

CLOSURE PLAN REVIEW FORM

RISK ASSESSMENT

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			

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 #
I. Constituents of Concern					
A) Were all hazardous waste constituents associated with the unit identified (Appendix to Rule 3745-51-11)? These should be included in the table below, if more should be identified, please explain in the Notes.					
B) Has the nature and extent of the contamination from the unit been defined?					
C) Have all relevant forms, such as the data validation form, been filled prior to the completion of this form?					

I. <u>Constituents of Concern</u>			
Detected Hazardous Waste Constituents (Appendix to Rule 3745-51-11)	Constituents of Concern Included in Risk Assessment	Reason for Inclusion/Exclusion	Location in Closure Plan
Soil			
Groundwater			

II. Exposure Point Concentration					
Constituent of Concern	Exposure Point Concentration (mg/kg or mg/L)	Detection Frequency	Distribution	Basis for EPC (95% UCL or maximum)	Location in Closure Plan
Soil					
Groundwater					

	YES	NO	N/A	Page #	Notes - NOD Comment #
II. Exposure Point Concentration					
A) Were all data tested for normality? Please include methods used in the Notes.					

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	YES	NO	N/A	Page #	Notes - NOD Comment #
B) Were any data transformations used? Please describe in the Notes.					
C) Was a data validation and QA/QC analysis performed by the reviewer? If no, please explain in the Notes.					
D) Were any special tests or analyses performed (eg. organic carbon content, hydraulic conductivity, etc.)? If yes, please describe in the Notes.					
E) Does the plan state what the facility is using as the horizontal and vertical point of compliance for soil? ^{1,2} If yes, please include in the Notes.					
F) Does the plan state what the facility is using as the horizontal and vertical point of compliance for groundwater? ^{1,3} If yes, please include in the Notes.					
G) Does the plan state how the exposure point concentration for groundwater was determined (TCLP, modeling, etc.)? If yes, please include in the Notes.					
H) If modeling was used to determine the EPC for groundwater, please list the name and reference for the model.					
III. Pathway/Media Evaluation					
A) Were land use scenarios evaluated for residential use?					

1 Units undergoing closure under interim standards (3745-65-90 to 94) do not need to have compliance points.

2 The point of compliance for soil is at the unit boundary as defined by the extent of contamination both vertically and horizontally.

3 The point of compliance for groundwater is a vertical surface located at the hydraulically down gradient limit of the waste management area that extends down into the uppermost aquifer underlying the regulated unit.

	YES	NO	N/A	Page #	Notes - NOD Comment #
B) Were land use scenerios evaluated for industrial use?					
C) Were land use scenerios evaluated for other uses? Please explain in the Notes.					

III. Pathway/Media Evaluation					
Constituents of Concern	Ingestion	Inhalation	Dermal Contact	Other Pathways Evaluated	Location in Closure Plan
Soil					
Groundwater					

	YES	NO	N/A	Page #	Notes - NOD Comment #
III. Pathway/Media Evaluation (continued)					
A) Was the impact to groundwater from contaminated soil evaluated?					
B) Was the Ground Water Scoring Matrix (CPRG, Appendix E) completed? If so, include in the Notes if the impact to groundwater from the contaminated soil pathway requires evaluation.					
C) Was the impact to groundwater from the contaminated soil pathway evaluated? If a model was used, provide the name and reference for the model in the Notes and attach a copy of the reference.					
D) If a pathway (ie. inhalation, ingestion, or dermal contact) or medium (ie. soil, groundwater, or air) was eliminated for any constituent, please include reasons in the Notes.					
IV. Exposure Assumptions					
A) Does the risk assessment assume residential land use?					
B) Does the risk assessment assume industrial land use?					
C) Does the risk assessment assume other use? Please describe in the notes.					

Exposure Assumptions

P = Plan; D = Default; GW = Groundwater; c = Cancer; nc = Noncancer; r = Residential; I= Industrial
 See Table 2 Appendix M for Dermal Absorption Factors (ABS) and Permeability Constants (PC)

Pathways Receptors	IR		FI		CF		EF		ED		BW		AT	
	Ingestion Rate (mg/d)		Fraction Ingested (unitless)		Conversion Factor (kg/mg)		Exposure Frequency (d/yr)		Exposure Duration (yrs)		Body Weight (kg)		Averaging Time (days)	
Soil Ingestion	<i>Plan</i>	<i>Def.</i>	<i>Plan</i>	<i>Def.</i>	<i>Plan</i>	<i>Def.</i>	<i>Plan</i>	<i>Def.</i>	<i>Plan</i>	<i>Def.</i>	<i>Plan</i>	<i>Def.</i>	<i>Plan</i>	<i>Def.</i>
Child(r)		200		1		1E-06		350		6		15		2190(nc) 25550(c)
Adult(r)		100		1		1E-06		350		30		70		10950(nc) 25550(c)
Adult(i)		50		1		1E-06		250		25		70		9125(nc) 25550(c)

Pathways Receptors	IR		EF		ED		BW		AT	
	Inhalation Rate (m³/d)		Exposure Frequency (d/yr)		Exposure Duration (yrs)		Body Weight (kg)		Averaging Time (days)	
Soil Inhalation	<i>Plan</i>	<i>Default</i>	<i>Plan</i>	<i>Default</i>	<i>Plan</i>	<i>Default</i>	<i>Plan</i>	<i>Default</i>	<i>Plan</i>	<i>Default</i>
Child(r)		10		350		6		15		2190(nc) 25550(c)
Adult(r)		20		350		30		70		10950(nc) 25550(c)
Adult(i)		7		250		25		70		9125(nc) 25550(c)

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Pathways Receptors	SA		AF		CF		EF		ED		BW		AT	
	Skin Surface Area (cm ²)		Adherence Factor (mg/cm ²)		Conversion Factor (kg/mg)		Exposure Frequency (d/y)		Exposure Duration (yrs)		Body Weight (kg)		Averaging Time (days)	
Dermal Contact with Soil	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>
<i>Child(r)</i>		2800		0.2		1E-06		350		6		15		2190(nc) 25550(c)
<i>Adult(r)</i>		5700		0.07		1E-06		350		30		70		10950(nc) 25550(c)
<i>Adult(i)</i>		3300		0.02		1E-06		250		25		70		9125(nc) 25550(c)
ABS Dermal Absorption Factor (unitless) - Dermal Contact with Soil														
Constituents of Concern					P					D (See CPRG)				

Pathways Receptors	IR		EF		ED		BW		AT	
	Ingestion Rate (L/d)		Exposure Frequency (d/yr)		Exposure Duration (yrs)		Body Weight (kg)		Averaging Time (days)	
Groundwater Ingestion	<i>Plan</i>	<i>Default</i>	<i>Plan</i>	<i>Default</i>	<i>Plan</i>	<i>Default</i>	<i>Plan</i>	<i>Default</i>	<i>Plan</i>	<i>Default</i>
<i>Child(r)</i>		1		350		6		15		2190(nc) 25550(c)
<i>Adult(r)</i>		2		350		30		70		10950(nc) 25550(c)

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Pathways Receptors	SA		CF		ET		EF		ED		BW		AT	
	Skin Surface Area (cm ²)		Conversion Factor (L/cm ³)		Exposure Time (hrs/day)		Exposure Frequency (d/y)		Exposure Duration (yrs)		Body Weight (kg)		Averaging Time (days)	
Dermal Contact with GW	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>
<i>Child(r)</i>		6600		0.001		1.0		350		6		15		2190(nc) 25550(c)
<i>Adult(r)</i>		18000		0.001		0.58		350		30		70		10950(nc) 25550(c)
PC Permeability Constant (cm/hr) - Dermal Contact with GW														
Constituents of Concern					P					D (see CPRG)				

Pathways Receptors	IR		ET		EF		ED		BW		AT	
	Inhalation Rate (m ³ /hr)		Exposure Time (hrs/day)		Exposure Frequency (d/y)		Exposure Duration (yrs)		Body Weight (kg)		Averaging Time (days)	
Inhalation of GW	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>	<i>P</i>	<i>D</i>
<i>Child(r)</i>		0.42		1.0		350		6		15		2190(nc) 25550(c)
<i>Adult(r)</i>		0.83		0.58		350		30		70		10950(nc) 25550(c)

	YES	NO	N/A	Page #	Notes - NOD Comment #
IV. Exposure Assumptions (continued)					
D) Were any additional receptors (other than the child or adult) evaluated for the residential or industrial land uses? If so, describe the receptor and exposure assumptions.					

V. Toxicity Assessment

P = Value used in plan; E = Value used by Ohio EPA

Constituents of Concern	RfD _o Oral Reference Dose (mg/kg-d)		RfC Inhalation Reference Concentration (mg/m ³)		SF _o Oral Slope Factor (mg/kg-d)		UR Inhalation Unit Risk (μg/m ³) ⁻¹		Relative Absorption Factor (%)		RfD _d Dermal Reference Dose (mg/kg-d)		SF _d Dermal Slope Factor (mg/kg-d) ⁻¹	
	P	E	P	E	P	E	P	E	P	E	P	E	P	E

	YES	NO	N/A	Page #	Notes - NOD Comment #
V. Toxicity Assessment (continued)					
A) Was the Inhalation Reference Concentration (mg/m ³) converted to an Inhalation Reference Dose (mg/kg-d), and was the appropriate conversion used? See 2008 CPRG, Section 7.3 for conversion.					

	YES	NO	N/A	Page #	Notes - NOD Comment #
VI. Air Pathway Evaluation (continued)					
A) Was the appropriate Q/C term used (68.81 g/m ² -s per kg/m ³ for source areas less than 0.5 acres)?					
B) Was the appropriate Exposure Interval (T) (ie. 9.5x10 ⁸) used?					
C) Were any of the physical/chemical input values inappropriate? Were the references used to obtain these values appropriate? (List the references that the facility used.)					
D) Was the equation presented in CPRG, Appendix A used to estimate air concentrations?					
E) Was a model other than the one found in CPRG, Appendix L used? If yes, in the Notes list the model name and input parameters or attach a copy of the model from the risk assessment. (A copy of the reference for the model should also be attached).					
F) Did the facility evaluate all constituents of concern that require evaluation for this pathway (ie. all constituents that have a Henry's Law Constant of 1x10 ⁵ g-m ³ /mol or greater or a molecular weight of 200 g/mol or less)? If no, in the Notes list the additional constituents that should have been evaluated.					

Particulate Emission Factor						
Constituents of Concern	C_A Concentration in Air (mg.m ³)	PEF Particulate Emission Factor (m ³ /kg)	V Fraction of Vegetative Cover (unitless)	U_m Mean Annual Windspeed (m/s)	U_t Equivalent Threshold Value of Windspeed at 7m (m/s)	F_x Function dependent on U_m/U_t (unitless)

	YES	NO	N/A	Page #	Notes - NOD Comment #
VI. Air Pathway Evaluation (continued)					
G) Was the appropriate Q/C term used (90.80 g/m ² -s per kg/m ³ for source areas less than 0.5 acres)?					
H) Were any of the model input values inappropriate? Were the references used to obtain these values appropriate? (List the references that the facility used.)					
I) Was the equation presented in CPRG, Appendix A used to estimate air concentrations?					
J) Was a model other than the one found in CPRG, Appendix A used? If yes, in the Notes list the model name and input parameters or attach a copy of the model from the risk assessment. (A copy of the reference for the model should also be attached.)					

	YES	NO	N/A	Page #	Notes - NOD Comment #
K) Did the facility evaluate all constituents of concern that require evaluation for this pathway (i.e. all constituents that have a Henry's Law Constant of 1×10^5 g-m ³ /mol or greater or a molecular weight of 200 g/mol or less)? If no, in the Notes list the additional constituents that should have been evaluated.					

Volatilization Factor for Water						
Constituents of Concern	C _A Concentration in Air (mg/m ³)	C _w Concentration in Water (mg/L)	f Fraction Volatilization (unitless)	F _w Water Flow Rate (L/hr)	t Time (hr)	V _a Bathroom Size (L)

	YES	NO	N/A	Page #	Notes - NOD Comment #
VI. Air Pathway Evaluation (continued)					
L) Was the showering equation (based on Andelman, 1990) presented in CPRG, Appendix A used to estimate air concentrations? If no, in the Notes list the name of the model and the input parameters used or attach a copy of the model reference from the risk assessment.					
M) Was the appropriate Exposure Interval (T) (ie. 9.5×10^8) used?					

	YES	NO	N/A	Page #	Notes - NOD Comment #
VII. Risk Characterization (continued)					
A) Did the facility combine the cancer risk and the noncancer risk estimates for all pathways for each individual constituent? If not, describe how the facility evaluated the cancer and noncancer risk for each constituent and pathway.					
B) Did the facility combine all pathways and all constituents to calculate a total cancer risk and a total noncancer hazard index? If not, describe how the facility evaluated the total cancer risk and the total noncancer hazard index.					

VIII. Cleanup Levels

Complete this section if alternative cleanup standards were calculated other than the standards calculated by the facility.

Constituents of Concern	Unit Specific Standard Proposed by Facility	Basis for Standard (GCN, RBS, MDL, etc.)	Cleanup Standard Calculated by Reviewer	Reason for Difference

	YES	NO	N/A	Page #	Notes - NOD Comment #
XIV. Environmental Covenant					
A) Were any industrial assumptions used in the risk assessment? If yes, an environmental covenant is required for the site, in the Notes list any assumptions that should be addressed by the environmental covenant.					
XV. Risk Management					
A) Were any risk management decisions made by the facility? If yes, please describe in the Notes.					