

# CLOSURE PLAN REVIEW FORM

## DATA COLLECTION AND ANALYSIS PLAN REVIEW FORM

Last Updated: July 2005

Facility Name		Reviewer / District Office	
Facility ID Number		Date Review of Plan Completed	
Date of Plan		Date Reviewed by Closure Coordinator	
Plan is: New, Amended, Revised		Date Reviewed by DDAGW (if applicable)	

This Closure Plan Review Form is #		of		forms completed in the review of this closure plan.
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Relevant Guidance Document Closure Plan Review Guidance for RCRA Facilities - OEPA/DHWM <http://epa.ohio.gov/portals/32/pdf/2008CPRG.pdf>

	YES	NO	N/A	Page #	Notes - NOD Comment #
<b>I. General Information About the Sample Analysis Plan</b>					
A) Does the closure plan clearly state the facility's intention to fully define the nature and extent of contamination?					
B) Does the plan identify all media that are to be sampled? If yes, list the types of media in the Notes.					
C) Does the plan include a list of all parameters that are to be analyzed? If yes, list the parameters and state the basis for including each parameter in Table 1 below (e.g., included in the hazardous waste managed at the facility, underlying constituent for listed waste, degradation compound, etc.).					
D) Does the plan identify the correct analytical method for each parameter? If yes, list the analytical methods in Table 1 below. If no, include explanation in Notes.					

	YES	NO	N/A	Page #	Notes - NOD Comment #
E) Does the plan include an estimated quantitation limit (EQL) for each parameter? If yes, list the EQLs in Table 1 below:					
F) Are all the EQLs below the risk-based standard (RfD, PRG, etc.)?					

Table 1: Sampling Methods and Detection Limits				
Parameter	Method	Rationale	EQL (mg/l)	Is EQL < Risk (Y/N)?

	YES	NO	N/A	Page #	Notes - NOD Comment #
<b>II. Grid Spacing, Number of Samples, and Sampling Data</b>					
A) Did the facility determine the appropriate grid spacing for horizontal sampling? Provide the sampling interval in the Notes. Also include the method utilized to determine this in the Notes.					
B) Did the facility determine the correct number of samples to be taken? Include in the Notes the number of samples determined and the method used to determine this. Also note if more or less samples should be taken.					

	YES	NO	N/A	Page #	Notes - NOD Comment #
C) Did the plan include a map of the sampling locations? If yes, attach a copy to this form or reference the page.					
D) Did the plan identify the interval at which vertical samples will be taken? If yes, in the Notes include the interval and the rationale for the interval.					
E) If a lab has been selected, did the plan include a statement indicating that the lab doing the analysis has QA/QC procedures in place that will meet the requirements of a RCRA closure?					
F) Did the plan state what type of samples (grab or composite) will be collected? If yes, include information in the Notes.					
G) Did the plan state what type of lab method(s) will be employed to analyze the samples? If yes, include information in the Notes.					
H) Did the plan specify the correct order of collecting samples (VOCs, SVOCs, PCB/pesticides, metals)?					
I) Did the plan specify the appropriate sampling equipment (e.g., hollow stem auger, split spoon, etc.)? If yes, list the sampling devices in Table 2 below.					
J) Did the plan include a narrative that describes the sampling procedures, including the type of container and preservative to be used? If yes, list the container type and the preservative used in Table 2 below.					

Table 2: Sampling Devices, Containers, & Preservatives				
Parameter	Media	Sampling Devices	Container	Preservative

	YES	NO	N/A	Page #	Notes - NOD Comment #
<b>II. Grid Spacing, Number of Samples, and Sampling Data (Continued)</b>					
K) Did the plan list what information will be included on container labels? If yes, in the Notes list the information. Such information may include: sample number; sample description (i.e., color, volume, matrix, layering); date, time, and place of collection; collector's name; witness; preservative added; and the analysis required.					
L) Did the plan list what information will be included in boring logs? If yes, include information in the Notes.					
M) Did the plan list what information will be included in field logs? If yes, include information in the Notes.					
N) Are field QA/QC samples specified (e.g., field & trip blanks, field duplicates & MS/MSD)? If yes, include the type of sample and the frequency for each sample in the Notes.					
O) Did the plan call for field screening of samples? If yes, briefly describe the procedure in the Notes.					

	YES	NO	N/A	Page #	Notes - NOD Comment #
P) Are chain-of-custody procedures defined in the plan?					
Q) Does the plan describe the decontamination procedures? Include this information in the Notes. Such description may include control of sample cross-contamination, equipment and cleaning pad decontamination, rinseate management, decontamination protocol, and control of rinseate release.					
<b>III. Site-Specific Background Sampling</b>					
A) Does the plan state how many site-specific background samples are proposed to be collected? Include the number in the Notes.					
B) Does the plan give the rational for the amount of background samples to be collected? If yes, include this information in the Notes.					
B) Did the plan include at least 12 different sampling locations? If yes, attach a copy to this form or reference the page.					
C) Are the sample locations in an area of native soil with the same soil horizon as the site soil?					
D) Are the sample locations away from roadsides, parking lots, spill areas, etc. that may affect the background concentrations?					
E) Did the plan indicate that a data outlier evaluation will be performed on the background sampling data? If yes, include information in the Notes.					
F) Did the plan indicate that a data normality evaluation will be performed on the background sampling data? If yes, include information in the Notes.					

	YES	NO	N/A	Page #	Notes - NOD Comment #
G) Did the plan state what method is to be used for determination of background remediation standard for each metal in each soil strata (i.e., mean plus two standard deviations)? If yes, include information in the Notes.					
<b>IV. <u>Alternative Remediation Standards</u></b>					
A) Did the plan propose to use the generic remediation standards (GRS) for metals as shown in the 2005 CPRG, Section 4.1, Table 4-1?					
B) Did the plan propose to use the generic cleanup numbers (GCNs) for select metals and VOCs as shown in the 2005 CPRG, Appendix M, Table 1?					
C) Did the plan propose not to use either the GRS or GCNs? If yes, VOCs must be remediated to non-detect levels and metals must be remediated to site-specific background conditions. For metals, Section V must be completed when background sampling results are received.  If the site will be remediated to risk-based concentrations, the risk assessment plan review form must be completed.					
<b>V. <u>Statistical Analysis of Background Soil Samples</u></b>					
A) Have a minimum of 12 site-specific background samples been obtained for each metal constituent in each soil stratum? If no, how many additional samples are needed?					
B) Were any of the background samples deemed unusable due to a preliminary screening of the background data set? If yes, include how many in the Notes.					

	YES	NO	N/A	Page #	Notes - NOD Comment #
C) Was the reason for the dismissal given (e.g., samples near roadway or contaminated area, lab error, samples from the wrong soil horizon, etc.)? Include information in the Notes.					
D) Was the laboratory EQL clearly stated and consistent for each constituent?					
E) Does the plan include the number and percent of non-detect samples and the EQL for each constituent in each soil stratum? Include this information in Table 3 below.					

Table 3: Incorporation of Non-Detect Background Samples into Data Set						
Total # of Samples	Type of Metal	Soil Stratum	EQL (ppm)	# of Non-Detect Samples	% of Non-Detect Samples	How were the non-detect samples incorporated into the data set?

	YES	NO	N/A	Page #	Notes - NOD Comment #
<b>V. Statistical Analysis of Background Soil Samples (Continued)</b>					
F) Did the plan include a test for determining normality? Complete Table 4 below, and if the following information is given please include it in the Notes.					

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	YES	NO	N/A	Page #	Notes - NOD Comment #
1) The method used (e.g., Shapiro-Wilk, Kolmogorov-Smirnov).					
2) The type of graphs that were included (e.g., Normal Probability Plot, Box and Whiskers Plot).					
3) Was the data set found to be normally distributed?					
G) Did the plan include a test for determining outlier values in the data set? If the following information is given please include it in the Notes.					
1) The number of outlier values that were found.					
2) What was done with those outliers? If those were removed, explain why. If not, explain why not.					
H) Was the data set found to be normally distributed? If no, include the following information in the Notes.					
1) Was the data set transformed?					
2) Was the transformed data set found to be normally distributed?					
3) Which transformation method was used (e.g., $\ln(x)$ , $\log_{10}(x)$ , square root)?					

Table 4: Box Plot Analysis of Background Sampling Data								
Type of Metal	Soil Stratum	Normally Distributed (Y/N)?	Lower Quartile (Q <sub>1</sub> )	Upper Quartile (Q <sub>3</sub> )	IQR Q <sub>3</sub> -Q <sub>1</sub>	Lower Cut-Off Q <sub>1</sub> -1.5 × IQR	Upper Cut-Off Q <sub>3</sub> +1.5 × IQR	# of Outlier Values

	YES	NO	N/A	Page #	Notes - NOD Comment #
<b>V. Statistical Analysis of Background Soil Samples (Continued)</b>					
I) Did the plan include a test for normality after outlier values were removed? If the following information is given please include it in the Notes.					
1) The method used (e.g., Shapiro-Wilk, Kolmogorov-Smirnov).					
2) The type of graphs included (e.g., Normal Probability Plot, Box and Whiskers Plot).					
3) Was the data set found to be normally distributed?					
J) If the data set, with the removed outlier values, was not found to be normally distributed, was the data set transformed? If the following information is given please include it in the Notes.					
1) Was the transformed data set found to be normally distributed?					

	YES	NO	N/A	Page #	Notes - NOD Comment #
2) Which transformation method was used (e.g., $\ln(x)$ , $\log_{10}(x)$ , square root)?					
K) Was the sum of the mean and two standard deviations of the background data set used to calculate a background remediation standard (BRS) for each metal in each soil stratum?					
1) Was the mean calculated correctly for each metal in each soil stratum? If no, in the Notes explain what was incorrect.					
2) Was the standard deviation calculated correctly for each metal in each soil stratum? If no, in the Notes explain what was incorrect.					

**Table 5: BRS Calculation Using Background Sampling Data**

Type of Metal	Soil Stratum	Method to Transform Data Set	Normally Distributed (Y/N)?	Mean (ppm) ( $U_b$ )	Standard Deviation ( $S_b$ )	BRS (ppm) $U_b + 2S_b$

	YES	NO	N/A	Page #	Notes - NOD Comment #
<b>VI. <u>Statistical Analysis of Confirmation Soil Samples</u></b>					
A) Have confirmation soil samples been obtained for each constituent in each soil stratum? If yes, complete Table 6 below.					

	YES	NO	N/A	Page #	Notes - NOD Comment #
B) Was the laboratory EQL clearly stated and consistent for each constituent?					

Table 6: Incorporation of Non-Detect Confirmatory Samples into Data Set						
Total # of Samples	Type of Metal	Soil Stratum	EQL (ppm)	# of Non-Detect Samples	% of Non-Detect Samples	How were the non-detect samples incorporated into the data set?

	YES	NO	N/A	Page #	Notes - NOD Comment #
<b>VI. Statistical Analysis of Confirmation Soil Samples (Continued)</b>					
D) Did the plan include a test for determining normality? Complete Table 7 below, and if the following information is given please include it in the Notes.					
1) The method that was used (e.g., Shapiro-Wilk, Kolmogorov-Smirnov).					
2) The type of graphs included (e.g., Normal Probability Plot, Box and Whiskers Plot).					
E) Did the plan include a test for determining outlier values in the data set? If yes, in the Notes indicate the number of outlier values that were found.					

	YES	NO	N/A	Page #	Notes - NOD Comment #
F) Did the plan state what was done with the outliers? If those were removed, explain why. If not, explain why not.					
G) If the data set was not found to be normally distributed, was the data set transformed? If the following information is given please include it in the Notes.					
1) Was the transformed data set found to be normally distributed?					
2) The transformation method used (e.g., $\ln(x)$ , $\log_{10}(x)$ , square root).					

Table 7: Box Plot Analysis of Confirmatory Sampling Data								
Type of Metal	Soil Stratum	Normally Distributed (Y/N)?	Lower Quartile (Q <sub>1</sub> )	Upper Quartile (Q <sub>3</sub> )	IQR Q <sub>3</sub> -Q <sub>1</sub>	Lower Cut-Off Q <sub>1</sub> -1.5 × IQR	Upper Cut-Off Q <sub>3</sub> +1.5 × IQR	# of Outlier Values

	YES	NO	N/A	Page #	Notes - NOD Comment #
<b>VI. Statistical Analysis of Confirmation Soil Samples (Continued)</b>					
H) Did the plan include a test for normality after outlier values were removed?					

	YES	NO	N/A	Page #	Notes - NOD Comment #
1) If yes, which method was used (e.g., Shapiro-Wilk, Kolmogorov-Smirnov)?					
2) The type of graphs that were included (e.g., Normal Probability Plot, Box and Whiskers Plot).					
3) Was the data set found to be normally distributed?					
l) If the data set, with the removed outlier values, was not found to be normally distributed, was the data set transformed? If the following information is given, please provide in the Notes.					
1) Was the transformed data set found to be normally distributed?					
2) The transformation method used (e.g., $\ln(x)$ , $\log_{10}(x)$ , square root).					
<b>VII. Comparison of Background &amp; Confirmation Soil Sampling Data</b>					
A) If both data sets are found to be normally distributed, the soil stratum can be declared remediated for a constituent when the 95 percent UCL for the mean of the confirmation data is significantly less than the BRS. Was a t-test performed to prove this?  If the background and confirmation data sets are normally distributed, Table 8 below should be completed to verify that the site was remediated for those metal constituents.					
B) Was the t-test performed properly (as shown in the 2005 CPRG, Appendix C)? List the t-test results in Table 8 below.					
C) If a t-test was not performed, was a test for non-parametric data analysis performed on the data set?					

