1.0 Overview of Adaptive Management

The May 25, 2012 Interim Response Activity Plan Designed to Meet Criteria Work Plan (Work Plan) allows for project specific implementation details to be modified, based on field experience and data evaluation through an adaptive management process. In support of this process, a thorough evaluation of the data generated during 2012 was completed.

The following aspects of the response activity work were evaluated:

- Decision Unit (Section 7.4.1 of the Work Plan);
- Soil Testing (Section 7.4.3 of the Work Plan);
- Analytical Methods (Section 7.4.3.3 of the Work Plan);
- Decision Rules for Residential Land Use (Section 7.4.4 of the Work Plan); and
- Determine relationship between building age and toxic equivalent (TEQ).

2.0 Decision Unit

A *sampling unit* is the area in which a multi-incremental sample is collected and analyzed. For the Year 1 (2012) sampling program, the sampling unit in the residential area was each individual property. A *decision unit* (DU) is the contiguous area for which a decision needs to be made that determines if the area requires no further action (NFA) or Remedy. For the 2012 sampling program, the DU was defined to be the same as the sampling unit; namely, each individual property. In some instances, portions of properties had significantly different use (e.g., heavily wooded) and were split into different DUs. However, no single DUs were larger than a single property.

This evaluation investigates whether a larger DU could be appropriately defined while controlling the possibilities of two potential statistical decision errors:

- False negative error (i.e., incorrectly concluding that a contaminated area is clean); and
- False positive error (i.e., incorrectly concluding that a clean area is contaminated).

A larger DU, if justified, would help in applying a uniform policy to all properties within the DU. If a DU is concluded to be contaminated, a better coordinated cleanup strategy could be developed for all properties within the DU.

For purposes of this evaluation, each city block was defined as a DU. The properties sampled in 2012 were located in 15 different blocks, as shown on Figure B-1. A key factor in assessing whether a block is an appropriate DU is the variability of the dioxin TEQ concentrations of the individual properties within the block. The Fast Analysis dioxin TEQ concentrations from the residential areas were used to evaluate this variability with respect to aerial deposition. For consistency, the 0-12" depth samples were excluded from the evaluation so samples represent the same soil depth.

The relative standard deviation (RSD) of the Fast Analysis dioxin TEQ concentrations for the individual properties within each block was calculated and is presented in Table B-1. The RSD values range from 10% to 57%. In contrast, the RSD of the 1613b dioxin TEQ concentrations for the individual properties within the blocks ranges from 4% to 7%, as shown in Table B-2. Given the strong correlation between 1613b and Fast Analysis dioxin TEQ concentrations, the range of RSD of Fast Analysis dioxin TEQ concentrations would be similar to that of the EPA Method 1613b dioxin concentrations. Thus, the RSD across multiple properties is substantially higher than the RSD for individual properties.

This finding indicates that the spatial variability of concentrations across individual properties within a block can be large and a remediation decision made based on the mean block EPA Method 1613b concentration may not be consistent with the remediation decisions made for individual properties within the block using the property-specific concentrations and decision rules established for individual parcels as DUs. For example, the mean block Fast Analysis concentration may be less than the lower bound of the confidence interval and, hence, the decision of NFA would be reached. However, the Fast Analysis concentration of one or more properties within the block may either exceed the upper bound of or lie within the confidence interval. In the former case, the decision would be to remediate those properties. In the latter

case, the decision would be to send triplicate samples from those properties for laboratory analysis by EPA Method 1613b. In both cases, the decision would be different from the block decision of no further action. Based on this analysis, defining a DU as a city block and comparing to the decision rules developed for individual properties is not appropriate at this time.

For the reasons noted above, the 95% confidence limits on the block mean should not be directly used to make remediation decisions for individual properties within the block using the current decision rules. However, it may be possible to establish a tiered decision-making approach in which a lower limit on the block mean is used as the first tier (essentially appending the current decision rules with an initial block-scale step). The lower limit on the block mean can be derived such that, if the sample block mean falls below that limit, one can state with a specified high confidence that no property within the block would have a concentration exceeding the lower bound on the property concentration. Thus, if the sample block mean is below the lower limit, NFA would be needed for all properties within the block. However, if the sample block mean exceeds the lower limit on the block mean, no common decision may be appropriate for all properties within the block. An incremental composite sample from each property within the block would need to be analyzed and a decision made separately for each individual property by comparing the sample property concentration to the bounds derived previously on the property concentration.

Additional sampling or construction of a block-scale composite would be necessary to employ this method. Although theoretically possible to develop and append the decision rules with an initial block-scale tier, none are proposed at this time. It is possible that additional work may be proposed in the future for consideration.

3.0 Soil Testing

During the Year 1 implementation activities, samples to a depth of 0-12” were also collected, in addition to the typical sample depth of 0-6”. Ten properties were documented that significant landscaping had been performed on the yard in recent years. The increments for each sample

depth were collected adjacent to each other. The dioxin TEQ concentrations from these paired samples are presented in Table B-3.

Figure B-2 shows a plot of the difference between the two concentrations, *delta* = 0-6" concentration – 0-12" concentration. The plot shows that the difference is positive for eight of the ten sample pairs and only slightly negative for two sample pairs. The average difference is 37 parts per trillion (ppt) TEQ and the standard deviation of the difference is 40 ppt TEQ. The hypothesis that the mean difference is less than or equal to zero is rejected at a significance level, p, of less than 0.01. These results indicate that the 0-6" concentrations within a property are significantly higher than the 0-12" concentrations.

Figure B-3 shows a plot of the 0-6" concentrations versus the 0-12" concentrations and the best-fit line. For comparison, the unbiased 45-degree line between the two variables is also shown. The 0-12" concentrations mostly plot below the 45-degree line, thus confirming that the 0-12" concentrations are generally lower than the 0-6" concentrations. The squared correlation coefficient (R^2) between the 0-6" and 0-2" concentrations is 0.54, which is statistically significant ($p = 0.02$).

As shown in Figure B-3, the following regression equation may be used to estimate the 0-12" concentration as a function of the 0-6" concentration:

$$\text{0-12" dioxin TEQ concentration (ppt TEQ)} = 22.3 + 0.65 \times \text{0-6" dioxin TEQ concentration (ppt TEQ)}$$

The root mean square error of the regression equation is 37 ppt TEQ.

To summarize the findings above, the dioxin TEQ concentration for the 0-12" samples are correlated to the dioxin TEQ concentration for the 0-6" samples. The dioxin TEQ concentrations of the 0-12" samples are consistently lower than the concentration from the corresponding 0-6" samples. Therefore, the 0-6" samples conservatively represent the concentration for the yard. As 0-12" samples were only obtained from properties that had some evidence that significant

landscaping had been performed in recent years, these findings indicate that recent significant landscaping did not result in a low bias in the 0-6" samples. No change is currently proposed and sampling will continue in accordance with Section 7.4.3 of the Work Plan.

4.0 Analytical Methods

4.1 Statistical Correlation between Midland 8280 MAS versus EPA 1613b Analysis

During 2012 sampling, three independent replicates were collected from each DU; a primary, duplicate, and triplicate. The primary sample was tested by the Midland 8280 MAS (Fast Analysis) method (which is considered to be an estimate of the EPA Method 1613b concentration). A total of 26 DUs had Fast Analysis results that fell within the established confidence interval (< 280 ppt TEQ but > 220 ppt TEQ). All three samples for these 26 DUs were tested using EPA Method 1613b (which is considered to be definitive); therefore, results were available from the primary sample for both methods. This constitutes the 2012 data set utilized to evaluate the statistical correlation between the dioxin TEQ concentration (sample results) using the Fast Analysis and the EPA Method 1613b. Both analyses were completed using sample extracts of the same incremental composite sample. Consequently, these paired results were directly comparable to each other and could be used to evaluate the statistical correlation between them. Table B-4 presents the 26 pairs of data.

The difference, Δ (Fast Analysis result – EPA Method 1613b concentration) was calculated for each pair of data. Figure B-4 shows a plot of Δ versus the EPA 1613bconcentrations. The plot shows that all Δ values are positive with an average of about 40 ppt TEQ, which indicates that the Fast Analysis over-estimates the EPA Method 1613b concentrations by an average of approximately 40 ppt TEQ.

In addition, Figure B-5 presents a plot of the EPA Method 1613b concentrations (on the Y-axis) versus the Fast Analysis results (on the X-axis) and the regression line that was fitted to the data. The data points all plot below the 45-degree line, showing that the EPA Method 1613b sample concentrations are consistently lower than the Fast Analysis sample results. The joint hypothesis

that the slope of the regression line is equal to 1 and the intercept is zero (i.e., the Fast Analysis provides unbiased estimates of the EPA Method 1613b concentrations) was tested. It was rejected at a significance level, p, of less than 0.001. This confirms that the Fast Analysis consistently over-estimates the dioxin TEQ concentrations measured by EPA Method 1613b.

However, Figure B-5 does show a close fit between the two data sets with a squared correlation coefficient (R^2) of 0.87. This suggests that it would be possible to correct the bias in the Fast Analysis results by using a regression line with a slope different from 1. Figure B-6 shows a plot of the regression residuals against the Fast Analysis results. The residuals show a random scatter around the zero-residual line, indicating a constant variance, which validates the key assumptions in a regression analysis. The regression line, therefore, may be used to obtain unbiased estimates of EPA Method 1613b concentrations as a function of Fast Analysis results (shown on Figure B-5). The equation of this regression line is:

$$EPA\ Method\ 1613b\ Conc\ (ppt\ TEQ) = -22.39 + 0.922 \times Fast\ Analysis\ Result\ (ppt\ TEQ)$$

The root mean square error (RMSE) of the regression line was calculated to be 7.2 ppt TEQ. Thus, the one-standard deviation band around the regression-line value is approximately ±7.2 ppt TEQ. It should be noted that the regression equation should be used only within the range of data used in the regression analysis (i.e., extrapolation beyond the observed range would not be reliable).

Based on these evaluations, the Fast Analysis method produces a consistent and conservative over-estimate in dioxin TEQ concentrations over the EPA Method 1613b analysis, which can be reliably estimated within the range included in the above evaluation.

4.2 1613b Primary versus Secondary Column Results

Standard analytical laboratory methods for dioxins and furans have been developed based on DB-5 GC Column performance or equivalent; however, this column cannot fully separate four isomers (1,2,3,7,8,9-HCDD, 2,3,7,8-TCDF, 2,3,4,7,8-PCDF, and 1,2,3,4,7,8-HCDF).

EPA Method 1613b specifies use of a second polar column (such as DB-225, SP-2330, or equivalent) to resolve the poor selectivity of 2,3,7,8-TCDF only. This is often generally referred to as "second column confirmation." Newer GC Columns, J&W Scientific DB-5ms specifically, along with the proper GC conditions, improves the separation of 2,3,7,8-TCDF (Fishman V.N., et al., 2007). Using these conditions and depending on the source pattern, there may only be a relatively minor TEQ contribution from the other unresolved congeners: 2,3,4,7,8-PCDF, 2,3,4,7,6,8-HxCDF, and 1,2,3,7,8,9-HCDF. Thus, a single analysis by a DB-5ms (or equivalent) column could be sufficient.

During 2012, twenty-eight samples were tested using Fast Analysis (MAS 8280), EPA Method 1613b single DB-5ms column, and confirmatory column SP-2331 (see Table B-5). Figure B-7 presents the results of analyses via each of the three methods. As anticipated from previous discussion, the Fast Analysis method yields overestimates above the higher resolution methods. The EPA Method 1613b single DB-5ms column TEQ results are also observed to be unanimously biased 2 – 16 % higher than the results produced by the second confirmatory SP-2331 GC Column results. Analysis using EPA Method 1613b with a single DB-5ms GC Column for the Midland Area Soils is, therefore, shown to be sufficiently conservative to meet the data quality objectives for making remedy decisions.

Based on these findings, where decision results indicate confirmation by EPA Method 1613b will be conducted (Section 3.2.3), analysis using the DB-5ms (or equivalent) GC Column will be performed. Second SP-2331 (or equivalent) GC Column analysis may be performed, but is not required.

5.0 Decision Rules for Residential Land Use

The established 2012 confidence interval approved in the May 2012 IRDC (URS, May 2012) was defined as < 280 ppt TEQ and > 220 ppt TEQ based on extensive pilot study data set. The approved confidence interval and the corresponding decision rules were utilized during the completion of 2012 implementation activities. Based on the results of 2012 samples collected

from yards within the Midland Resolution Area, this confidence interval was evaluated to determine whether or not an adjustment to the zone was warranted.

The calculation of these bounds was based in part on the sampling variability of the concentrations in the pilot study data for 1-acre lots. The sampling variability was estimated using the pilot study data from triplicate samples that were each formed using 30 increments. The estimated sampling variability, expressed in terms of the relative standard deviation (RSD), was 7%. The pilot test area used as the basis for calculating the confidence interval was selected because it was close to the area to be sampled during 2012 and was historically a residential area.

With the first year of implementation completed, it is appropriate to review and reassess the confidence interval using field data obtained from the residential areas within the Midland Resolution Area. This evaluation is appropriate to verify that the remedy decision rules developed during the pilot study continue to be representative and accurate. The reassessment accounted for the following:

- Observed RSD of the EPA Method 1613b concentrations;
- The bias and variability of the Fast Analysis results relative to the EPA Method 1613b concentrations; and
- The comparison of the Fast Analysis primary sample results to the confidence interval bounds.

2012 data contained 26 properties for which the Fast Analysis result was within the confidence interval (between 220 and 280 ppt TEQ). The same data set utilized for the evaluation of Fast Analysis results compared to the EPA Method 1613b concentrations was used for this evaluation. Table B-7 shows the EPA Method 1613b concentrations of the triplicate samples for each of the 26 properties, the property acreage, the number of increments, and the basic statistics of the triplicate concentrations (mean, standard deviation, and RSD). This data set was used to estimate the sampling variability.

The number of increments used to form the sample varied depending on the size of each property (acreage). The properties were classified within three groupings based on size as follows:

Group	Size of Property	# of Increments	# of Properties in the Group
1	≤ 0.25 acres	10	22
2	< 1 but > 0.25 acres	20	3
3	> 1 acre	30	1

The sampling variability of the triplicate sample values was analyzed separately for each group.

For the twenty-two properties in Group 1, Figure B-8 shows a scatterplot of the RSD versus the mean concentration of the triplicate samples. The plot does not show any trend in the RSD as a function of the mean values. Consequently, the RSD values may be averaged to estimate the RSD for this group. The average RSD for the twenty-two properties in this group was 4.35%.

For the three properties in Group 2, the average RSD was calculated to be 6.7%. For the one property in Group 3, the RSD was calculated to be 3.5%.

To derive the confidence interval bounds on the Fast Analysis concentration of the primary sample of a given property, a statistical relationship must be established between EPA Method 1613b concentration (which is considered to be definitive) and the Fast Analysis result (which is considered to be an estimate of the EPA Method 1613b concentration). Such a statistical relationship was developed using the paired data on the primary sample that was analyzed using both the Fast Analysis and the EPA Method 1613b analysis for each of the 26 properties sampled in 2012. Figure B-9 shows a plot of the Fast Analysis result versus the corresponding EPA Method 1613b concentration and the regression line that was fitted to the data. For a given EPA Method 1613b concentration, the Fast Analysis result may be estimated from the following regression equation:

$$\text{Fast Analysis result (ppt TEQ)} = b_0 + b_1 \times \text{EPA Method 1613b conc (ppt TEQ)} \qquad (1)$$
$$= 53.7 + 0.945 \times \text{EPA Method 1613b conc (ppt TEQ)}$$

RMSE of the regression equation = 7.2 ppt TEQ.

The bounds on the confidence interval were derived based on the hypothesis-testing procedure. To derive the upper bound, the null and alternative hypotheses were defined as follows:

H_0: True mean concentration ≤ 250 ppt TEQ (i.e., no further action); and
H_A: True mean concentration > 250 ppt TEQ (i.e., remedy).

If the true mean concentration were 250 ppt TEQ, the EPA Method 1613b mean concentration could also be assumed to be 250 ppt TEQ. An estimate of the Fast Analysis mean result, calculated from Equation (1), is 289.9 ppt TEQ. The standard deviation of this estimated mean is given by (RMSE ÷ square root of n), where n is the number of data points used in the regression analysis and is equal to 26.

The individual Fast Analysis results would be spread around this mean with an estimated variance given by:

Variance of individual Fast Analysis results:

$= s^2$

$= b_1^2 \times$ variance of EPA Method 1613b concentrations + MSE of regression equation $\times (1 + 1/n)$ (3)

$= b_1^2 \times$ (RSD of EPA Method 1613b conc × mean of l EPA Method 1613b conc)^2 + MSE $\times (1 + 1/n)$

Table B-2 shows the calculated variance of the individual Fast Analysis results from Equation (3), and the corresponding standard deviation, for each of the three groups of properties defined previously.

The null hypothesis would be rejected if the Fast Analysis result were to exceed the upper limit of the distribution of Fast Analysis results corresponding to (1-α) confidence. Assuming normal distribution for results, this upper limit is given by

$$\text{Mean} + t_{(n\text{-}1,\ 1\text{-}\alpha)} \times s \qquad (4)$$

in which,

s = standard deviation of the individual Fast Analysis results shown in Table B-2

n = number of data points for the regression analysis = 26

$t_{(n\text{-}1,\ 1\text{-}\alpha)}$ = Student's t value for (n-1) degrees of freedom and (1-α) confidence.

Similarly, the lower limit is given by:

$$\text{Mean} - t_{(n\text{-}1,\ 1\text{-}\alpha)} \times s \qquad (5)$$

The upper and lower bounds calculated from Equations (4) and (5) define the confidence interval for Fast Analysis result of the primary sample for each property in a given group. Table B-6 presents these bounds for each of the three property groups.

The analysis of 2012 data indicate that it is not likely that EPA Method 1613b will measure concentrations above 250 ppt TEQ for properties where the Fast Analysis result was less than 260 ppt TEQ. It is also unlikely that EPA Method 1613b will measure concentrations less than 250 ppt TEQ for properties where the Fast Analysis result was above 300 ppt TEQ. Currently, all properties where the Fast Analysis result is <280 ppt TEQ and > 220 ppt TEQ must be tested in triplicate by EPA Method 1613b.

The results of this evaluation indicate a confidence interval of 260 – 300 parts per trillion (ppt) TEQ for the analytical work performed in 2012; however, there are mitigating factors that are not accounted for in the statistical evaluation of the analytical results to date. The bias observed in the MAS 8280 analysis during 2012 was within the allowable variability in the EPA Methods (8280 MAS and 1613b) with respect to calibration verification. The bias observed during pilot testing during 2011 was lower than that observed during 2012. The variability in biasing observed from 2011 to 2012 suggests it is prudent to retain a factor of safety for remedy decision. Therefore, to conservatively account for the variability, no changes to the current

lower limit of 220 ppt TEQ are proposed. Fast Analysis concentrations measured greater than 220 ppt TEQ and less than or equal to 250 ppt TEQ will result in testing of all three replicates by EPA Method 1613b using a DB-5ms (or equivalent) column. While the results of the evaluation support 260 ppt TEQ as the lower bound of the confidence interval, in order to retain a factor of safety for remedy decision a lower limit of 220 ppt TEQ rather than 260 ppt is proposed. It is further recommended that properties where Fast Analysis results are above 250 ppt TEQ, Dow shall complete a presumptive remedy for the DU or at their discretion, demonstrate the concentration is below the SSAL of 250 ppt TEQ by testing of all three replicates using EPA Method 1613b with a DB-5ms (or equivalent) column (subject to existing QAPP requirements [Attachment C of the Work Plan]). Dow could, therefore, elect to conduct a remedy for any property with a Fast Analysis result greater than 250 ppt TEQ or perform confirmation by testing all three replicates using EPA Method 1613b and calculating a 95% UCL. The 95% UCL would be compared to the SSAL for the final remedy decision.

6.0 Property Development Age vs Dioxin TEQ Concentration

The statistical correlation between dioxin TEQ concentration from aerial deposition and building age was analyzed using 2012 Fast Analysis data from residential areas to evaluate whether the dioxin TEQ concentrations were related to how recently a parcel was developed. The Fast Analysis results for individual properties were used for the analysis of this correlation. After excluding the 0-12” depth samples, the data set consisted of 120 properties that contained a residential building for which an estimate of the age of the building was available. Table B-8 presents the paired data on concentration and building age for these 120 properties.

Figure B-10 presents a scatterplot of the Fast Analysis dioxin TEQ concentration versus building age. Based on the positive slope of the best-fit regression line shown in Figure B-10, there appears to be a small, positive correlation between concentration and age. While the slope of this line is statistically significant ($p < 0.01$), the squared correlation coefficient (R^2) is only 8% and while the mean concentration is moderately increasing with age, there is a large amount of scatter around the mean line. An examination of the data scatter suggests the following:

- For buildings older than about 65 years (i.e., those built on or before 1947), the scatter is larger and the data points do not appear to show an increasing relationship between concentration and age; and
- For buildings younger than 65 years, the data scatter is smaller and concentrations do appear to be increasing with age.

To examine these patterns further, the range of building ages was classified into three discrete groups using the break points indicated by the data scatter in Figure B-10. The three age groups were defined as follows:

- Building Age < 65 years,
- Building Age between 65 and 95 years; and
- Building Age ≥ 95 years.

Building ages 65 and 95 approximately correspond to 25th and 75th percentiles of the age distribution.

An analysis of variance (ANOVA) was performed to evaluate the variations in concentration across the three age groups. The ANOVA results are shown in Figure B-11. They indicate that the mean dioxin TEQ concentration for the age group of less than 65 years is significantly lower than those for the other two groups; however, the mean concentrations for the latter two age groups of 65 to 95 years and greater than or equal to 95 years are statistically no different. Based on this finding, the latter two age groups were combined, which resulted in defining two statistically significant building age groups – age less than 65 years and age greater than or equal to 65 years.

To further examine the influence of age on concentration within each of the two statistically significant age groups, separate regression analysis was performed for each group.

Figure B-12 shows a scatterplot of data points with age greater than or equal to 65 years. The

data points appear to scatter randomly around a line that is almost horizontal, indicating that age has little influence on concentration for this age group. The correlation between concentration and age is practically zero and the slope of the regression line is statistically not significantly different from 0 (p = 0.95). The mean and standard deviation of dioxin TEQ concentration for this group are 213 ppt TEQ and 79 ppt TEQ, respectively.

Figure B-13 shows a scatterplot of data points with age less than 65 years. The plot shows one apparent outlier with a concentration of 419 ppt TEQ. This outlier was excluded from the subsequent regression analysis. The resulting regression line is also shown in Figure B-13. The slope of the regression line is significantly different than 0 (p =0.03), indicating a statistically significant relationship between dioxin TEQ concentration and age for this age group. The following regression equation may be used to estimate the mean Fast Analysis result as a function of age when age is less than or equal to 65 years:

$$\textit{Mean Fast Analysis result (ppt TEQ)} = 95.2 + 0.993 \times \textit{Age (years)} \qquad (6)$$

The RMSE of the regression equation is 45 ppt TEQ. Thus, for example, the estimated mean concentrations for 20-year and 60-year old buildings are 115 and 155 ppt TEQ, respectively. The one-standard deviation band around these estimated mean concentrations is approximately ±45 ppt TEQ. In contrast, as noted previously, the estimated mean concentration for a building older than 65 years is 213 ppt TEQ and a one-standard deviation band around the estimated mean concentration is ±79 ppt TEQ.

Of the twenty-seven properties with a building age less than 65 years, two properties required remedy (or just over 7%). For ninety-three properties with a building age greater than 65 years, nineteen required remedy (or just over 20%).

Based on this evaluation, there is a statistically significant correlation between dioxin TEQ concentration and building ages of 65 years or less in age. There is no significant correlation between concentration and building ages greater than 65 years. While a significant correlation

cannot be identified, properties with a building age greater than 65 years were much more likely to need remedy.

7.0 References

Fishman, V.N., et al (2007). *Comparison of a variety of gas chromatographic columns with different polarities for the separation of chlorinated dibenzo-p-dioxins and dibenzofurans by high-resolution mass spectrometry*. Journal of Chromatography A, 1139. 285-300.

URS (2012). *Interim Response Activity Plan Designed to Meet Criteria Work Plan.* The Dow Chemical Company, Midland, Michigan.

Table B-1. Confidence Interval Bounds on Mean Block Fast Analysis Dioxin TEQ Results

Block ID	# of Properties	Relative Standard Deviation (RSD) of Fast Analysis Results	Mean Block Fast Analysis Results (ppt TEQ)	Variance of Fast Analysis Results of Properties in Block (ppt TEQ)^2	Action Level for True Mean Dioxin TEQ Concentration (ppt TEQ)	Corresponding Fast Analysis Mean Dioxin TEQ Concentration	Lower Bound on Block Fast Analysis Mean (ppt TEQ)	Upper Bound on Block Fast Analysis Mean (ppt TEQ)	Block Remediation Decision	# of Properties in the Block with Different Remediation Decision
1	5	40%	110.6	1920.3	250	289.9	248.1	331.7	No further action	0
2	13	39%	107.8	1791.0	250	289.9	269.0	310.8	No further action	0
3	7	33%	175.2	3253.3	250	289.9	248.0	331.8	No further action	0
4	4	16%	182.8	825.6	250	289.9	256.1	323.7	No further action	0
5	6	10%	271.7	692.7	250	289.9	268.2	311.5	Send one sample from each property for laboratory analysis	2
6	7	22%	213.9	2139.8	250	289.9	255.9	323.9	No further action	1
7	7	29%	227.1	4471.5	250	289.9	240.8	339.0	No further action	2
8	14	27%	239.4	4191.0	250	289.9	259.2	320.5	No further action	6
9	20	34%	259	7776.8	250	289.9	255.8	324.0	Send one sample from each property for laboratory analysis	14
10	7	24%	180.4	1867.3	250	289.9	258.1	321.6	No further action	1
11	14	57%	206.1	13556.7	250	289.9	234.8	345.0	No further action	4
12	25	36%	163.8	3426.1	250	289.9	269.9	309.9	No further action	3
13	9	28%	142.4	1544.6	250	289.9	265.5	314.2	No further action	0
14	4	15%	127.5	379.7	250	289.9	267.0	312.8	No further action	0
15	2	45%	134.6	3604.0	250	289.9	21.9	557.9	Send one sample from each property for laboratory analysis	2

Table B-2. Variance and Standard Deviation of Individual Fast Analysis Dioxin TEQ Results

Property Group	Property Area Range	Number of Increments	Relative Standard Deviation (RSD) of EPA Method 1613b Triplicates	Slope (b_1) of Regression Equation to Estimate Fast Analysis Result from EPA Method 1613b Concentration	Action Level (ppt TEQ)	Root Mean Square Error (RMSE) of Regression Equation	Mean Square Error (MSE) of Regression Equation	Number of Data Points Used in the Regression Analysis (n)	Variance of Individual Fast Analysis Results	Standard Deviation of Individual Fast Analysis Results
1	≤ 0.25 acre	10	4.4%	0.945	250	7.25	52.6	26	160	12.7
2	> 0.25 and ≤ 1 acre	20	6.7%	0.945	250	7.25	52.6	26	305	17.5
3	> 1 acre	30	3.5%	0.945	250	7.25	52.6	26	123	11.1

Table B-3. Fast Analysis Dioxin TEQ Results at 0-6" and 0-12" Depths

Property Address	0-6" Dioxin TEQ Concentration (ppt TEQ)	0-12" Dioxin TEQ Concentration (ppt TEQ)
715 Fournie Street	205	131
717 Fournie Street	179	107
812 E Grove Street	171	158
720 Haley Street	146	144
1128 E Haley Street	92.1	67.6
1202 E Haley Street	177	73.7
301 Kent Court	224	221
310 Kent Court	92.9	93.2
314 Kent Court	137	138
516 Mill Street	279	204

Table B-4. EPA Method 1613b Dioxin TEQ Concentrations versus Fast Analysis Dioxin TEQ Results

Property Address	EPA Method 1613b (Primary Sample) Concentration (ppt TEQ)	Matched Fast-Analysis Dioxin TEQ Results (ppt TEQ)
609 Fournie Street	212	252
711 Fournie Street	216	259
811 Fournie Street	242	277
813 Fournie Street	229	267
516 George Street	179	228
808 E Grove Street	184	223
914 E Grove Street	232	275
1010 E Grove Street	221	260
602 Haley Street	190	230
613 Haley Street	195	242
806 Haley Street	213	252
811 Haley Street	216	272
819 Haley Street	199	244
1002 Haley Street	215	267
1007 Haley Street	195	237
915 E Indian Street	208	250
301 Kent Court (6" sample)	174	224
327 Kent Court (Wooded)	212	250
331 Kent Court (Cleared)	191	226
510 Mill Street	209	232
516 Mill Street (6" sample)	232	279
812 Mill Street	234	279
311 Walter Court	239	277
319 Walter Court	214	270
325 Walter Court	234	268
329 Walter Court	184	223

*515 E. Buttles and 514 Sixth St. excluded from data set as outliers.

Table B-5. Summary of MAS 8280 Fast Analysis and EPA Method 1613b Primary and Secondary Columns

FA Sample #/ Trace Sample #	Sample #120730/120812			Sample #120697/120815			Sample #120765/120818			Sample #120724/120821			Sample #120723/120824		
Analysis Type	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331
File #	120730	120622mi07	120625cf08	120697	120622mi11	120625cf12	120765	120622mi20	120625cf21	120724	120625mi07	120627cf08	120723	120625mi11	120627cf12
Analyte	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.
2378-TCDD	55.1	60.2		107	102.0		84.1	85.4		85.4	84.7		105	105.4	
12378-PCDD	49.1	36.2		60.6	35.2		56.6	40.9		50.6	38.4		61.2	47.1	
123478-HCDD	109	27.7		123	24.8		144	35.0		135	33.7		139	33.2	
123678-HCDD		74.0			80.6			92.1			88.8			105.6	
123789-HCDD	56.5	48.7		60.6	48.0		72.5	55.2		60.3	52.3		68.8	65.5	
1234678-H7CDD	1170	1075.2		1500	1401.1		1360	1398.2		1470	1407.6		1790	1700.1	
OCDD	10100	9500.9		15400	14524.5		13400	11762.1		14500	13355.0		17700	16965.7	
2378-TCDF	110	87.9	91.6	77.2	52.3	55.2	158	126.4	128.8	97.6	69.8	74.8	71.8	49.4	47.0
12378-PCDF		65.1			37.2			97.9			52.7			32.7	
23478-PCDF	147	117.0	58.8	62.7	46.7	34.5	131	114.0	72.7	92.7	73.3	45.8	62.1	49.1	29.9
123478-HCDF	182	103.5		110	68.0		210	131.1		162	98.9		110	67.8	
123678-HCDF		44.1			28.3			50.2			40.0			32.3	
234678-HCDF		58.7	34.0		33.1	23.3		56.8	42.9		50.8	30.0		44.6	29.5
123789-HCDF		7.3	3.6		4.0	ND		8.5	ND		3.5	ND		1.8	ND
1234678-H7CDF	759	644.0		1330	1310.8		958	854.8		885	825.2		1560	1492.9	
1234789-H7CDF		35.8			37.2			41.8			42.0			49.0	
OCDF	980	853.9		2180	1974.2		1510	1257.6		1440	1244.0		2750	2559.7	
ETEQ* WHO-TEC*	228	199	179	270	219	214	279	246	231	250	218	207	277	246	239
% bias reduction of ETEQ/WHO-TEC		13%	10%		19%	2%		12%	6%		13%	5%		11%	3%
1613b Dup (WHO-TEC*)		207	186		198	194		241	225		225	213		242	234
1613b Trip (WHO-TEC*)		202	181		192	187		266	250		231	220		241	234
Average of 3		203	182		203	198		251	235		225	213		243	236
STDEV		4.0	3.5		14.1	14.0		13.3	13.0		6.9	6.3		3.0	2.8
RSD%		2%	2%		7%	7%		5%	6%		3%	3%		1%	1%

*=Calculated at ND=0

Note: Primary Sample WHO-TEC is calculated from non-truncated data. Duplicate and Triplicate WHO-TEC values are from truncated data.

Table B-5. Summary of MAS 8280 Fast Analysis and EPA Method 1613b Primary and Secondary Columns

FA Sample #/ Trace Sample #	Sample #120741/120827			Sample #120746/120875			Sample #120755/120878			Sample #120751/120881			Sample #120773/120884		
Analysis Type	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331
File #	120741	120625mi20	120627cf21	120746	120627mi07	120629cf08	120755	120627mi11	120629cf11	120751	120703mi07	120710cf08	120773	120711mi07	120703cf07
Analyte	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.
2378-TCDD	110	110.1		72.7	70.9		66	65.4		79.5	84.8		80.7	84.3	
12378-PCDD	50.9	36.8		53	38.1		50	34.7		46.4	39.3		62.1	43.0	
123478-HCDD	139	37.2		132	31.1		116	30.4		132	34.9		145	40.1	
123678-HCDD		94.9			99.0			78.2			87.3			93.1	
123789-HCDD	68.5	59.2		64.8	60.4		55.1	48.9		61.5	58.0		69.3	62.7	
1234678-H7CDD	1780	1758.0		1710	1678.4		1150	1209.4		1480	1455.8		1460	1455.0	
OCDD	16600	15915.9		19100	18909.5		12100	11707.1		13900	13503.6		15400	14137.4	
2378-TCDF	96.4	62.5	61.2	34.3	21.7	21.4	140	103.6	100.9	89	76.1	81.7	94.8	66.1	68.8
12378-PCDF		44.8			17.6			68.2			58.3			44.6	
23478-PCDF	81.7	63.6	37.9	48.4	35.6	21.4	90.4	75.5	50.4	90.3	75.9	49.4	84.4	66.2	43.4
123478-HCDF	136	88.9		115	62.5		147	94.5		133	87.9		138	85.2	
123678-HCDF		37.7			30.9			38.5			40.1			39.2	
234678-HCDF		49.1	29.4		43.3	32.4		46.8	34.1		47.9	31.9		53.5	31.7
123789-HCDF		2.8	ND		2.6	ND		1.4	ND		2.2	3.2		3.2	5.1
1234678-H7CDF	875	856.6		1680	1747.4		737	759.5		751	679.1		784	784.3	
1234789-H7CDF		45.2			46.8			37.0			41.7			39.2	
OCDF	1500	1458.8		2680	2530.5		1450	1317.5		1250	1167.8		1590	1443.0	
ETEQ* WHO-TEC*	275	242	232	226	197	191	223	193	184	232	218	209	252	220	212
% bias reduction of ETEQ/WHO-TEC		12%	4%		13%	3%		13%	5%		6%	4%		13%	4%
1613b Dup (WHO-TEC*)		211	203		187	181		202	190		212	205		219	208
1613b Trip (WHO-TEC*)		217	209		222	215		191	184		217	210		223	213
Average of 3		224	215		202	196		195	186		216	208		221	211
STDEV		16.6	15.4		18.3	17.5		6.0	3.5		3.5	2.7		1.8	2.6
RSD%		7%	7%		9%	9%		3%	2%		2%	1%		1%	1%

*=Calculated at ND=0

Table B-5. Summary of MAS 8280 Fast Analysis and EPA Method 1613b Primary and Secondary Columns

FA Sample #/ Trace Sample #	Sample #120766/120887			Sample #120788/120890			Sample #120789/120905			Sample #120795/120908			Sample #120849/120911		
Analysis Type	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331
File #	120766	120711mi10	120703cf10	120788	120711mi18	120703cf13	120789	120704mi07	120702cf07	120795	120704mi11	120702cf10	120849	120704mi20	120702cf13
Analyte	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.
2378-TCDD	64.7	65.1		80	78.3		84.2	80.0		81.5	82.0		86.4	86.3	
12378-PCDD	48.3	36.7		57.2	39.3		57.4	42.6		50.5	35.3		57	43.2	
123478-HCDD	114	24.5		125	33.4		140	29.1		127	35.2		129	30.9	
123678-HCDD		81.6			82.9			98.7			85.4			92.0	
123789-HCDD	55	56.2		65.6	52.1		69.9	65.0		62.8	52.4		67.9	60.7	
1234678-H7CDD	1290	1344.1		1300	1321.7		1800	1852.5		1350	1408.2		1550	1687.7	
OCDD	14100	13397.3		12000	11920.3		19800	20048.1		12700	13100.8		17100	16992.9	
2378-TCDF	39.1	25.3	23.4	84.7	52.4	54.3	52.8	36.1	30.2	82.4	53.4	53.6	130	107.0	102.6
12378-PCDF		17.9			41.0			27.9			40.1			68.4	
23478-PCDF	132	116.2	29.9	88.7	62.9	39.6	51.3	39.3	27.1	80.2	66.4	33.7	89.8	76.9	57.7
123478-HCDF	110	56.7		131	82.6		115	73.4		111	74.5		159	113.4	
123678-HCDF		39.3			40.7			36.0			32.4			37.3	
234678-HCDF		75.2	37.2		50.9	31.6		48.5	34.5		46.3	24.2		44.6	29.9
123789-HCDF		1.7	ND		2.4	2.2		2.3	ND		1.6	3.3		2.2	ND
1234678-H7CDF	1150	1207.0		842	842.5		1830	1813.9		637	632.7		1490	1470.3	
1234789-H7CDF		34.3			39.8			49.6			37.4			53.0	
OCDF	1910	1729.5		1200	1164.4		2920	2718.1		1210	1160.3		2490	2352.0	
ETEQ* WHO-TEC*	224	204	174	242	203	195	250	218	212	230	202	190	268	241	233
% bias reduction of ETEQ/WHO-TEC		9%	15%		16%	4%		13%	3%		12%	6%		10%	3%
1613b Dup (WHO-TEC*)		218	177		220	210		205	199		204	193		247	240
1613b Trip (WHO-TEC*)		183	159		239	227		229	221		199	189		244	238
Average of 3		201	170		221	211		217	211		201	191		244	237
STDEV		17.4	9.6		17.8	16.2		12.0	11.1		2.6	2.1		2.9	3.4
RSD%		9%	6%		8%	8%		6%	5%		1%	1%		1%	1%

*=Calculated at ND=0

Table B-5. Summary of MAS 8280 Fast Analysis and EPA Method 1613b Primary and Secondary Columns

FA Sample #/ Trace Sample #	Sample #120870/120914			Sample #120693/120917			Sample #120921/120922			Sample #120938/120997			Sample #121202/121301		
Analysis Type	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331
File #	120870	120702mi07	120704cf08	120693	120710mi07	120709cf08	120921	120709mi07	120708cf08	120938	120724mi07	120720cf08	121202	120820mi07	120822cf08
Analyte	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.
2378-TCDD	78.9	79.5		36.5	32.3		73.1	68.6		246	265.1		97.5	104.6	
12378-PCDD	51.8	39.0		80.1	16.2		53.5	40.1		159	107.8		55.9	40.4	
123478-HCDD	156	41.8		60.6	12.9		125	29.3		438	88.5		130	34.6	
123678-HCDD		100.4			37.1			87.3			265.2			87.1	
123789-HCDD	69.6	63.8		35.3	24.8		64.9	53.5		216	164.6		61.4	54.4	
1234678-H7CDD	1540	1649.9		569	580.0		1590	1519.7		5810	5254.3		1370	1392.1	
OCDD	16400	16236.0		5330	5065.8		15600	15476.8		56400	53006.4		11800	12288.9	
2378-TCDF	137	107.9	104.5	8260	6775.5	6667.0	44.4	25.9	27.2	127	89.0	93.4	171	135.3	137.6
12378-PCDF		71.1			4839.4			18.9			63.5			80.6	
23478-PCDF	108	94.3	60.1	3720	3557.3	2892.6	52.9	37.4	23.4	511	429.8	113.8	115	89.7	68.3
123478-HCDF	190	111.6		4460	3652.5		92.8	58.4		413	202.5		153	107.3	
123678-HCDF		46.2			721.3			27.2			135.9			38.3	
234678-HCDF		58.1	36.1		329.0	215.8		37.4	33.5		264.1	133.3		44.4	27.5
123789-HCDF		2.8	3.9		75.0	69.8		1.7	2.3		58.8	8.3		2.5	3.9
1234678-H7CDF	895	914.8		652	682.4		1530	1503.2		2370	2107.5		722	678.5	
1234789-H7CDF		44.1			161.7			42.6			115.7			38.8	
OCDF	1550	1442.9		600	571.3		2550	2338.7		4930	4377.4		1120	1058.8	
ETEQ* WHO-TEC*	260	234	221	2660	2440	2218	223	189	184	817	723	610	277	250	242
% bias reduction of ETEQ/WHO-TEC		10%	5%		8%	9%		15%	2%		12%	16%		10%	3%
1613b Dup (WHO-TEC*)		227	214		1877	1770		195	191		922	793		245	237
1613b Trip (WHO-TEC*)		217	206		1772	1610		200	197		914	782		289	278
Average of 3		226	214		2030	1866		195	191		853	728		261	252
STDEV		8.5	7.4		358.9	314.9		5.7	6.4		112.8	102.6		24.3	22.3
RSD%		4%	3%		18%	17%		3%	3%		13%	14%		9%	9%

*=Calculated at ND=0

Table B-5. Summary of MAS 8280 Fast Analysis and EPA Method 1613b Primary and Secondary Columns

FA Sample #/ Trace Sample #	Sample #121224/121304			Sample #121225/121307			Sample #121281/121330			Sample #121222/121333			Sample #121223/121336		
Analysis Type	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331
File #	121224	120820mi10	120822cf11	121225	120820mi18	120822cf19	121281	120823mi07	120824cf08	121222	120823mi10	120824cf11	121223	120823mi18	120824cf19
Analyte	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.
2378-TCDD	90.2	87.2		86.3	86.8		89.4	94.3		97.4	100.2		75.4	80.3	
12378-PCDD	65.4	39.7		55.7	39.3		58.7	37.4		71	41.6		62.2	37.4	
123478-HCDD	135	33.9		118	30.3		124	34.7		138	37.9		119	29.9	
123678-HCDD		97.6			78.8			80.8			86.7			81.7	
123789-HCDD	65.6	55.6		57.4	48.2		52.8	53.5		65.2	57.5		59.2	51.3	
1234678-H7CDD	1450	1474.3		1170	1127.5		1260	1280.5		1480	1531.7		1200	1186.4	
OCDD	12400	12832.0		9990	10461.5		12500	11801.7		13100	13957.9		10000	10436.5	
2378-TCDF	120	88.0	88.7	62.8	42.4	43.0	92.2	66.4	64.7	76.9	47.2	45.4	118	78.5	79.2
12378-PCDF		57.1			31.7			44.5			32.1			55.3	
23478-PCDF	87.4	79.4	49.0	85.7	71.5	36.0	84.5	70.1	42.4	81	62.4	32.6	88.2	79.2	49.6
123478-HCDF	132	88.5		116	70.9		144	92.7		112	68.3		143	97.6	
123678-HCDF		41.5			36.9			40.3			30.9			40.6	
234678-HCDF		51.2	30.7		53.6	31.6		52.4	31.2		46.9	29.4		51.7	28.6
123789-HCDF		1.9	5.0		2.3	4.4		1.5	6.1		2.0	ND		1.5	4.5
1234678-H7CDF	821	778.7		746	745.4		897	940.5		814	808.3		842	796.8	
1234789-H7CDF		34.6			35.0			43.5			37.0			37.4	
OCDF	1300	1252.4		1140	1130.2		1300	1143.4		1270	1235.2		989	987.3	
ETEQ* WHO-TEC*	267	225	215	237	207	195	252	223	213	272	228	216	244	210	199
% bias reduction of ETEQ/WHO-TEC		16%	5%		12%	6%		12%	5%		16%	5%		14%	5%
1613b Dup (WHO-TEC*)		218	209		194	182		223	210		228	218		199	188
1613b Trip (WHO-TEC*)		228	215		184	172		187	175		209	198		199	188
Average of 3		224	213		195	183		211	199		222	211		203	192
STDEV		5.1	3.4		11.9	11.4		20.7	21.0		11.2	11.1		6.5	6.5
RSD%		2%	2%		6%	6%		10%	11%		5%	5%		3%	3%

*=Calculated at ND=0

Table B-5. Summary of MAS 8280 Fast Analysis and EPA Method 1613b Primary and Secondary Columns

FA Sample #/ Trace Sample #	Sample #121321/121363			Sample #121322/121366			Sample #121323/121369		
Analysis Type	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331	FA	DB-5ms	SP-2331
File #	121321	120827mi07	120829cf07	121322	120827mi10	120829cf10	121323	120827mi18	120829cf17
Analyte	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.	ng/kg d.w.
2378-TCDD	90.7	89.5		80.4	81.7		96.6	102.1	
12378-PCDD	64.5	44.3		60.4	41.0		63.4	45.8	
123478-HCDD	160	41.1		153	41.2		139	38.1	
123678-HCDD		116.6			106.7			95.9	
123789-HCDD	84.5	71.1		79.9	62.6		74	61.7	
1234678-H7CDD	2030	2040.4		1780	1802.2		1450	1479.4	
OCDD	19100	19353.5		16900	16782.3		13400	13503.5	
2378-TCDF	118	85.8	86.0	95.1	59.0	63.4	96.5	62.4	64.6
12378-PCDF		55.4			48.1			46.0	
23478-PCDF	87.4	76.4	48.7	83.7	69.9	43.5	77.4	67.7	40.3
123478-HCDF	134	88.3		142	91.2		136	82.7	
123678-HCDF		39.2			43.8			35.9	
234678-HCDF		48.4	30.5		52.0	33.7		45.4	27.0
123789-HCDF		2.4	6.3		2.4	4.0		2.7	ND
1234678-H7CDF	882	849.6		1050	1047.9		787	769.2	
1234789-H7CDF		46.0			52.2			41.4	
OCDF	1740	1591.8		1960	1847.2		1260	1164.2	
ETEQ* WHO-TEC*	279	243	234	259	226	216	267	239	229
% bias reduction of ETEQ/WHO-TEC		13%	4%		13%	4%		10%	4%
1613b Dup (WHO-TEC*)		252	242		260	249		233	224
1613b Trip (WHO-TEC*)		257	248		279	267		225	216
Average of 3		251	241		255	244		232	223
STDEV		7.0	7.2		26.9	25.6		7.3	6.7
RSD%		3%	3%		11%	10%		3%	3%

*=Calculated at ND=0

Table B-6. Lower and Upper Bounds on Individual Fast Analysis Dioxin TEQ Results

Property Group	Property Area Range	Number of Increments	Action Level (ppt TEQ)	Mean of Fast Analysis Results (ppt TEQ)	Lower Bound on Individual Fast Analysis Results (ppt TEQ)	Upper Bound on Individual Fast Analysis Results (ppt TEQ)
1	≤ 0.25 acre	10	250	290	268	312
2	> 0.25 and ≤ 1 acre	20	250	290	260	320
3	> 1 acre	30	250	290	271	309

Table B-7. EPA Method 1613b Dioxin TEQ Concentrations for Triplicate Samples

Property Address	Primary Dioxin TEQ Concentration (ppt TEQ)	Duplicate Dioxin TEQ Concentration (ppt TEQ)	Triplicate Dioxin TEQ Concentration (ppt TEQ)	Acreage	Number of Increments	Mean Concentration (ppt TEQ)	Standard Deviation of Concentration (ppt TEQ)	Relative Standard Deviation (RSD)
609 Fournie Street	212	208	213	0.166	10	211.0	2.65	1.3%
711 Fournie Street	216	249	267	0.186	10	244.0	25.87	10.6%
811 Fournie Street	242	237	278	0.189	10	252.3	22.37	8.9%
813 Fournie Street	229	224	216	0.187	10	223.0	6.56	2.9%
516 George Street	179	186	181	0.154	10	182.0	3.61	2.0%
808 E Grove Street	184	190	184	0.166	10	186.0	3.46	1.9%
914 E Grove Street	232	203	209	0.166	10	214.7	15.31	7.1%
1010 E Grove Street	221	214	206	1.312	30	213.7	7.51	3.5%
602 Haley Street	190	193	189	0.165	10	190.7	2.08	1.1%
613 Haley Street	195	210	227	0.166	10	210.7	16.01	7.6%
806 Haley Street	213	210	175	0.186	10	199.3	21.13	10.6%
811 Haley Street	216	218	198	0.184	10	210.7	11.02	5.2%
819 Haley Street	199	189	188	0.184	10	192.0	6.08	3.2%
1002 Haley Street	215	209	215	0.190	10	213.0	3.46	1.6%
1007 Haley Street	195	182	172	0.186	10	183.0	11.53	6.3%
915 E Indian Street	208	213	220	0.166	10	213.7	6.03	2.8%
301 Kent Court (6" sample)	174	177	159	0.380	20	170.0	9.64	5.7%
327 Kent Court (Wooded)	212	199	221	0.970	20	210.7	11.06	5.3%
331 Kent Court (Cleared)	191	181	216	0.970	20	196.0	18.03	9.2%
510 Mill Street	209	205	210	0.127	10	208.0	2.65	1.3%
516 Mill Street (6" sample)	232	225	250	0.204	10	235.7	12.90	5.5%
812 Mill Street	234	242	248	0.195	10	241.3	7.02	2.9%
311 Walter Court	239	234	234	0.215	10	235.7	2.89	1.2%
319 Walter Court	214	194	187	0.177	10	198.3	14.01	7.1%
325 Walter Court	234	240	238	0.221	10	237.3	3.06	1.3%
329 Walter Court	184	191	197	0.221	10	190.7	6.51	3.4%

Table B-8. Data for Correlation between Dioxin TEQ Concentration and Building Age

Sample Description	Dioxin TEQ Concentration (ppt TEQ)	Year Built	Age (Years)
Primary Sample 2208 Bay City Road	192	1936	76
Primary Sample 609 E. Butler	204	1917	95
Primary Sample 501 E Buttles Street	128	1919	93
Primary Sample 505 E Buttles Street	101	1860	152
Primary Sample 711 E. Buttles Street	131	1922	90
Primary Sample 902 East Carpenter St	202	1926	86
Primary Sample 912 East Carpenter St	189	1924	88
Primary Sample 1010 East Carpenter St	197	1919	93
Primary Sample 1016 E. Carpenter	216	1920	92
Primary Sample 609 Fournie Street	252	1933	79
Primary Sample 613 Fournie Street	186	1973	39
Primary Sample 711 Fournie St	259	1930	82
Primary 6" Sample 715 Fournie St	205	1989	23
Primary 6" Sample 717 Fournie St	179	1989	23
Primary Sample 719 Fournie St	152	1988	24
Primary Sample 811 Fournie St	277	1917	95
Primary Sample 813 Fournie St	267	1917	95
Primary Sample 819 Fournie St	369	1919	93
Primary Sample 1001 Fournie St	434	1920	92
Primary Sample 1007 Fournie St	285	1917	95
Primary Sample 416 George Street	49.1	1940	72
Primary Sample 512 George Street	218	1900	112
Primary Sample 516 George Street	228	1910	102
Primary Sample 612 E. Grove Street	172	1952	60
Primary Sample 704 E. Grove Street	205	1932	80
Primary Sample 808 E. Grove Street	223	1918	94
Primary Sample 812 E. Grove St. - 6"	171	1925	87
Primary Sample 913 E. Grove Street	303	1922	90
Primary Sample 914 E. Grove Street	275	1922	90
Primary Samples 915 E. Grove St	205	1920	92
Primary Sample 916 E. Grove St	303	1915	97
Primary Sample 1011 E. Grove Street	214	1917	95
Primary Sample 1015 E. Grove Street	110	1996	16
Primary Sample 602 Haley Street	230	1930	82
Primary Sample 606 Haley Street	287	1947	65
Primary Sample 612 Haley Street	311	1900	112
Primary Sample 613 Haley Street	242	1927	85
Primary Sample 615 Haley St	180	1922	90
Primary Sample 706 Haley St	287	1907	105
Primary Sample 712 East Haley St	124	1957	55
Primary Sample 716 Haley St	492	1910	102
Primary Sample 716 East Haley St	114	1948	64
Primary 6" Sample 720 Haley St	146	1991	21
Primary Sample 800 East Haley St	116	1956	56
Primary Sample 801 Haley St	174	1890	122
Primary Sample 805 Haley St	365	1935	77
Primary Sample 806 Haley St	252	1916	96
Primary Sample 811 Haley St	272	1926	86
Primary Sample 816 Haley St	194	1935	77
Primary Sample 819 Haley St	244	1917	95

Table B-8. Data for Correlation between Dioxin TEQ Concentration and Building Age

Sample Description	Dioxin TEQ Concentration (ppt TEQ)	Year Built	Age (Years)
Primary Sample1001 Haley St	292	1934	78
Primary Sample 1002 Haley St	267	1934	78
Primary Sample 1007 Haley St	237	1920	92
Primary Sample 1010 Haley St	219	1928	84
Primary Sample 804/808 East Haley St	156	1957	55
Primary Sample 612 E. Indian Street	111	1885	127
Primary Sample 615 East Indian Street	207	1925	87
Primary Sample 616 E. Indian Street	101	1915	97
Primary Sample 702 E. Indian Street	49.9	1910	102
Primary Sample 706 East Indian	135	1912	100
Primary Sample 712 East Indian Street	68.7	1900	112
Primary Sample 811 E. Indian Street	156	1913	99
Primary Sample 909 E. Indian Street	291	1890	122
Primary Sample 915 E. Indian Street	250	1910	102
Primary Sample 301 Kent Ct. - 6"	224	1965	47
Primary Sample 306 Kent Court	82	1993	19
Primary Sample 310 Kent Ct. - 6"	92.9	1994	18
Primary Sample 312 Kent Court	96.7	1994	18
6" Primary Sample 314 Kent Court	137	1991	21
Primary Sample 315 Kent Ct. - Wooded	324	1937	75
Primary Sample 315 Kent Ct. - Cleared	292	1937	75
Primary Sample 318 Kent Court	217	1945	67
Primary Sample 319 Kent Ct. - Wooded	419	2001	11
Primary Sample 319 Kent Ct. - Cleared	46.9	2001	11
Primary Sample 322 Kent Court	177	1936	76
Primary Sample 323 Kent Ct. - Cleared	162	1937	75
Primary Sample 323 Kent Ct. - Wooded	347	1937	75
Primary Sample 327 Kent Ct. - Wooded	250	1938	74
Primary Sample 327 Kent Ct. - Cleared	212	1938	74
Primary Sample 331 Kent Ct. - Wooded	181	1936	76
Primary Sample 331 Kent Ct. - Cleared	226	1936	76
Primary Sample 332 Kent Court	180	1938	74
Primary Sample 409 Kent Court	52.9	1926	86
Primary Sample 410 Kent Court	148	1936	76
Primary Sample 412 Kent Court	146	1940	72
Primary Sample 415 Kent Court	51.1	2005	7
Primary Sample 416 Kent Court	170	1934	78
Primary Sample 419 Kent Court	98	1936	76
Primary Sample 420 Kent Court	166	1940	72
Primary Sample 424 Kent Court	143	1946	66
Primary Sample 510 Mill Street	232	1900	112
Primary Sample 516 Mill Street - 6"	279	1890	122
Primary Sample 606 Mill Street	200	1910	102
Primary Sample 610 Mill Street	204	1930	82
Primary Sample 802 Mill St	151	1938	74
Primary Sample 806 Mill St	163	1928	84
Primary Sample 812 Mill St	279	1937	75
Primary Sample 820 Mill St	297	1917	95
Primary Sample 1002 Mill St	307	1917	95
Primary Sample 901 E. Pine St	180	1918	94

Table B-8. Data for Correlation between Dioxin TEQ Concentration and Building Age

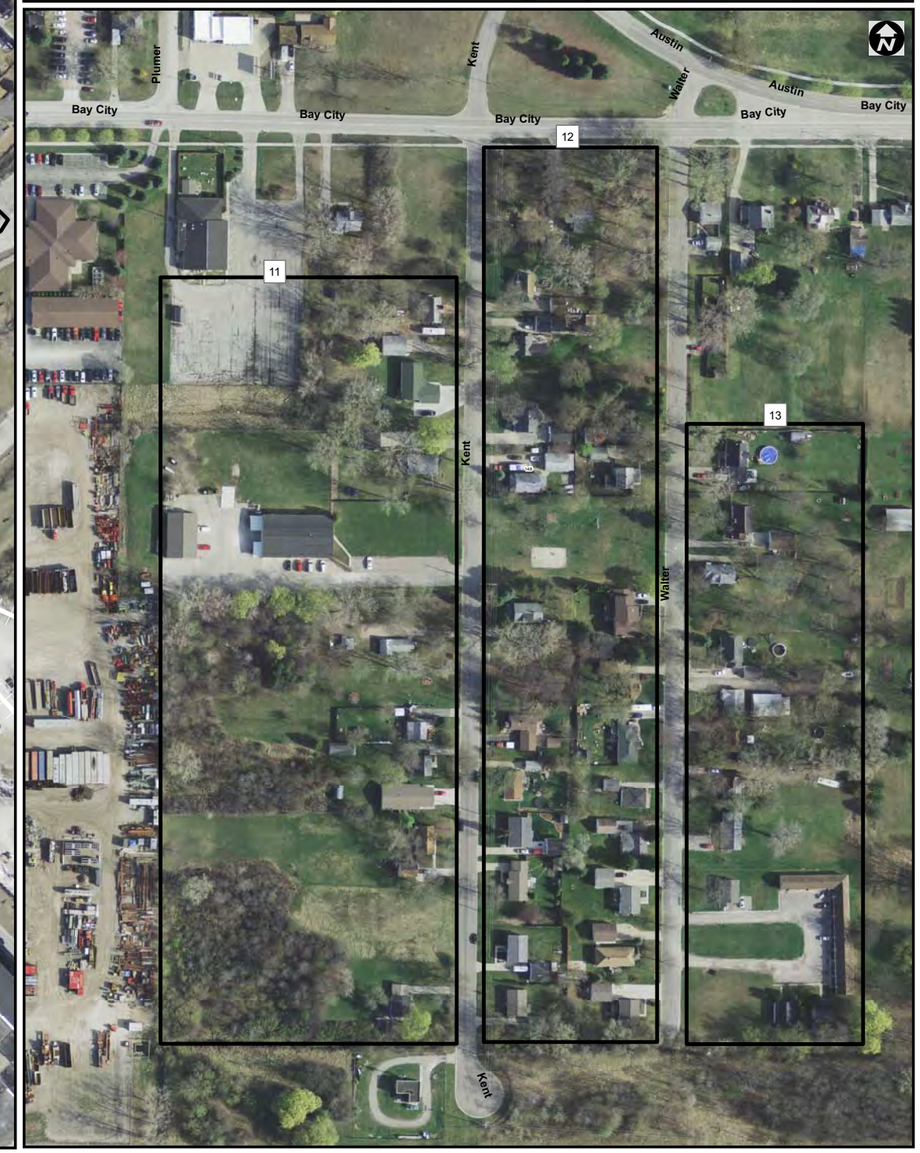
Sample Description	Dioxin TEQ Concentration (ppt TEQ)	Year Built	Age (Years)
Primary Sample 1009 East Pine St	202	1940	72
Primary Sample 409 State Street	93.5	1920	92
Primary Sample 502 State Street	181	1884	128
Primary Sample 301 Walter Court	122	1994	18
Primary Sample 307 Walter Court	80.5	1910	102
Primary Sample 309 Walter Court	99.6	1994	18
Primary Sample 311 Walter Court	277	1936	76
Primary Sample 316 Walter Court	139	1945	67
Primary Sample 319 Walter Court	270	1928	84
Primary Sample 320 Walter Court	171	1937	75
Primary Sample 324 Walter Court	132	1936	76
Primary Sample 325 Walter Court	268	1947	65
Primary Sample 328 Walter Court	84.9	1968	44
Primary Sample 329 Walter Ct	223	1947	65
Primary Sample 332 Walter Court	156	1945	67
Primary Sample 400 Walter Court	190	1938	74
Primary Sample 401 Walter Court	83.9	1978	34
Primary Sample 408 Walter Court	196	1941	71
Primary Sample 410 Walter Court	96.1	1937	75
Primary Sample 413 Walter Court	204	1940	72

Table B-9. Data for Correlation between Dioxin TEQ Concentration and Building Age

Sample Description	Dioxin TEQ Concentration (ppt TEQ)	Year Built	Age (Years)
Primary Sample 2208 Bay City Road	192	1936	76
Primary Sample 609 E. Butler	204	1917	95
Primary Sample 501 E Buttles Street	128	1919	93
Primary Sample 505 E Buttles Street	101	1860	152
Primary Sample 711 E. Buttles Street	131	1922	90
Primary Sample 902 East Carpenter St	202	1926	86
Primary Sample 912 East Carpenter St	189	1924	88
Primary Sample 1010 East Carpenter St	197	1919	93
Primary Sample 1016 E. Carpenter	216	1920	92
Primary Sample 609 Fournie Street	252	1933	79
Primary Sample 613 Fournie Street	186	1973	39
Primary Sample 711 Fournie St	259	1930	82
Primary 6" Sample 715 Fournie St	205	1989	23
Primary 6" Sample 717 Fournie St	179	1989	23
Primary Sample 719 Fournie St	152	1988	24
Primary Sample 811 Fournie St	277	1917	95
Primary Sample 813 Fournie St	267	1917	95
Primary Sample 819 Fournie St	369	1919	93
Primary Sample 1001 Fournie St	434	1920	92
Primary Sample 1007 Fournie St	285	1917	95
Primary Sample 416 George Street	49.1	1940	72
Primary Sample 512 George Street	218	1900	112
Primary Sample 516 George Street	228	1910	102
Primary Sample 612 E. Grove Street	172	1952	60
Primary Sample 704 E. Grove Street	205	1932	80
Primary Sample 808 E. Grove Street	223	1918	94
Primary Sample 812 E. Grove St. - 6"	171	1925	87
Primary Sample 913 E. Grove Street	303	1922	90
Primary Sample 914 E. Grove Street	275	1922	90
Primary Samples 915 E. Grove St	205	1920	92
Primary Sample 916 E. Grove St	303	1915	97
Primary Sample 1011 E. Grove Street	214	1917	95
Primary Sample 1015 E. Grove Street	110	1996	16
Primary Sample 602 Haley Street	230	1930	82
Primary Sample 606 Haley Street	287	1947	65
Primary Sample 612 Haley Street	311	1900	112
Primary Sample 613 Haley Street	242	1927	85
Primary Sample 615 Haley St	180	1922	90
Primary Sample 706 Haley St	287	1907	105
Primary Sample 712 East Haley St	124	1957	55
Primary Sample 716 Haley St	492	1910	102
Primary Sample 716 East Haley St	114	1948	64
Primary 6" Sample 720 Haley St	146	1991	21
Primary Sample 800 East Haley St	116	1956	56
Primary Sample 801 Haley St	174	1890	122
Primary Sample 805 Haley St	365	1935	77
Primary Sample 806 Haley St	252	1916	96
Primary Sample 811 Haley St	272	1926	86
Primary Sample 816 Haley St	194	1935	77
Primary Sample 819 Haley St	244	1917	95
Primary Sample1001 Haley St	292	1934	78
Primary Sample 1002 Haley St	267	1934	78
Primary Sample 1007 Haley St	237	1920	92
Primary Sample 1010 Haley St	219	1928	84
Primary Sample 804/808 East Haley St	156	1957	55
Primary Sample 612 E. Indian Street	111	1885	127
Primary Sample 615 East Indian Street	207	1925	87
Primary Sample 616 E. Indian Street	101	1915	97
Primary Sample 702 E. Indian Street	49.9	1910	102
Primary Sample 706 East Indian	135	1912	100
Primary Sample 712 East Indian Street	68.7	1900	112
Primary Sample 811 E. Indian Street	156	1913	99
Primary Sample 909 E. Indian Street	291	1890	122

Table B-9. Data for Correlation between Dioxin TEQ Concentration and Building Age

Sample Description	Dioxin TEQ Concentration (ppt TEQ)	Year Built	Age (Years)
Primary Sample 915 E. Indian Street	250	1910	102
Primary Sample 301 Kent Ct. - 6"	224	1965	47
Primary Sample 306 Kent Court	82	1993	19
Primary Sample 310 Kent Ct. - 6"	92.9	1994	18
Primary Sample 312 Kent Court	96.7	1994	18
6" Primary Sample 314 Kent Court	137	1991	21
Primary Sample 315 Kent Ct. - Wooded	324	1937	75
Primary Sample 315 Kent Ct. - Cleared	292	1937	75
Primary Sample 318 Kent Court	217	1945	67
Primary Sample 319 Kent Ct. - Wooded	419	2001	11
Primary Sample 319 Kent Ct. - Cleared	46.9	2001	11
Primary Sample 322 Kent Court	177	1936	76
Primary Sample 323 Kent Ct. - Cleared	162	1937	75
Primary Sample 323 Kent Ct. - Wooded	347	1937	75
Primary Sample 327 Kent Ct. - Wooded	250	1938	74
Primary Sample 327 Kent Ct. - Cleared	212	1938	74
Primary Sample 331 Kent Ct. - Wooded	181	1936	76
Primary Sample 331 Kent Ct. - Cleared	226	1936	76
Primary Sample 332 Kent Court	180	1938	74
Primary Sample 409 Kent Court	52.9	1926	86
Primary Sample 410 Kent Court	148	1936	76
Primary Sample 412 Kent Court	146	1940	72
Primary Sample 415 Kent Court	51.1	2005	7
Primary Sample 416 Kent Court	170	1934	78
Primary Sample 419 Kent Court	98	1936	76
Primary Sample 420 Kent Court	166	1940	72
Primary Sample 424 Kent Court	143	1946	66
Primary Sample 510 Mill Street	232	1900	112
Primary Sample 516 Mill Street - 6"	279	1890	122
Primary Sample 606 Mill Street	200	1910	102
Primary Sample 610 Mill Street	204	1930	82
Primary Sample 802 Mill St	151	1938	74
Primary Sample 806 Mill St	163	1928	84
Primary Sample 812 Mill St	279	1937	75
Primary Sample 820 Mill St	297	1917	95
Primary Sample 1002 Mill St	307	1917	95
Primary Sample 901 E. Pine St	180	1918	94
Primary Sample 1009 East Pine St	202	1940	72
Primary Sample 409 State Street	93.5	1920	92
Primary Sample 502 State Street	181	1884	128
Primary Sample 301 Walter Court	122	1994	18
Primary Sample 307 Walter Court	80.5	1910	102
Primary Sample 309 Walter Court	99.6	1994	18
Primary Sample 311 Walter Court	277	1936	76
Primary Sample 316 Walter Court	139	1945	67
Primary Sample 319 Walter Court	270	1928	84
Primary Sample 320 Walter Court	171	1937	75
Primary Sample 324 Walter Court	132	1936	76
Primary Sample 325 Walter Court	268	1947	65
Primary Sample 328 Walter Court	84.9	1968	44
Primary Sample 329 Walter Ct	223	1947	65
Primary Sample 332 Walter Court	156	1945	67
Primary Sample 400 Walter Court	190	1938	74
Primary Sample 401 Walter Court	83.9	1978	34
Primary Sample 408 Walter Court	196	1941	71
Primary Sample 410 Walter Court	96.1	1937	75
Primary Sample 413 Walter Court	204	1940	72



URS
Dow Business Unit

Block Identification for
Evaluation of Decision Units Size
The Dow Chemical Company
Michigan Operations
Figure B-1

Drawn: JLH	Checked: MDC	Approximate Scale: 1 inch = 120 feet
Date: 15 January 2013	Drawing File: Figures for Year 2 Work Plan/Figure 2-6.mxd	

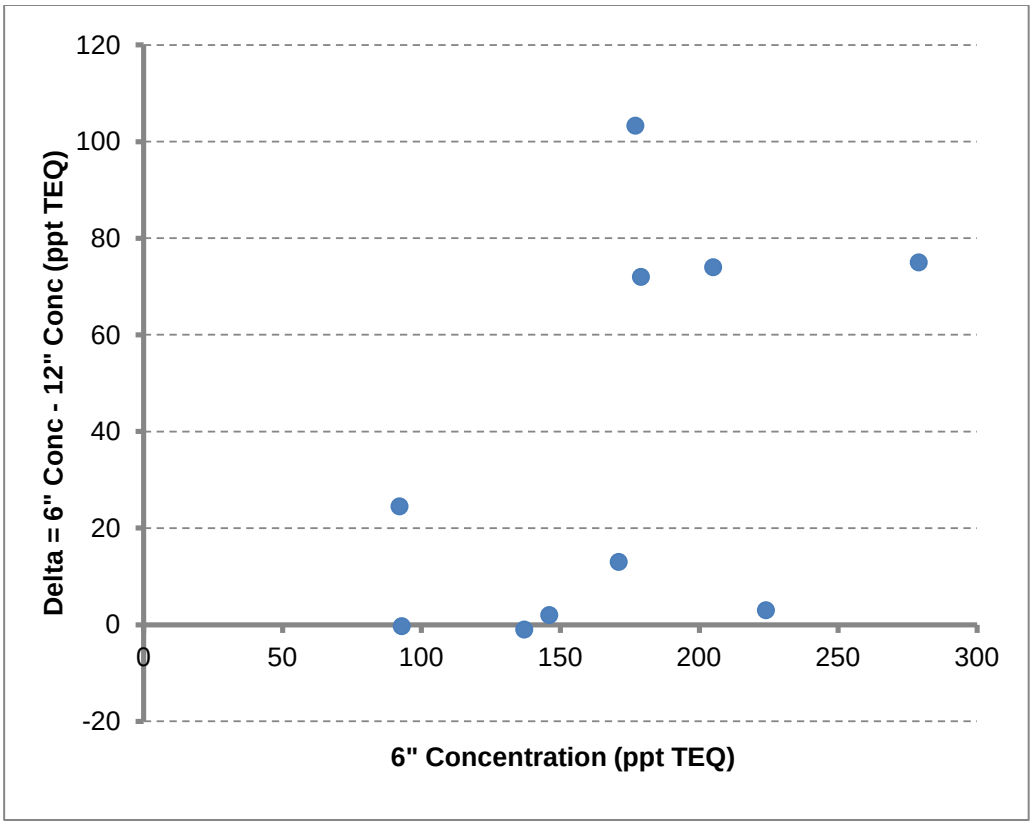


Figure B-2. Difference in 6" and 12" Dioxin TEQ Concentrations versus 6" Dioxin Concentration

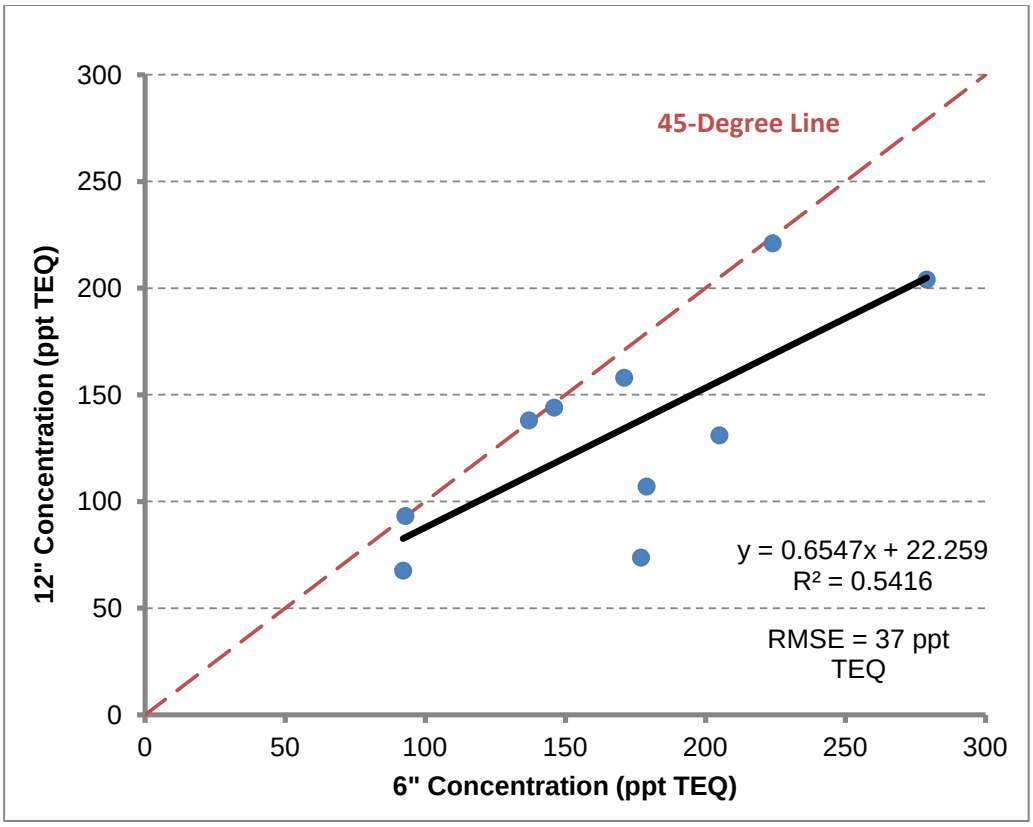


Figure B-3. 12" Dioxin TEQ Concentration versus 6" Dioxin TEQ Concentration

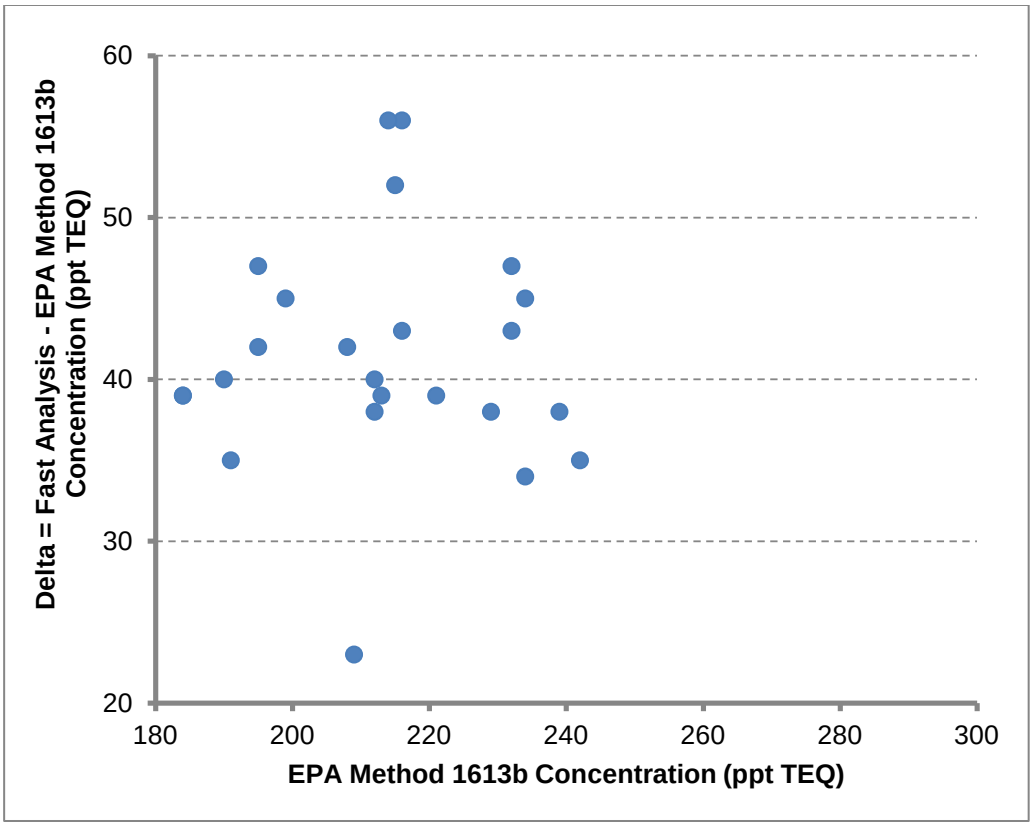


Figure B-4. Delta versus EPA Method 1613b Concentrations

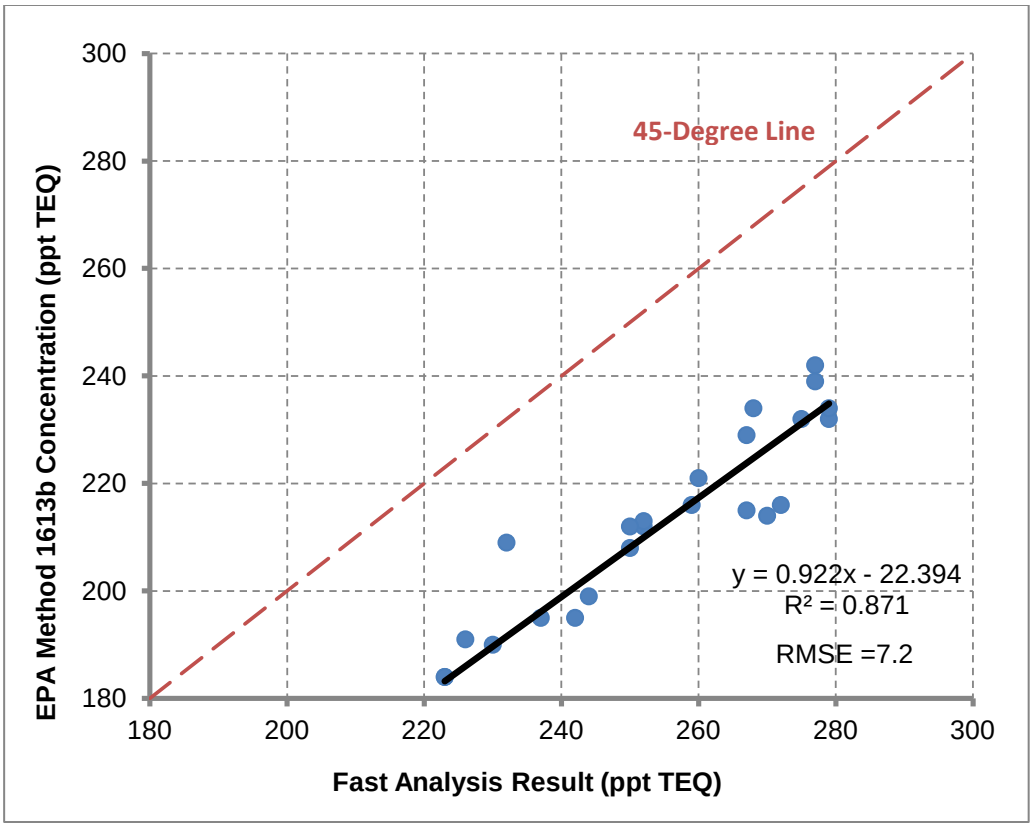


Figure B-5. EPA Method 1613b versus Fast Analysis Dioxin TEQ Concentrations

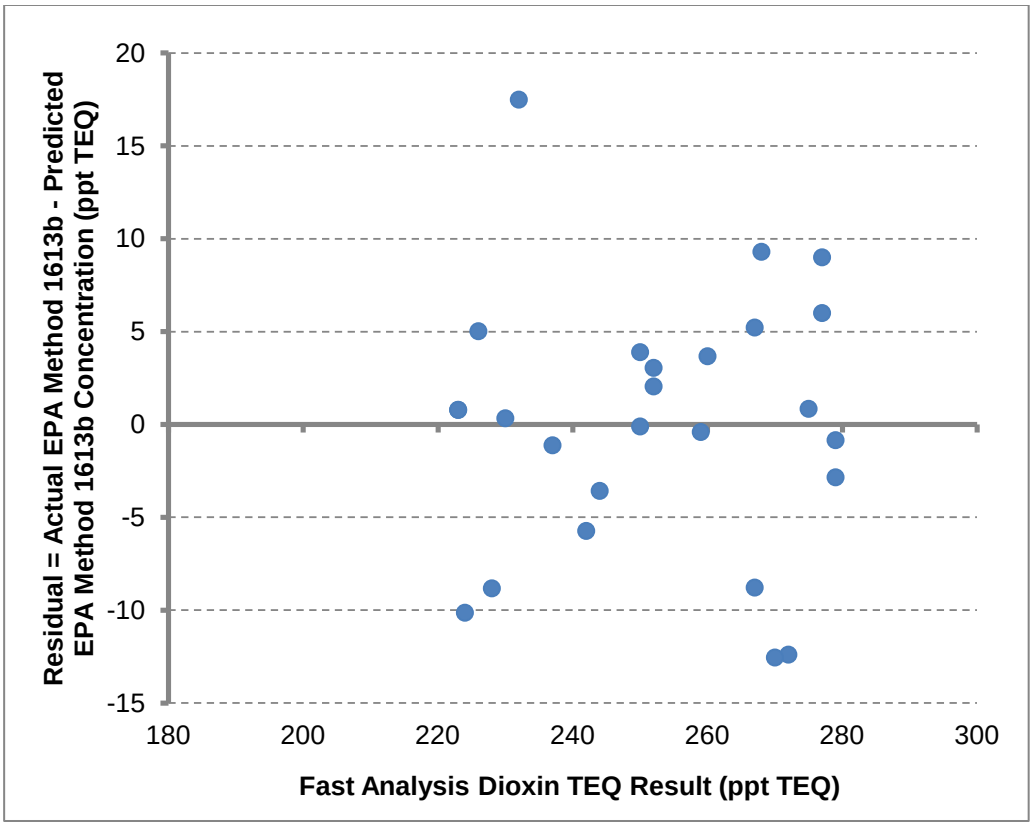
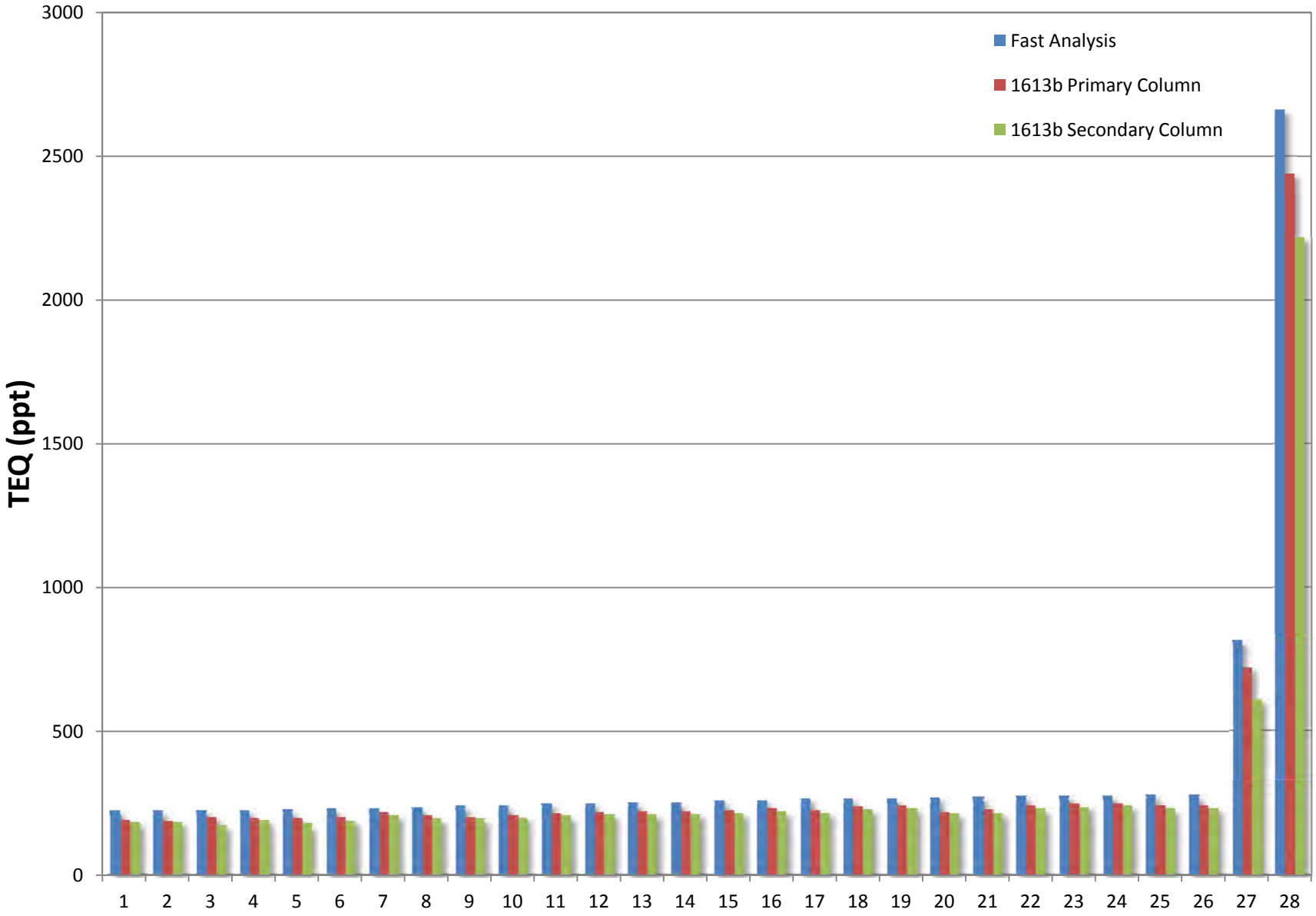


Figure B-6. Regression Residuals Plot

Figure B-7

1613b Primary and Second Column Results



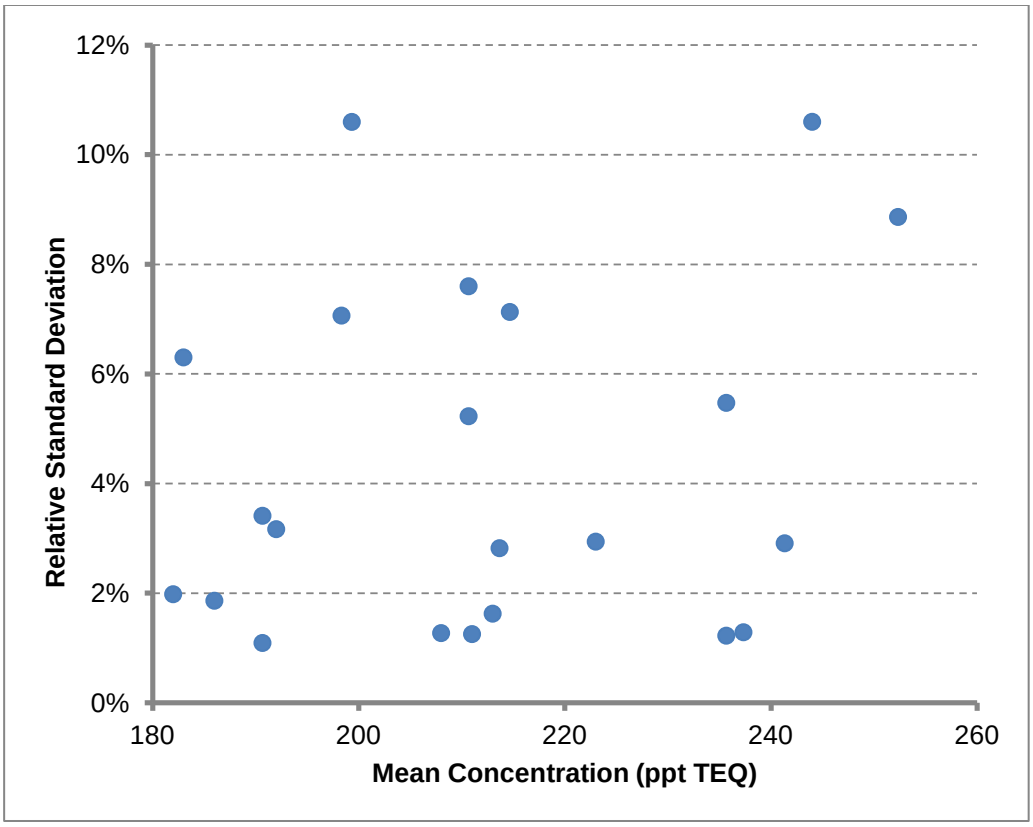


Figure B-8. Relative Standard Deviation versus Mean Dioxin TEQ Concentration in 1/4-Acre Lots

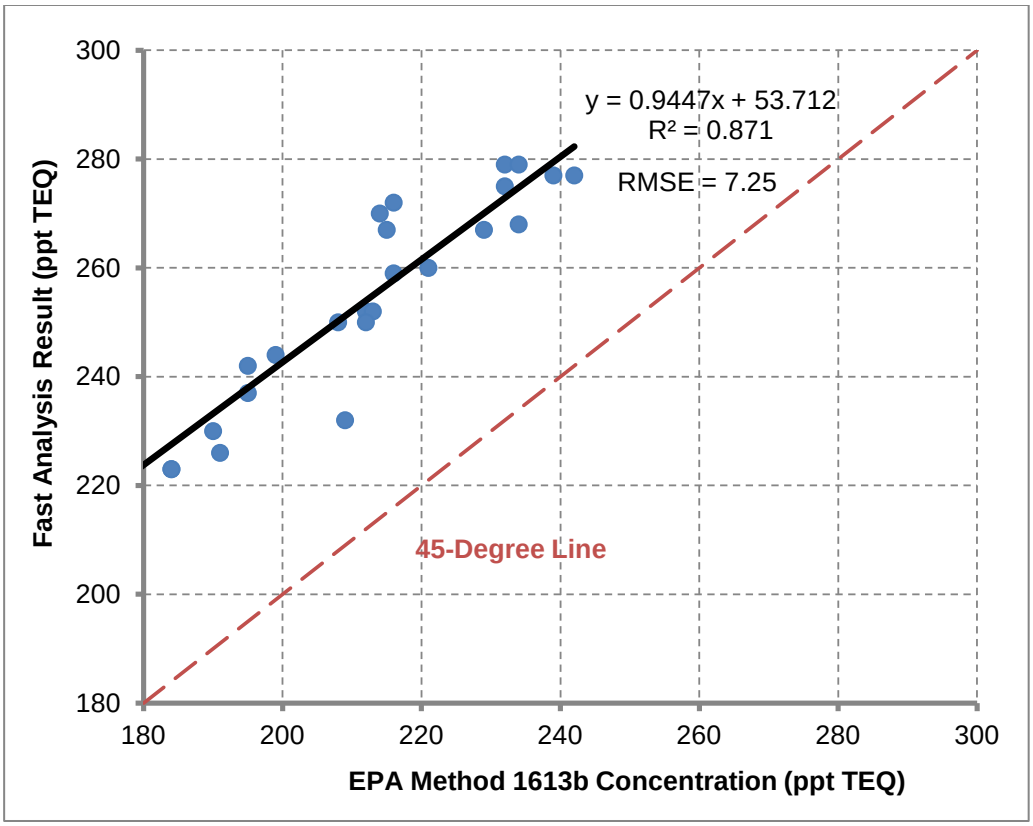


Figure B-9. Fast Analysis vs EPA Method 1613b Dioxin TEQ Concentrations

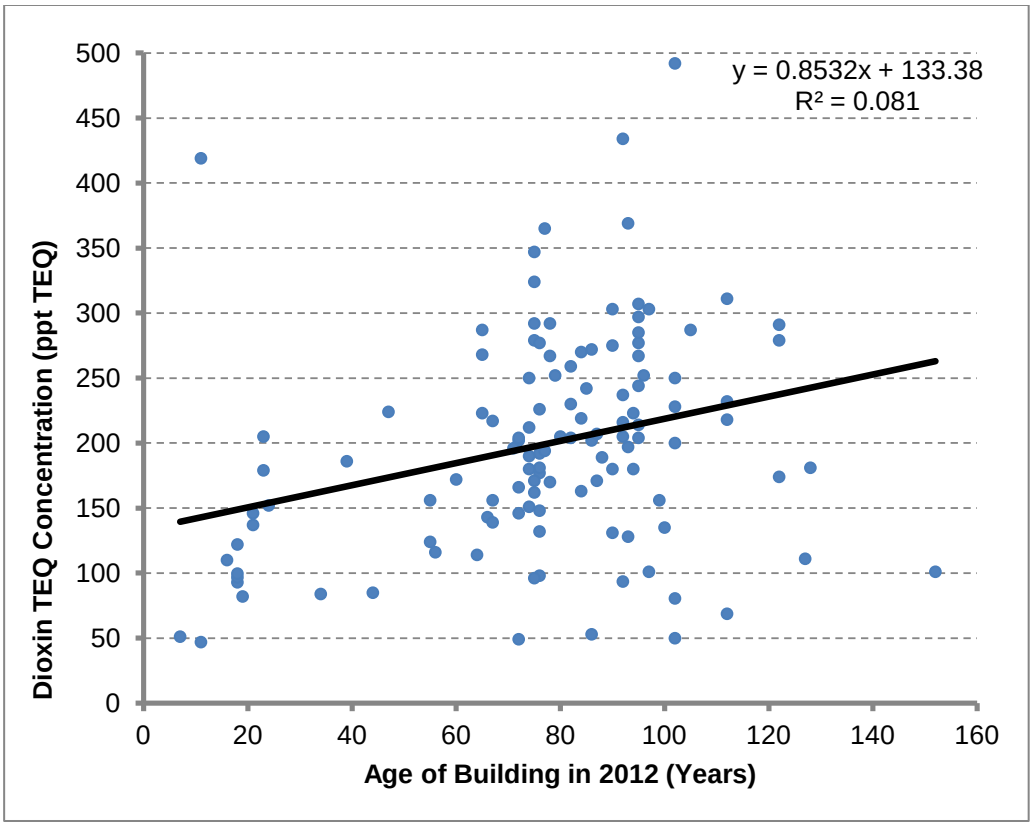
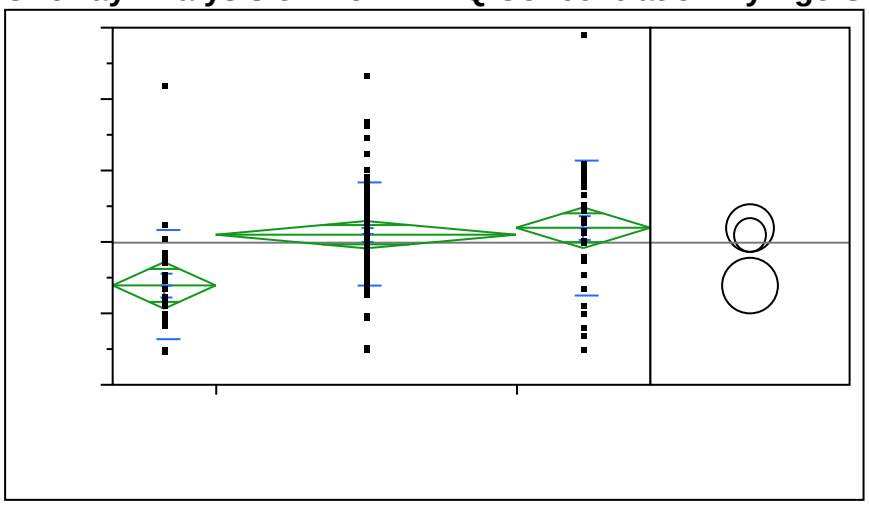


Figure B-10. Scatterplot of Dioxin TEQ Concentration vs Building Age

Oneway Analysis of Dioxin TEQ Concentration By Age Group



Oneway Anova
Summary of Fit

Rsquare	0.124523
Adj Rsquare	0.109558
Root Mean Square Error	78.97902
Mean of Response	198.9558
Observations (or Sum Wgts)	120

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Age Group	2	103804.17	51902.1	8.3207	0.0004*
Error	117	729809.13	6237.7		
C. Total	119	833613.30			

Means and Std Deviations

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
1	23	139.130	76.5109	15.954	106.04	172.22
2	67	210.128	72.3864	8.843	192.47	227.78
3	30	219.870	93.8077	17.127	184.84	254.90

Figure B-11. ANOVA Results for Dioxin TEQ Concentrations versus Building Age Group

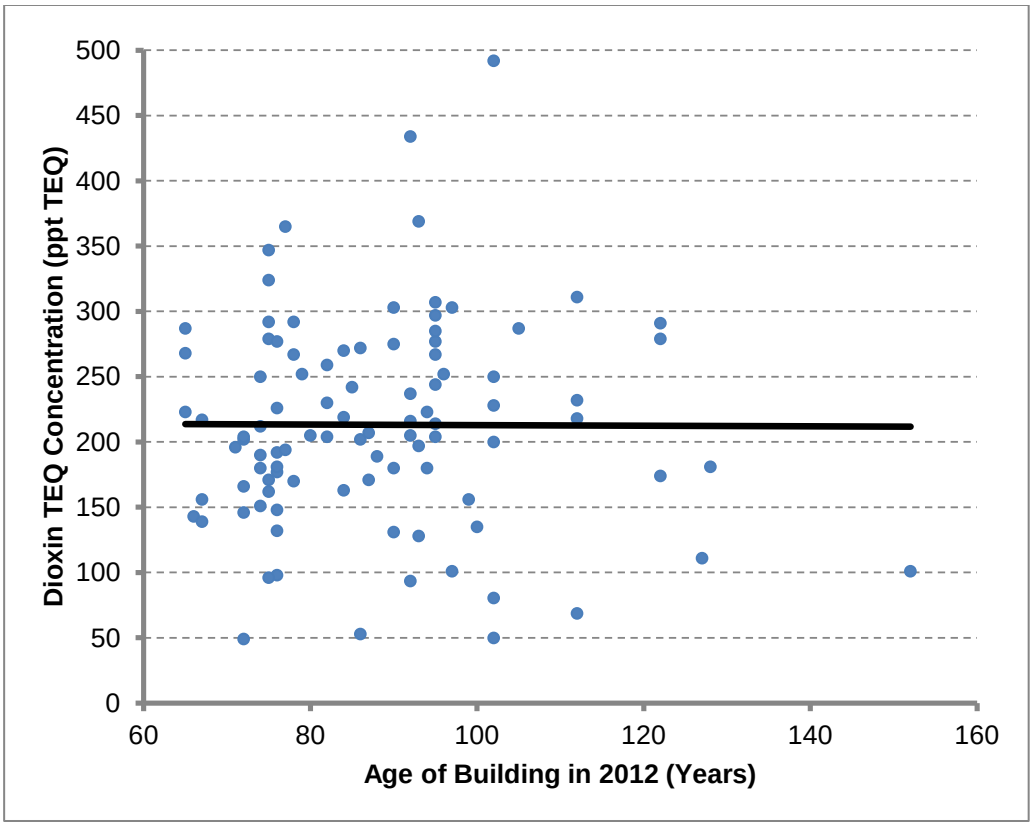


Figure B-12. Scatterplot of Dioxin TEQ Concentrations versus Age (Age ≥ 65 years)

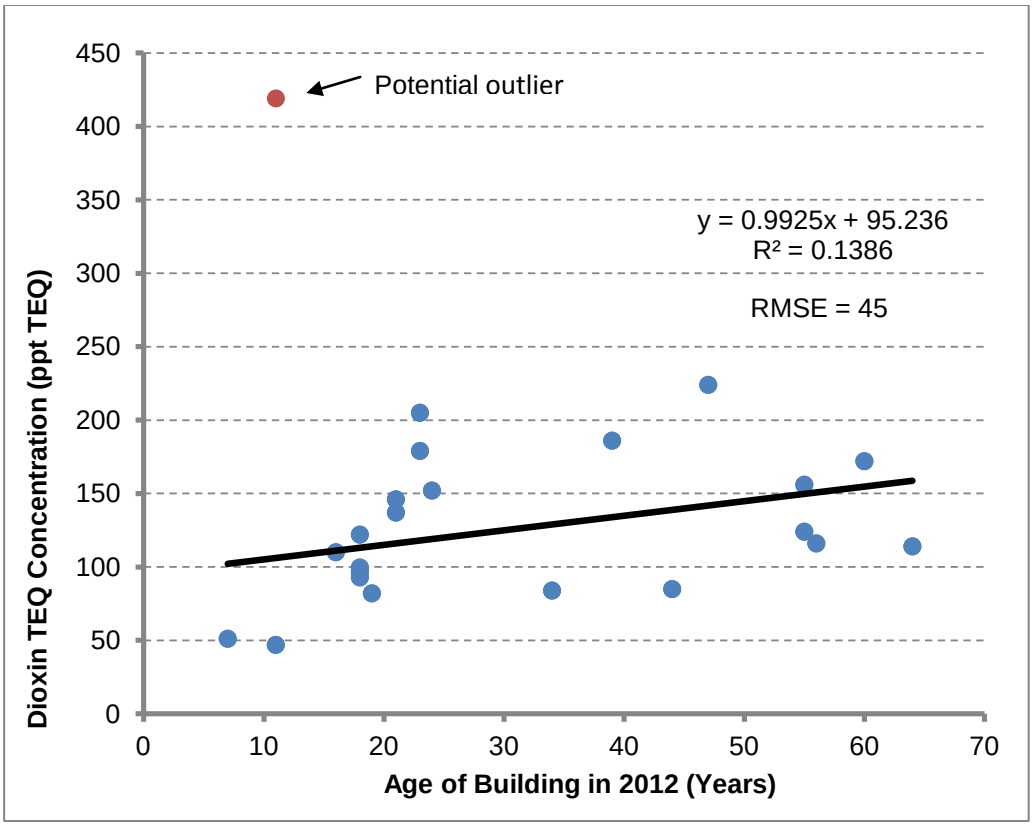


Figure B-13. Scatterplot of Dioxin TEQ Concentrations versus Age (Age < 65 years)

March 1, 2013

«OWNER»
«Owner_Address»
«Owner_City», «Owner_State» «Owner_Zip»

RE: LETTER REGARDING PROPERTY ACCESS
OPPORTUNITY FOR SOIL SAMPLING
«Address_1», «Parcel_1»

Dear «SALUTATION»,

In June 2012, The Dow Chemical Company (Dow)'s work plan to conduct soil sampling and cleanup for portions of the City of Midland was approved by the Michigan Department of Environmental Quality (MDEQ). This area is referenced as the Midland Resolution Area. Your property, listed above, is included within the area where sampling will be conducted in 2013. Sampling will consist of the collection of soil cores from your property. These cores will be 1-inch wide and approximately 6-inches deep and will be collected using hand held equipment. The soil will be submitted for laboratory analysis of dioxin.

Your property will be sampled in the spring of 2013. By late July, 2013 you will receive a letter providing the results of the sample for your property. In cases where analysis confirms dioxin concentrations exceed 250 parts per trillion (ppt), you will be contacted to schedule an appointment with a representative of Dow to discuss the cleanup for your property. Cleanup would be scheduled to begin in August 2013. If the sample results confirms that the concentration on your property is 250 ppt or below, no further action is necessary. You will also receive a letter from the MDEQ confirming that your property requires no further action.

Enclosed are a Sampling agreement form, a questionnaire and a sampling plan for your property. If you are ready to participate, you need to sign and return the sampling agreement form and questionnaire to the Midland Resolution Center in the enclosed postage paid envelope. Please understand that in order to have your property sampled, you must complete and return these forms. Once we receive your agreement, a Midland Resolution Center representative will be contacting you to schedule the sampling. If you have any questions or concerns regarding the sampling plan for your property, please contact the Midland Resolution Center at 989-631-2270. We would be glad to speak with you by phone, meet you in person at the Midland Resolution Center or at your home to explain the sampling, answer any questions

and address any specific concerns you may have regarding the program. You may also contact DEQ staff at 1-517-335-4799.

We encourage you to participate in this program; however your participation is completely voluntary. If you decide not to participate, please also indicate that decision on the enclosed form and return to Midland Resolution Center in the enclosed postage paid envelope. Dow is obligated to try several times through various means (phone, home visits, etc.) to contact you to explain your options and attempt to obtain access. It is important that we receive the Sampling Agreement Form with your choice indicated.

Thank you for your attention to this matter. We look forward to working with you.

Midland Resolution Team

Enclosures:

Midland Soils Cleanup Activities Agreement Form

1008 Jefferson Avenue
Midland, MI 48640

Contact Information

Property Owner: _____ Phone Number:_____

Property Address: _____

Alternate Contact: _____ Ph. Number_____

Description of Service Agreements:

(Activities that will be performed on property by Dow and it's contractors)

- Remove 12-inches of soil from property (soil removal will be cut 1 foot (12-inches) from permanent structures including side-walks, driveways and decks).
- Backfill with six-inches of clean screen borrow and six-inches of topsoil
- Removal and replacement of vegetation and landscaping like for like, see property drawing (exceptions noted)
- Grass replaced with sod
- Installations of irrigation system. Controls to be located: _____

_____

Other Service Agreements:

_____

_____

_____

_____

_____

_____

_____

_____

I (we) [ ] agree to [ ] decline to (please check one)

allow the Dow Chemical Company and it's contractors to implement the activities described above and perform follow up as necessary. I (we) understand the MDEQ may be present during these activities.

_____ _____
Signature of property owner *date*

_____ _____
Signature of additional property owner *date*

Dow Representative:_____ ***Date:***_____

Property Owner(s) warrants that they own the Property; and the Property Owner(s) has read and understands the Agreement.

Midland Soils Sampling Agreement Form
1008 Jefferson Avenue
Midland, MI 48640

Contact Information

Property Owner: «PROPERTY OWNER»

Property Address: «PROPERTY ADDRESS»

Phone Number: _____

Email Address: _____

Description of Service Agreements:

(Activities that will be performed on property by Dow and it's contractors)

- Collect approximately 10 soil cores for laboratory analyses.
- The soil cores will be 1-inch wide and 6-inches in depth, unless otherwise noted below.
- Laboratory results will be submitted in writing to the property owner.
- The sampling activities will require 1.5 hours and be a single occurrence.

_____
_____
_____
_____
_____

Special Conditions:

_____
_____
_____

Please Check One

[ ] I (we) agree **[ ] I (we) decline** to allow The Dow Chemical Company and it's contractor(s) to implement the activities described above and perform follow up as necessary. I (we) understand the MDEQ may be present during these activities.

_____ _____
Signature of property owner *date*

_____ _____
Signature of additional property owner *date*

I (we) warrant that I (we) own the property; and have read and understands the agreement.

Dow Representative:_____ ***Date:***_____

Property Owner Questionnaire

Property Address: «Parcel_Address»

	Questions	Yes/No	Comment
1	Do you have any pets or animals that we should be aware of?	☐Yes ☐No	
2	Do you have any buried objects that we should be aware of? (i.e. buried pets, buried wire for dog fence, sprinkler system)	☐Yes ☐No	
3	Have you completed significant amounts landscaping at your property? (i.e. bought or removed soil at the property, raised landscape beds, changed elevation of property)	☐Yes ☐No	Description of landscaping/date:
4	Have you had any utility work done or other soil disturbances (beyond landscaping) on this property?	☐Yes ☐No	Description/date:
5	Do you have any other comments, concerns, questions, or would like to speak with a representative of the Midland Resolution Center?	☐Yes ☐No	

Please provide your phone number and email address on the top of the attached Access Agreement so we may contact you regarding any of the above information and to schedule the sampling for your property.