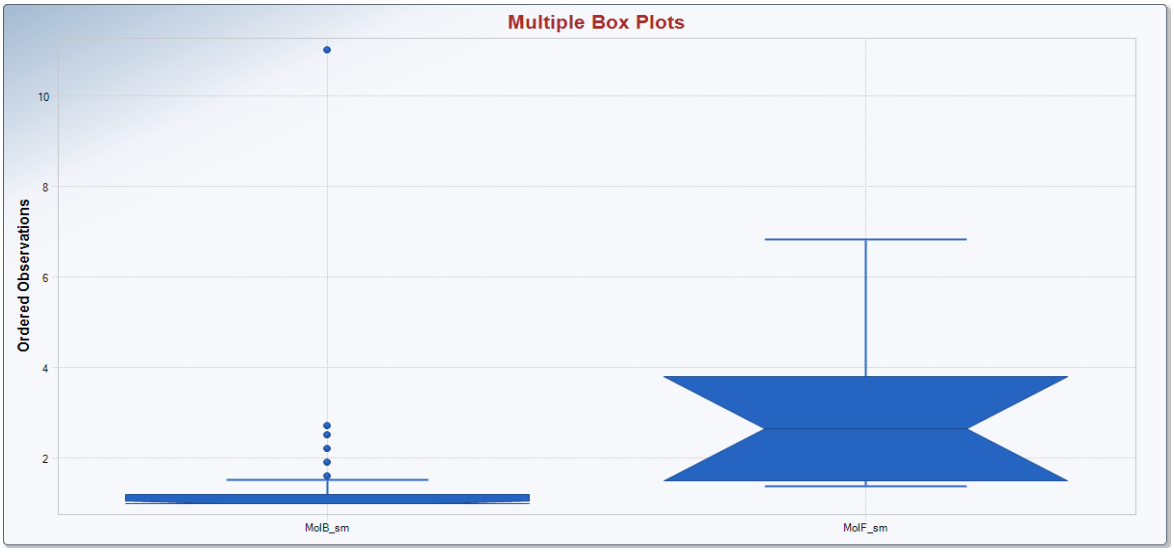
Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Sample 1 <= Sample 2
P-Value >= alpha (0.05)

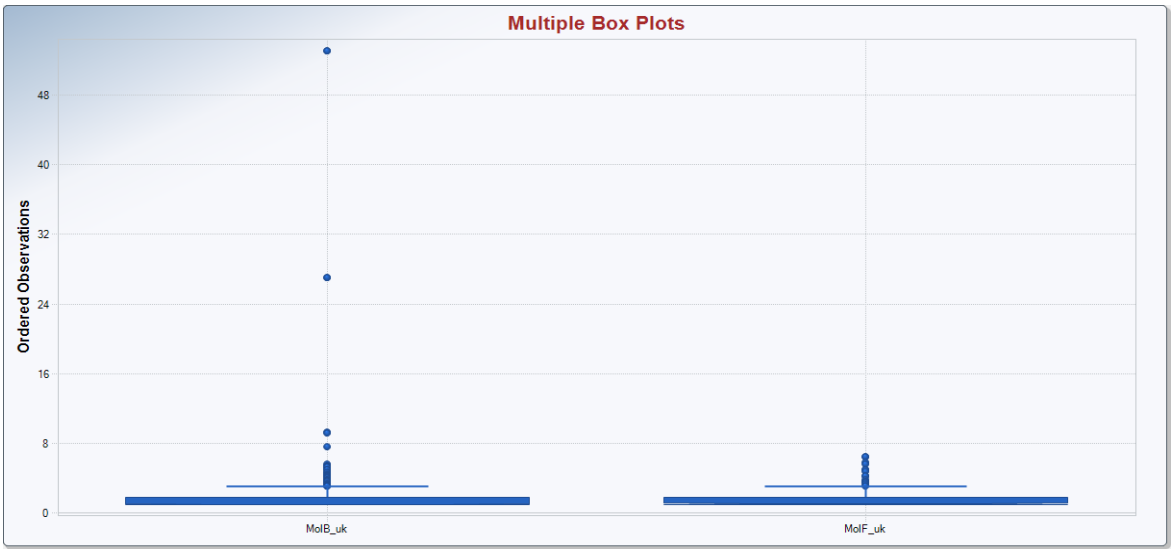
ATTACHMENT C4
BACKGROUND-FOREGROUND SOIL DATA SET COMPARISON BOX PLOTS
FOR SELECT DATA SETS

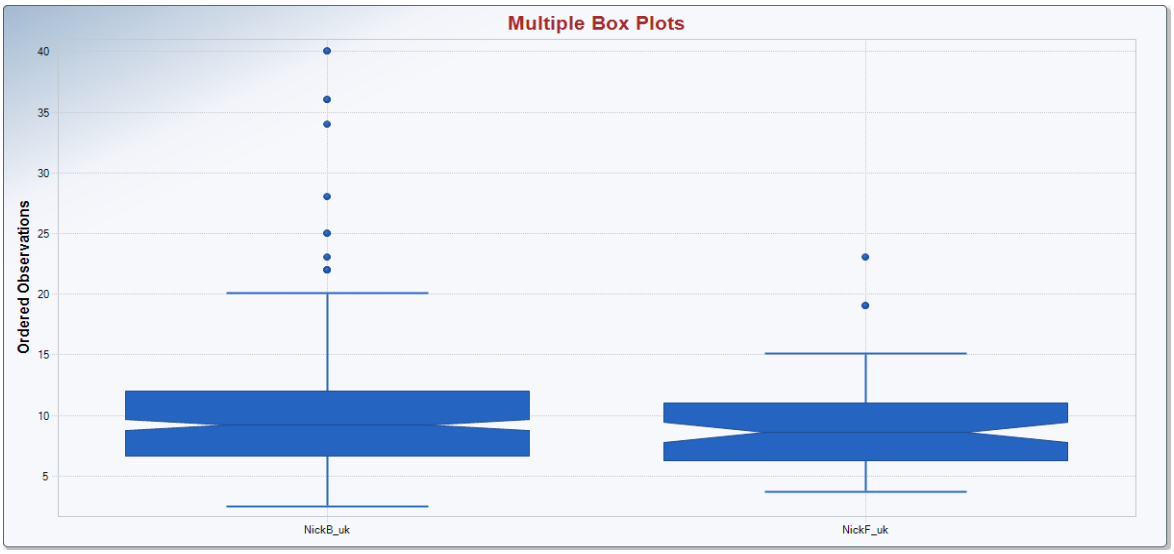

Multiple Box Plots
Ordered Observations
60
50
40
30
20
10
0
Maximum Non-Outlier Value: 13
MolB_ol
MolF_ol


Multiple Box Plots
Ordered Observations
35
30
25
20
15
10
5
NickB_ol
NickF_ol


Multiple Box Plots
Ordered Observations
48
40
32
24
16
8
VanB_ol
VanF_ol


Multiple Box Plots
Ordered Observations
10
8
6
4
2
MolB_sm
MolF_sm


Multiple Box Plots
Ordered Observations
48
40
32
24
16
8
0
MolB_uk
MolF_uk


Multiple Box Plots
Ordered Observations
40
35
30
25
20
15
10
5
NickB_uk
NickF_uk