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STANDARD CHLORINE OF DELAWARE, INC.

GOVERNOR LEA ROAD • P.O. BOX 339 • DELAWARE CITY, DELAWARE 19706

DATE: 12/3/92

TO: EPA

ATTN: Kate Lose X-0910 - 3H W42 - Called at 11:30 A.M. 12/3/92 Mon

FROM: Paul Johnston

We are sending 6 pages including this cover sheet. If you do not receive all pages or a clear copy, please call (302) 834-4536, Ext. ____.

Kate -

Response levels and remedial alternatives for your review.

Please call if you have any questions

- Paul

WESTON

METHODOLOGY FOR DETERMINATION OF RESPONSE LEVELS STANDARD CHLORINE OF DELAWARE, INC.

Response levels are set using the following decision tree:

1) If an applicable or relevant and appropriate regulation (ARAR) was identified, the standards identified in that ARAR are utilized. This is the case with groundwater and surface water. In the case where multiple standards are identified, the most stringent standard is applied.

2) If an ARAR is not identified, a risk-based response level is set using information from the Baseline Risk Assessment (BRA) as presented in the Remedial Investigation Report. The method for determining risk-based response levels is as follows:

   a) A "risk ratio" (i.e. the ratio of the concentration of contaminants in a media to the ratio of risk posed from the contaminants in a media) is calculated.

   b) The risk ratio is applied using several acceptable risk criteria (i.e. Hazard quotient = 1, carcinogenic risk = 1.00E-06, etc.) to determine the concentration of contaminants (potential response level) required to meet the acceptable risk criteria. This is performed for each media, using the potential exposure scenarios identified in the BRA. The minimum potential response level for each media, under each risk criteria is summarized in Table 1. For example, the potential response level for onsite surface soils is calculated using the Current Worker, Current Visitor, Future Worker, and Future Visitor exposure scenarios, and the lowest calculated potential response level is reported on Table 1.

   c) When evaluating ecological risk, the No-observable-effect-level (NOEL) and Lowest-observable-effect-level (LOEL) are used as presented in the BRA.

   d) The various potential response levels are evaluated and a response level is chosen. A brief explanation of the reasons for choosing a particular response level are presented on Table 1.

November 25, 1992

Table 1
Summary of Response Levels
Standard Chlorine of Delaware, Inc.

Media	Potential Response Levels									Selected Response Level	Comments
	ARARs		Response Levels based on Human Health Risk				Response Levels Based on Ecological Risk				
	MCLs	AWQCs	HQ	1.00E-06	1.00E-05	1.00E-04	HQ	NOEL	LOEL		
Onsite Surface Soils	na	na	1,390	62	625	6,250	na	2	33	625	The LOEL and NOEL risk may not be applicable to a process area where flora is already present in low quantities.
Offsite Surface Soils	na	na	2,450	410	4,100	41,000	na	2	33	33	The LOEL is most appropriate; the NOEL is too stringent (when compared to human risks).
Offsite Sediments	na	na	14,300	339	3,390	33,900	471	2	33	33	As above.
Offsite Surface Water	na	See Table 2	0.24	0.02	0.22	1.00	0.10	68	na	See Table 2	Federal and DNREC AWQC used.
Ground-water	See Table 2	na	0.51	0.04	0.36	3.56				See Table 2	Federal MCLs used.

Comments:

ne - Not evaluated
na - Not applicable
MCL - Maximum contaminant level
AWQC - Ambient water quality criteria
HQ - Hazard quotient; Response level based on non-carcinogenic risk.

1.00E-06 - 1 in 1,000,000 excess cancer risk.
1.00E-05 - 1 in 100,000 excess cancer risk.
1.00E-04 - 1 in 10,000 excess cancer risk.
NOEL - No-observable-effect-level.
LOEL - Lowest-observable-effect-level.

1) All concentrations are for total target compounds, expressed as ppm (mg/kg or mg/L)
2) ARARs are used wherever applicable.
3) The 1.00E-06 risk values are not considered appropriate for this industrial location, and, in some instances, cannot be practically achieved.
4) Response levels for groundwater and offsite surface water were based on applicable regulations (MCLs and AWQC resp.)

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Table 2
Summary of ARARs
Standard Chlorine of Delaware, Inc.

Compound	Groundwater	Surface Water		
	Federal MCL (mg/L)	Federal AWQC (1) (mg/L)	DNREC AWQC (2) (mg/L)	Comment
Chlorobenzene	0.1	0.05 (4)	26.1	Fed. Used
1,3-Dichlorobenzene	NP	0.763 (5)	4.3	Fed. Used
1,2-Dichlorobenzene	0.6	0.763 (5)	21.8	Fed. Used
1,4-Dichlorobenzene	0.075	0.763 (5)	[illegible]	Fed. Used
1,3,5-Trichlorobenzene	NP	NE	NE	
1,2,4-Trichlorobenzene	0.07	0.05 [illegible]	[illegible]	Fed. Used
1,2,3-Trichlorobenzene	NP	0.0[illegible] (4)	[illegible]NP	Fed. Used
1,2,4,5-Tetrachlorobenzene	NP	0[illegible] ([illegible]	[illegible]	Fed. Used
1,2,3,4-Tetrachlorobenzene	NP	0.0[illegible]	NP	Fed. Used
Pentachlorobenzene	NP	0.05 [illegible]	NP	Fed. Used
Hexachlorobenzene	0.001 (3)	[illegible]	0.001	DNREC Used
Nitrobenzene	[illegible]	[illegible]	2.2	DNREC Used
Metachloronitrobenzene	N[illegible]	NE	NE	
Benzene	[illegible]05	5.3	0.089	DNREC Used
Ethylbenzene	0.[illegible]	NE	NE	
Toluene	1.	NE	NE	

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NOTES:

NP - No standard promulgated.
NE - Not evaluated; compound not detected in media.
1) Protection of aquatic organisms; fresh water chronic criteria used.
2) Protection of human health; fish ingestion criteria used.
3) Proposed value.
4) General chlorinated benzenes criteria used.
5) General dichlorobenzenes criteria used.

TABLE 3
SUMMARY OF ALTERNATIVES FOR DETAILED ANALYSIS
STANDARD CHLORINE OF DELAWARE, INC.

MEDIA	ALTERATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
Surface Soils[1]	No Action	Limited Action - Fencing hot spots. - Deed restrictions	Containment - Capping of hot spots. - Silt fences to prevent transport through erosion. - Surface water diversion for runon and runoff. - Deed restrictions. - Backfill of soil pile into sedimentation basin.	Thermal Desorbtion - Excavation of contaminated surface soils above response levels. - Treatment of the excavated soils using thermal desorbtion. - Surface water controls as necessary.	Biological Treatment - In situ or ex situ treatment of soils above the response levels. - Surface water controls as necessary.
Sediments[2]	No Action	Limited Action - Fencing hot spots. - Impose restricted wetland use.	Containment - Sediment barriers (silt fences, aggregate materials) to prevent sediment transport. - Impose restricted wetland use. - Solidify and cap sedimentation basin.	Thermal Desorbtion - Excavation/dredging of contaminated sediments above response levels. - Treatment of these sediments using thermal desorbtion. - Sediment barriers as necessary.	Biological Treatment - In situ or ex situ treatment of sediments above the response levels. - Sediment barriers as necessary.

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TABLE 3 (Cont'd)
SUMMARY OF ALTERNATIVES FOR DETAILED ANALYSIS
STANDARD CHLORINE OF DELAWARE, INC.

MEDIA	ALTERATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
Ground-water	No Action	Limited Action - Deed and well restrictions.	Containment/Treatment - Enhance existing groundwater recovery system to contain all groundwater exiting site. Will include use of extraction wells and/or vertical barriers (interceptor trenches). - Treatment using existing or modified groundwater treatment system (air stripping).	Containment/Treatment - Enhance existing groundwater recovery system to contain all groundwater exiting site. Will include use of extraction wells and/or vertical barriers (interceptor trenches). - Use of product recovery wells to attempt to remove NAPL. - Treatment using existing or modified groundwater treatment system (air stripping).	Containment/Treatment - Same as Alternative 4
Surface Water[3]	No Action	Limited Action - Impose restricted wetland use.	Limited Action - Impose restricted wetland use[4].	Same as Alternative 3.	Same as Alternative 3.

NOTES:

1) Surface soils include soils to a depth of 3 feet, and soils contained in the soil piles.
2) Sediments include sediments in the Unnamed Tributary and Red Lion Creek to a depth of 1-1/2 feet, and those sediments contained in the sedimentation basin.
3) Surface water encompasses surface waters contained in the Unnamed Tributary and Red Lion Creek. Other surface waters (such as runon and runoff in the plant area) are covered under surface soils.
4) Concentrations generally exceed response levels only in Unnamed Tributary. Remedial actions in other media (e.g. groundwater containment) are expected to improve surface water quality.