DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Spickler Landfill
Spencer, Wisconsin

STATEMENT OF BASIS AND PURPOSE

This decision document represents the selected remedial action for the first operable unit for the Spickler Landfill developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision is based upon the contents of the administrative record for the Spickler Landfill site.

The United States Environmental Protection Agency (U.S. EPA) and the State of Wisconsin agree on the selected remedy for the first operable unit.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present a current or potential threat to public health, welfare, or the environment.

DESCRIPTION OF SELECTED REMEDY

This operable unit is the first of two operable units for the site. The first operable unit addresses closure of the mercury brine pit and the landfill, which is the source of groundwater contamination, landfill gas control, leachate extraction and treatment, and groundwater monitoring. The second operable unit will consist of a final remedy decision for groundwater.

The major components of the selected remedy for the first operable unit include:

* Solidification/stabilization of the contents of the mercury brine pit, followed by installation and maintenance of an impermeable cap which meets the requirements of NR 660 Wisconsin Administrative Code (WAC).

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* Install and maintain a solid waste cap which meets the requirements of NR 504 WAC over the New and Old Fill areas, excluding the mercury brine pit.

* Install and maintain a leachate extraction and treatment system in the landfills, excluding the mercury brine pit.

* Install and maintain an active landfill gas collection system.

* Monitoring of groundwater, leachate and landfill gas and inspection of the fence and the landfill cap.

* Institute deed restrictions on the property to prohibit installation of drinking water wells and prohibit construction on the landfill itself.

STATUTORY DETERMINATIONS

The selected remedy for the first operable unit is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. The remedy satisfies the statutory preference for remedies that employ treatment as a principal element because the stabilization of the mercury brine pit, if feasible as determined by treatability studies, constitutes treatment.

Due to the volume of landfilled waste that would need to be treated, treatment of this low level threat waste is considered impracticable. The remedy employs engineering controls which will be protective of human health and the environment to address the low level threat posed by the landfilled waste.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

David A. Ullrich

Valdas V. Adamkus
Regional Administrator
U.S. EPA - Region V

June 3, 1992
Date

RECORD OF DECISION

DECISION SUMMARY

SPICKLER LANDFILL

SOURCE CONTROL OPERABLE UNIT

SPENCER, WISCONSIN

Prepared By:

U.S. Environmental Protection Agency

Region V

Chicago, Illinois

May, 1992

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I. SITE LOCATION AND DESCRIPTION

The Spickler Landfill is located at S-2550 Eckes Road in the Town of Spencer, Marathon County, Wisconsin. The site consists of ten acres with two fill areas (Old and New Fill areas) which are separated by a crude oil pipeline right-of-way, and a groundwater contaminant plume. The landfill is located on an eighty acre parcel of land. The landfill accepted municipal and industrial wastes from July 1970 to March 1974. See Figure 1, site features.

The site, as discussed in this document, consists of the Old and New Fill areas, the mercury brine pit, and the groundwater contaminant plume. The site is located on property owned by Kenneth Fuller, but consists only of approximately 10 acres of Mr. Fuller's 80 acre parcel of property. See Figure 2, property boundary.

The Spickler Landfill is located in a sparsely populated, rural area. The population of the Town of Spencer, Wisconsin in 1991 was 1,095. All residents are using private well water. Mr. Fuller, who owns the property on which the landfill is located, lives next to the landfill and operates a tree farm on top of the landfill. There are two homes directly west of the landfill and additional homes to the south and southwest of the landfill. Groundwater is flowing to the northwest and could impact Mr. Fuller's wells and the two homes to the south and southwest. Sampling of these residential wells was conducted during the remedial investigation but no evidence of contamination was found.

Surface water from the site drains along several unnamed intermittent streams which flow north and northeast. The intermittent streams subsequently flow east and southeast approximately 1.5 miles to the East Branch of the Yellow River.

The site geology consists of unconsolidated deposits of clayey and sandy soils (glacial till) and granular soils developed by the weathering of the underlying sandstone. The glacial till deposits consist of lean clays (USCS classification: CL), sandy and gravelly clays (SC and GC) and sand soils with variable silt and gravel contents (SM). The soils developed from the weathering of sandstone consist of sand with low silt content (SP), silty sands (SM) and sand soils with variable silt and clay contents (SP-SC). The thickness of unconsolidated deposits observed during monitoring well installation ranged from 4.0 feet at well MW8S to 14.5 feet at well MW14D.

Clay soils were observed below the waste mass at leachate head wells LH3 and LH4, located in the southern half of the Old Fill Area. Soils observed below the waste mass at LH3 consisted of approximately 6 feet of silt (OL and ML) and clay (CL). At

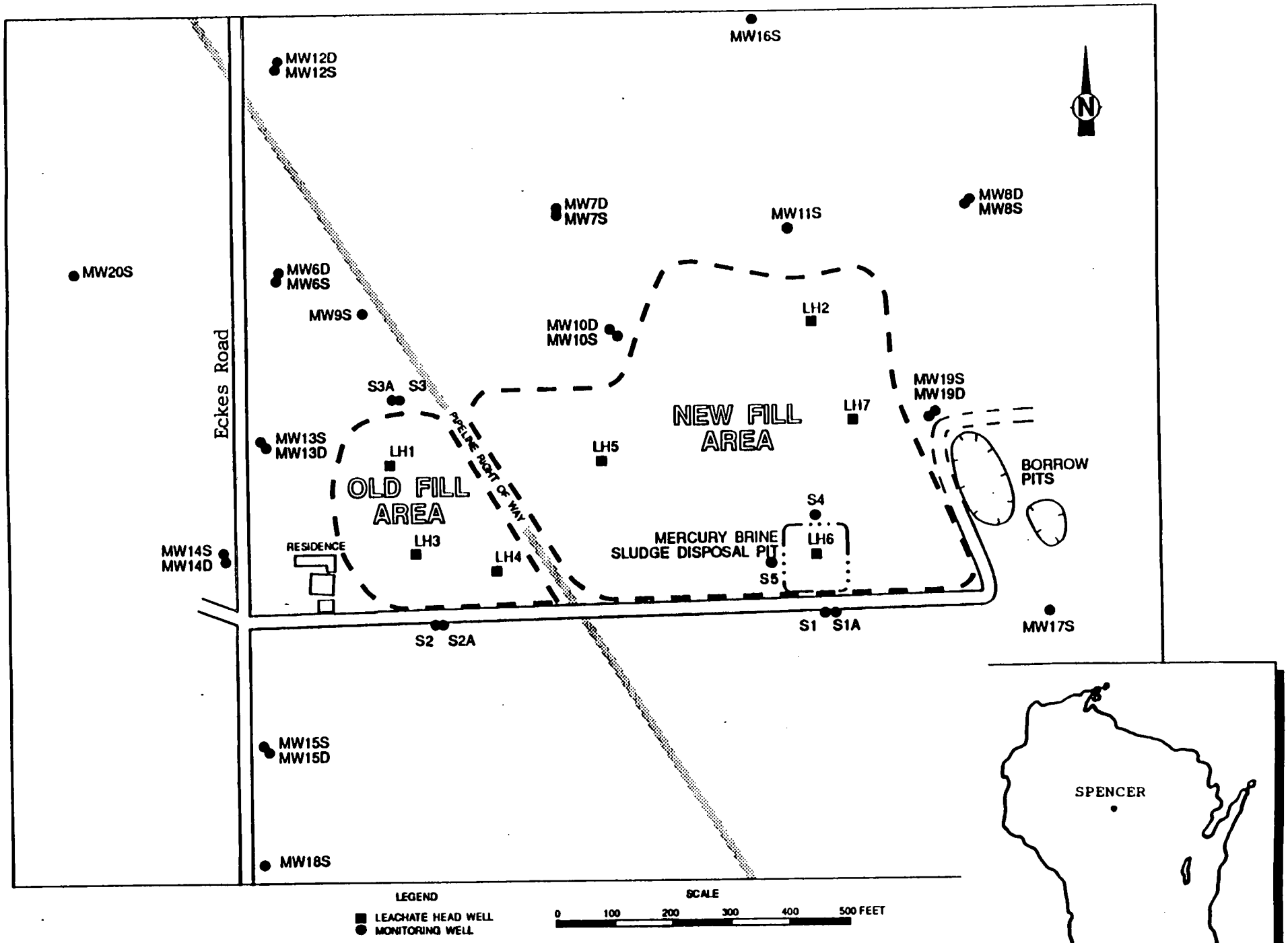

FIGURE 1 SITE FEATURES

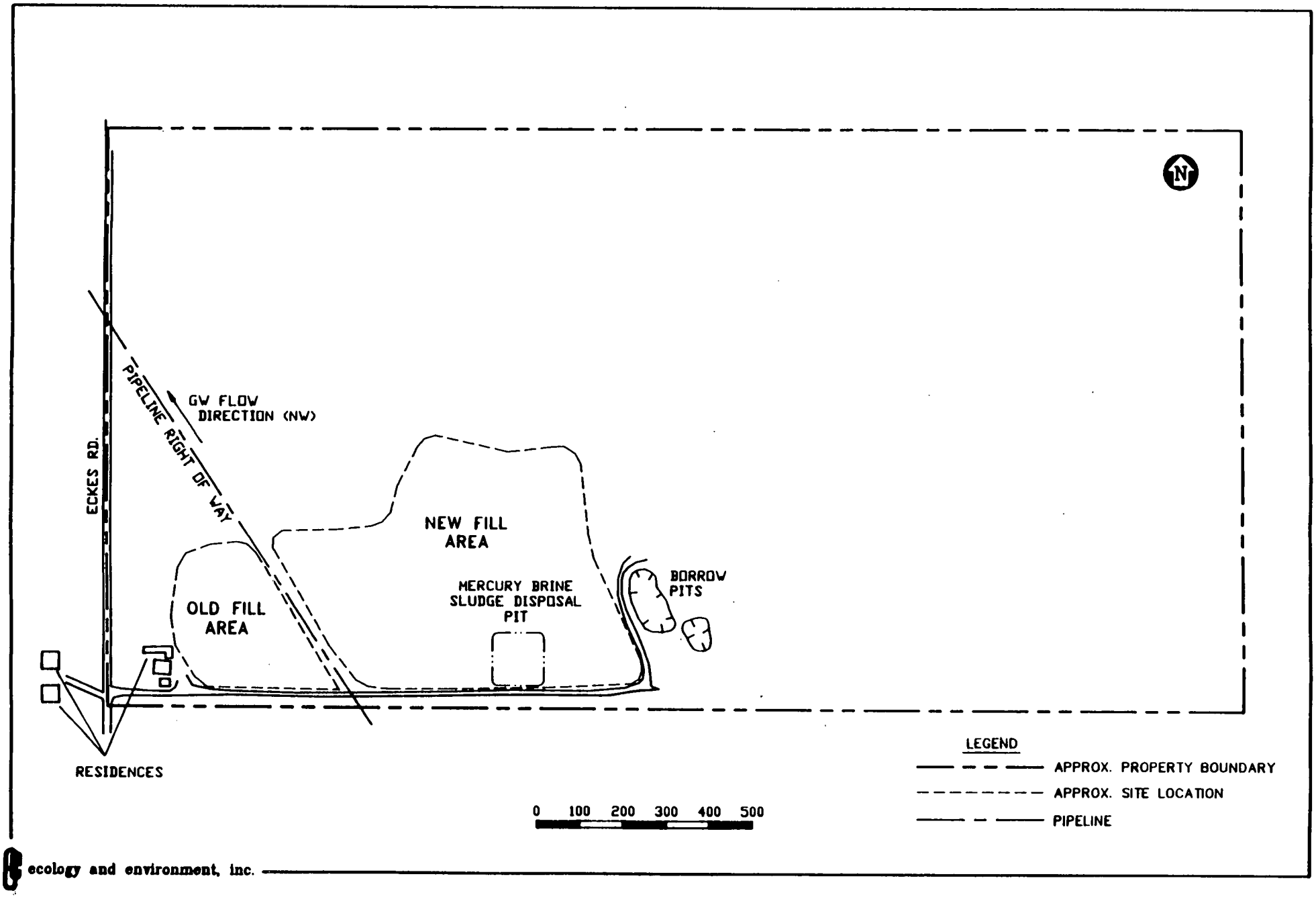

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FIGURE 2
PROPERTY BOUNDARY

leachate head well LH4, approximately 2 feet of clay (CL) was encountered below the fill materials. The clay under the Old Fill Area was not observed at LH1. Sandy soils were present (SM; possible weathered bedrock) at well LH1.

At leachate head wells in the New Fill Area, 3 feet of clayey soils (SC/CL) were observed below the waste mass at LH6 and 0.5 feet of clayey sand (SC) was observed below the waste mass at LH7. The waste mass appears to be directly deposited over the sandstone bedrock in the area of head wells LH2 and LH5.

The bedrock beneath the site consists of Upper Cambrian sandstone, likely the Mt. Simon formation. The sandstone is a multicolored, cross-bedded, fine to medium grained quartz sandstone. Thin clay seams and clay minerals are dispersed throughout the layering. Course grained layers and vuggy layers occur occasionally, and horizontal and angular fracturing is present at several locations.

The upper bedrock surface contains well developed fractures and joints. Two fracture/joint sets were identified in the upper bedrock layers. One fracture/joint set orientation at north 55 degrees ($\pm$10) east and another fracture/joint set orientation at north 40 degrees ($\pm$10) west were identified. An additional fracture/joint set orientation, in deeper bedrock layers, was identified as north 10 degrees west and north 60 degrees ($\pm$10) east. Secondary porosity associated with the fracture and joint systems was calculated at 1 to 8 percent.

The maximum thickness of sandstone observed during drilling was at well MW15D, where sandstone occurred to a depth of 70.9 feet from the ground surface (a minimum sandstone thickness of 63.9 feet).

Depth to groundwater in the area of the landfill is approximately five to ten feet, and groundwater flows to the northwest. It is unclear from information gathered during the remedial investigation if there is lateral flow of groundwater through the waste mass or not. The remedial investigation was conducted during a drought period for Wisconsin and groundwater elevations could have been depressed below normal water levels.

Most surface water runoff from the site appears to flow northwest through a culvert under Eckes Road and into a wetland area. This wetland is a State of Wisconsin classified wetland S3/E1K (deciduous scrub/shrub and persistent emergent/wet meadow) and S3K (deciduous scrub/shrub with wet soil). See figure 3. This wetland is approximately 15 acres in size. The northwest part of the wetland appears to have a drainage outlet channel which runs north. It appears that the drainage from the east end of this wetland and the flow from the site via the culvert under Eckes Road flows north to a second wetland, classified as T3K and

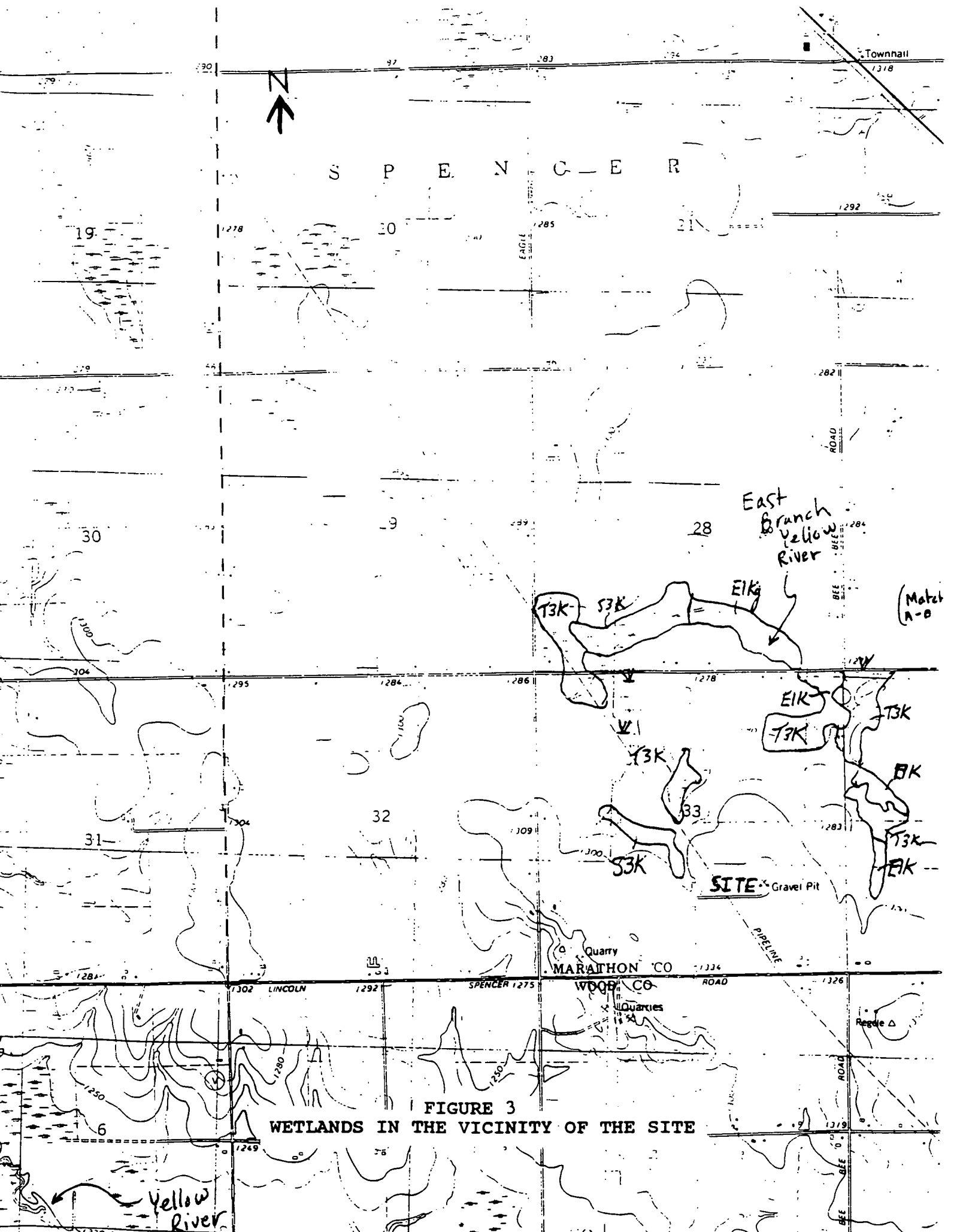

FIGURE 3
WETLANDS IN THE VICINITY OF THE SITE

approximately 10 acres in size, although there does not appear to be any well-defined channel for this drainage path. The wetland and all of its drainage outlets eventually flow into the East Branch of the Yellow River. The site is not within the 100-year floodplain of the East Branch of the Yellow River.

This wetland is in the headwater of the East Branch of the Yellow River and the surface water runoff flowing through it appears to be limited to that precipitation falling directly onto it and that from a limited contributing watershed, part of which is the Spickler Landfill site. Based on this assumption and observations made of this area in the field, it would appear that there is not sustained flow through this wetland throughout the year. Flow occurs during and, for a limited time, after runoff events (e.g., precipitation events and spring melt). As with many headwater wetland areas, the duration of flow through the wetland after the event depends on the volume of direct precipitation runoff and subsequent release of this water from surface and perhaps some subsurface (baseflow groundwater discharge) storage areas. There is not enough data to determine if the wetland is acting as a groundwater recharge area or groundwater discharge area.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Spickler Landfill was owned by Frederick Spickler and operated by Spickler's Sanitation Service in 1970 as a municipal open dump. In December, 1970, BASF Wyandotte received approval from the Wisconsin Department of Natural Resources (WDNR) to construct a clay-lined sludge disposal area at the landfill. This area is approximately 100 feet by 100 feet in area, and 10 feet deep. There are no construction records for this disposal area and therefore no verification that the pit was clay-lined as planned. The pit was used from January to April 1971. While in use, mercury brine muds were disposed in the pit. The pit was closed with a clay cap in September 1971 and posted with monuments (concrete posts). This area is known as the mercury brine pit. Other industrial wastes known to have been disposed in the Spickler Landfill include kalo dust, which contained asbestos, and toluene, xylenes, methyl-ethyl ketone, and methylene chloride.

In August 1972, Carmen Way purchased the property from Frederick Spickler, and the landfill was renamed Way's Sanitary Landfill. Ways's Sanitary Landfill was licensed to accept solid wastes, including industrial waste, with the exception of toxic and hazardous materials. During 1973, numerous violations were noted by the WDNR at Way's Sanitary Landfill. Among these were failure to perform daily cover operations and ineffective drainage control.

In late 1973, Lawrence Ladick and Vernon Verjinsky, owners of Midstate Disposal, purchased Way's Sanitary Landfill. Midstate Disposal operated the landfill until its closure in June 1975. In March 1974, the WDNR ordered Midstate Disposal to terminate operations and close the landfill. Between March 1974 and February 1975, most closure and abandonment work was completed, including placement, grading, and seeding of the landfill cover, with the exception of the west slope of the New Fill Area northeast of the pipeline right-of-way. In April, 1975, Frederick Spickler re-purchased the land from Midstate Disposal. In August, 1975, Kenneth Fuller purchased the property on land contract from Frederick Spickler. In November, 1975, the land contract was assigned to John Rooney.

On June 20, 1984, a Hazard Ranking System assessment was conducted by the U.S. EPA. It was noted that areas of leachate seepage occurred on both the north and south faces of the New Fill Area, and that the mercury brine pit had subsided and appeared to be collecting surface water. Soil samples taken from landfill seeps were found to contain traces of mercury and groundwater samples contained both organic and inorganic contaminants. In July 1987, the Spickler Landfill was placed on the National Priorities List (NPL).

BASF Corp. and Weyerhaeuser Co. signed an Administrative Order by Consent to conduct the Remedial Investigation and Feasibility Study (RI/FS). The order became effective on July 16, 1988.

III. COMMUNITY RELATIONS ACTIVITIES

A Community Relations Plan for the Spickler Landfill site was finalized in 1989. This document lists contacts and interested parties throughout government and the local community. It also establishes communication pathways to ensure timely dissemination of pertinent information. Subsequently a fact sheet outlining the Remedial Investigation (RI) sampling program was distributed in October 1991. The Remedial Investigation/Feasibility Study (RI/FS) and the Proposed Plan were released to the public in December 1991. All of these documents were made available in both the administrative record and an information repository maintained at the Spencer Village Hall. A public comment period was held from December 9, 1991 to February 10, 1992. All comments that were received by U.S. EPA prior to the end of the public comment period are addressed in the Responsiveness Summary, which is attached to this ROD.

IV. SCOPE AND ROLE OF THE ACTION

This ROD addresses the first operable unit for the Spickler Landfill site and will consist of closure of the landfills, including the mercury brine pit, and groundwater monitoring. The ROD for the second operable unit will make a final remedy decision for groundwater. The threats posed by this site to human health and the environment are future exposure to seep sediments and future use of the contaminated groundwater.

These threats will be addressed through the proposed cleanup action for the first operable unit, which includes:

Landfill Closure

* Capping the landfill areas with a clay cap which meets the requirements of NR 504 WAC.
* Active landfill gas control system.
* Leachate collection and treatment.

Mercury Brine Pit Closure

* Treatability tests for stabilization/solidification of the contents of the mercury brine pit.
* Stabilization/solidification of the contents of the mercury brine pit.
* Capping the mercury brine pit with a clay cap which meets the requirements of NR 660 WAC.

Groundwater

* Monitoring contaminated groundwater in the vicinity of the site.

V. SUMMARY OF SITE CHARACTERISTICS

The purpose of an RI is to characterize the nature and extent of contamination by hazardous substances at a site. The objective of an RI is not to remove all uncertainty, but rather to gather information sufficient to support an informed risk management decision regarding which remedial action appears to be the most appropriate for a given site.

The remedial investigation that was performed at the Spickler Landfill was designed to determine the nature and extent of site contamination through a program of soil, groundwater, leachate and surface water sampling. Site geology and groundwater flow patterns also were examined. The following conditions were observed:

* Depth to groundwater in the area of the landfill is less than five feet. It is unclear from data collected during the RI if lateral flow of groundwater occurs through the waste mass.

* Explosive levels of combustible landfill gas were detected in several new monitoring wells, an existing well, and in three permanent gas probes on the west and north perimeters of the Old Fill area.

* The existing landfill cover does not meet the WDNR's clay capping thickness requirements.

* Asbestos was confirmed in a landfill cover soil sample.

* There is a significant amount of leachate production and build-up. The refuse is sitting in leachate (saturated) which has collected on top of an impermeable clay layer below most areas of the landfill.

* Leachate samples from the mercury brine pit contained elevated levels of calcium, magnesium, mercury and nine organic compounds. See Tables 1 and 2.

* Groundwater samples from monitoring wells showed exceedences of Federal Maximum Contaminant Levels (MCLs), Wisconsin Enforcement Standards and Preventive Action Limits. MCLs were exceeded for the following chemicals: benzene (MWS2 at 8 ug/l and MW10S at 6 ug/l), vinyl chloride (MWS1A at 39 ug/l) and barium (MWS2 at 4,690 ug/l). Groundwater contamination has not moved off the property. Groundwater contamination has migrated approximately 300 feet from the waste boundary. Mercury was not detected in the groundwater samples collected for round 1 in July 1990, but was detected in monitoring well 15S at 0.2 ug/l and monitoring well S1A at 0.31 ug/l during round 2 sampling in January 1991. See Table 3.

* Eight private wells near the site were sampled. One well exceeded the Wisconsin Drinking Water Standard for manganese, one well exceeded for lead, one well exceeded for iron, and one well exceeded for copper. The standards for these inorganics are based on taste and odor considerations and not on health considerations. One well slightly exceeded the Wisconsin Drinking Water standard for chromium. This standard is based on health considerations. The matter has been referred to the Wisconsin Division of Health and the WDNR Water Supply Program. Contamination in these private wells does not appear to be site related because the wells are located off the property and the groundwater contamination associated with the site has not been documented to have moved off the property. See Table 4.

Table 1

Summary of Organic Group Concentrations
Leachate Samples
Spickler Landfill RI/FS
Town of Spencer, Wisconsin

Leachate Head Well	BETX	Chlorinated Ethenes	Ketones	Phenols	Chlorinated Aromatics	PAHs	Phthalates
S4	137	--	--	10	--	12	8
S5	50	--	6	201	2	13	4
LH1	28,425	128	443	554	--	7	--
LH2	909	--	--	426	--	14	6
LH4	9,490	--	--	3,005	--	--	7
LH6	--	83	33	300	--	--	13
LH7	150	--	--	--	--	--	10

Notes:

1. Concentrations are in ug/L.
2. Groups where no compounds were detected are excluded from this Table.
3. Samples were not collected from leachate head wells LH3 and LH5.
4. -- Not detected

SGW2/vlr/SMT/TEM/KEB/DF
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Table 2

Summary of Metals and Cyanide Concentrations
Leachate Samples
Spickler Landfill RI/FS
Town of Spencer, Wisconsin

	Minimum Concentration	Maximum Concentration	Mean Concentration	Location of Maximum Concentration	No of Detections/ No. of Samples
Aluminum	900	39,200	11,829	LH1	7/7
Arsenic	2.5	15.8	8.0	LH4	7/7
Barium	530	940	699	LH7	7/7
Beryllium	0.37	4.5	1.7	LH1	6/7
Cadmium	0.40	21.7	5.0	LH6	7/7
Calcium	221,000	3,340,000	909,286	LH6	7/7
Chromium	6.3	91	44	LH1	7/7
Cobalt	415	415	415	LH6	1/7
Copper	28	99	46	LH1	6/7
Iron	2,440	105,000	53,536	LH1	7/7
Lead	10.5	78.9	43	LH2	7/7
Magnesium	4,210	2,180,000	348,130	LH6	7/7
Manganese	378	35,800	7,315	LH6	7/7
Mercury	0.21	666	167	LH6	4/7
Nickel	50	323	139	LH6	4/7
Potassium	15,000	104,000	42,643	LH6	7/7
Silver	41	41	41	LH6	1/7
Sodium	34,400	50,600,000	7,309,114	LH6	7/7
Vanadium	9.3	63.3	24	LH1	7/7
Zinc	83	542	323	LH6	7/7
Cyanide	13	13	13	LH1	1/6

Notes:
1. Concentrations are in ug/L.
2. Antimony, Selenium, and Thallium were not detected in leachate samples and have been omitted from this Table.
3. The higher value between the sample and the field duplicate is used for minimum, maximum, and mean concentration calculations.

Table 3

Summary of Round 1 NR 140 Groundwater Quality Exceedances
Spickler Landfill RI/FS
Town of Spencer, Wisconsin

Analyte	Location	NR 140 Preventive Action Limit (2)	NR 140 Enforcement Standard (2)	40 CFR Part 141 Maximum Contaminant Level(3)	Concentration(1) in Sample
Benzene	MW6S	0.067	5.0	5.0	2
	MW10S				6
	MW11S				3
	S2				8
	S2A				4
Tetrachloroethene	S2A	0.1	1.0	5.0	4
Vinyl Chloride	S1A	0.0015	0.2	2.0	39
Xylene	MW10S	124	620	10,000	920
	S2				2100
	S2A				300
Arsenic	MW10S	5.0	50	50	6.7
	S1A				10.6
	S2				26.8
	S2A				35
Barium	MW6S	200	1000	2000	220
	MW7S				290
	MW8S				210
	MW9S				300
	MW10S				500
	MW11S				960
	MW13S				600
	MW14S				200
	MW16S				490
	MW17S				450
	MW19S				340
	S1				210
	S1A				380
	S2				4690
	S2A				580
	S3A				210
Cadmium	MW8D	1	10	5.0	1.1
Chromium	MW10S	5	50	100	11.7
	MW11S				6.2
	PW201				59.3
Copper	PW20	500	1000	1300	2250
Iron	PW202	150	300	300	4280
	PW203				1720
Lead	MW12S	5	50	50(5)	10.1
	MW19S				28.3
	S1				7.0
	PW20				12.4
Manganese	PW203	25	50	50	43.2
	PW23				54.1

Footnotes:
(1) All concentrations are in ug/L.
(2) Wisconsin Administrative Code Chapter NR 140.10, Tables 1 and 2 (10-01-90).
(3) Drinking Water Standards and Health Advisories Table (4-91), U.S. EPA Office of Drinking Water
(4) NA - Not Available
(5) The MCL for lead of 15 ug/L is not enforceable until December 1992. The present enforceable limit is 50 ug/L.

Note:
1. The higher value between the sample and field duplicate is used in this table.
2. Mercury was detected in wells S1A (0.31 ug/L) and MW15S (0.2 ug/L) during the Round 2 sampling.

Table 4

Summary of Round 2 Residential Well Sampling
NR 109 Safe Drinking Water Exceedances
Spickler Landfill RI/FS
Town of Spencer, Wisconsin

Analyte	Location	NR 109 Maximum Contaminant Level(2)	NR 109 Secondary Drinking Water Standard(2)	Concentration in Sample(1)
Chromium	PW 201	50		59.3
Copper	PW 20		1000	2250
Iron	PW 202		300	4280
	PW 203			1720
Manganese	PW 23		50	54.1

Footnotes:

(1) All concentrations are in ug/L

(2) Wisconsin Administrative Code Chapter NR 109.11 and NR 109.60 (March 1991)

* Surface water samples exceeded the Ambient Water Quality Criteria (AWQC) for manganese.

VI. SUMMARY OF SITE RISKS

A baseline risk assessment was conducted for the Spickler Landfill site and is presented in a document entitled "Baseline Risk Assessment, Spickler Landfill RI/FS," August 1991. The baseline risk assessment consisted of an identification of chemicals of concern, toxicity assessment, exposure assessment, risk characterization and ecological assessment.

A. Contaminants of Concern

Contaminants of concern are detected contaminants which have inherent toxic/carcinogenic effects that are likely to pose the greatest concern with respect to the protection of public health and the environment (see Table 5).

B. Toxicity Assessment

The purpose of the toxicity assessment is to develop human health and environmental receptor toxicity and carcinogenicity data for the chemicals of concern at the site and to provide an estimate of the relationship between the extent of exposure to a contaminant and the likelihood and/or severity of adverse effects. The toxicity assessment is accomplished in two steps--hazard identification and dose-response assessment.

The dose-response evaluation presented available human health and environmental criteria for the contaminants of concern, and related the chemical exposure (dose) to expected adverse health effects (response). Included in this assessment are the pertinent standards, criteria, advisories and guidelines developed for the protection of human health and the environment. An explanation of how these values were derived and how they should be applied is presented below.

Cancer potency factors (CPFs) have been developed by U.S. EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of (mg/kg/day)-1, are multiplied by the estimated intake of a potential carcinogen, in mg/kg/day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper-bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

TABLE 5

CHEMICALS OF POTENTIAL CONCERN

Volatile Organic Compounds (VOCs)

Acetone
Benzene
2-Butanone
Chlorobenzene
Chloroform
1,1-Dichloroethane
1,2-Dichloroethene (trans)
Ethylbenzene
2-Hexanone
Methylene Chloride
4-Methyl-2-pentanone
Tetrachloroethene
1,1,1-Trichloroethane
Trichloroethene
Toluene
Styrene
Vinyl Chloride
Xylene (total)

Metals/Inorganics

Aluminum
Arsenic
Barium
Beryllium
Cadmium
Chromium (III)
Cobalt
Copper
Iron
Lead
Manganese
Mercury
Nickel
Selenium
Silver
Sodium
Vanadium
Zinc
Cyanide

Semi-Volatile Compounds (SVOCs)

Benzoic acid
Bis(2-ethylhexyl)phthalate
4-chloro-3-methylphenol
1,4-Dichlorobenzene
Diethylphthalate
2,4-Dimethylphenol
Di-n-butylphthalate
4-Methylphenol

Pesticides/PCBs

gamma-BHC

Minerals

Asbestos

Reference doses (RfDs) have been developed by U.S. EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg/day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

C. Exposure Assessment and Risk Characterization

The exposure assessment identified potential pathways and routes for contaminants of concern to reach the receptors and the estimated contaminant concentration at the points of exposure.

The risk characterization quantifies present and/or potential future threats to human health that result from exposure to the contaminants of concern at the Spickler Landfill site.

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., 1x10-6 or 1E-6). An excess lifetime cancer risk of 1x10-6 indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

D. Current Site Conditions

Exposure of children to chemicals in surface soil adjacent to the landfill, borrow pit sediment and surface water, and seep sediment were estimated for current site conditions (see Table 6). In addition, based on a qualitative assessment of site conditions, it was concluded that chemical exposure may occur from air and cover soil. Based on analytical results, private drinking water downgradient of the site does not appear to be

Table 6

Total Site Risk Estimates
Human Health Evaluation
Spickler Landfill, Town of Spencer, Wisconsin

CURRENT SITE CONDITIONS

	Population: Trespassers (Children)	
	Hazard Indices	Cancer Risks
Medium		
Surface Water - Borrow Pit	7e-04	6e-08
Sediment - Borrow Pit	5e-03	3e-09
Sediment - Seep	3e-01	1e-06
Surface Soil	9e-03	6e-09
Total Risk	3e-01	1e-06

FUTURE SITE CONDITIONS

	Population: On-Site Residents	
	Hazard Indices	Cancer Risks
Medium		
Surface Water - Borrow Pit	4e-03	3e-07
Sediment - Borrow Pit	2e-02	2e-08
Sediment - Seep	2e+00	5e-06
Subsurface Soil	2e-02	4e-08
Groundwater	3e+01	3e-03
Total Risk (1)	3e+01	3e-03

Footnote:

(1) The "Total Risk" includes the risk due to groundwater, surface water, sediment, and soil exposure.

Note:

1. A noncancer risk estimate (hazard index) of greater than 1 indicates the potential for noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-06 (i.e., one in a million) is above the U.S. EPA's point of departure for Superfund sites.

affected by the landfill; therefore, this medium was not considered a source of chemical exposure under current conditions. Under the assumptions made (i.e., children play on-site 1 day/week, 8 months/year for 10 years), potential noncarcinogenic hazards and potential cancer risks related to surface soil, sediment, and surface water exposure were estimated. The total risk under current land use was within the risk range considered to be acceptable under the NCP (carcinogenic risk of 1X10-4 to 1X10-6).

A qualitative assessment of risk was conducted for potential exposure to air and the landfill cover soil under current land use. Landfill gas production is occurring that may result in the release of Volatile Organic Compounds (VOCs) to ambient air. The VOCs released will be carried downwind, which would expose nearby residents. It is not known at what concentration exposures will occur, therefore, it cannot be determined whether there is a health risk associated with air exposure, but the potential does exist.

During the RI, asbestos-containing materials were detected in subsurface cover material. Also, materials potentially containing asbestos were observed on the surface of the site in isolated areas. Asbestos is a known human carcinogen, therefore exposure to this mineral is a potential health concern. Currently, the site is used as a tree farm, and tree farming activities (e.g., tree spading) may cause the release of asbestos to the air and cover soil. For these reasons, there is the potential for exposure to asbestos through inhalation of air, and incidental ingestion of asbestos contained in cover soil. Asbestos concentrations in air have not been measured and cannot be predicted in a meaningful manner. In addition, it is not known what amount of exposure to asbestos may occur. However, the potential for exposure may exist.

E. Potential Future Site Conditions

Potential future use of the property was assumed to be a residential use scenario. To assess risks due to a potential future residential use, the risks associated with subsurface soil exposure and groundwater exposure were quantitatively assessed. It was also assumed that future exposure to borrow pit surface water and sediment, and seep sediment would be similar in nature to current land use conditions, but that the frequency of exposure would substantially increase (i.e., by five times). Therefore, the resultant risk estimates for these media under current land use conditions were multiplied by a factor of five to estimate future levels of risk associated with these media.

It was assumed that the soils adjacent to the landfill may be plowed in the future, exposing the subsurface soil. It was assumed children may be exposed to soil 5 days/week, 8

months/year, for 10 years.

Potential risk associated with future use of groundwater was estimated using the present concentrations of chemicals detected in monitoring wells at, and downgradient of the site, to estimate exposure point concentrations. It was assumed that individuals were exposed daily to chemicals of potential concern in water for 30 years, and that exposure occurred as a result of groundwater ingestion, as well as dermal contact and inhalation while bathing. The majority of the total noncancer health risk was associated with the potential exposure to arsenic, barium, lead, manganese, and nitrites detected in groundwater. The majority of the cancer risk associated with potential groundwater exposure was due to vinyl chloride and arsenic.

The noncancer risk associated with exposure of children to leachate seep-affected sediment in the future was associated with exposure to barium and manganese. The potential cancer risk is associated with exposure to arsenic.

See Table 6 for a summary of the total site risk estimates.

F. Ecological Assessment

An ecological assessment of the Spickler Landfill site was undertaken in order to identify any environmental resources at or near the site that might be adversely affected by site contaminants. An ecological assessment is a qualitative or quantitative appraisal of the actual or potential effects of hazardous waste site contaminants on plants and animals other than humans and domesticated species.

The site and vicinity includes several disturbed habitats. Based on field observations, the following habitats were present: northern mesic forest, conifer plantation, grassland area, ephemeral pond, and emergent vegetation ponds (borrow pits). Between some of these habitats are thin ecotones, or transitional zones.

The site and surrounding area fauna is likely composed of species common to forest edges or transition zones. Deer tracks have been observed at various site locations, as have those of small game mammals such as squirrels, raccoons and rabbits. The presence of the property owner's dogs and occasional stray dogs on the property probably restrict the occurrence of a wide variety of small animals. The borrow pits do not appear to support fish populations, but frogs and turtles are present.

The Natural Heritage Program of the WDNR does not have records of threatened or endangered species or critical habitats in the vicinity of the site.

In summary, effects of the landfill or hazardous components of the fill are not readily discernible on the ecology in the immediate vicinity of the site. Areas of stressed vegetation, possibly attributable to the landfill, were not noted.

G. Rationale for Further Action

Actual or threatened releases of hazardous substances from this site, if not addressed by implementation of the response action selected by this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment. Based on the findings in the RI report and the discussion above, a FS was performed to focus the development of alternatives to address the threats at the site. The FS report documents the evaluation of the magnitude of site risks, site-specific applicable or relevant and appropriate requirements, and the requirements of CERCLA and the NCP, especially the ground-water protection policy, in the derivation of remedial alternatives for the Spickler Landfill site.

VII. SUMMARY OF ALTERNATIVES

The principal objective of remedial action is to eliminate and/or reduce the threat or potential threat to human health and the environment posed by the areas of concern. The selection process for remedial actions is developed to address the specific threat posed in an area of concern, and considers the chemicals of concern and the routes of exposure, as well as effective technologies to address them.

The alternatives analyzed for the site are presented below.

Common Elements. Except for the "no action" alternative, all of the alternatives being considered for the site include a number of common components. Alternatives 2 through 5 include access and deed restrictions and site monitoring.

Alternatives 2 through 5 include an NR 660 cap on the mercury brine pit, active landfill gas control, and leachate collection and treatment.

Alternative 1: No Action

The NCP requires that a no action alternative be considered at every site. It is used as a basis for comparison during the evaluation of other alternatives. The no-action alternative assumes that nothing would be done to address potential public health and environmental problems.

Capital Cost: $0
Annual Operation and Maintenance (O&M) Cost: $0
Present Net Worth (over 30 years): $0

Alternative 2: Fencing and Deed Restrictions; NR 660 Cap on the Landfills and Brine Pit; Active Landfill Gas Control; Leachate Collection and Treatment; Groundwater Monitoring.

This alternative consists of fencing and deed restrictions to restrict future access and construction on and near the landfills. Site monitoring would be conducted to ensure integrity of the fence and the landfill cap. Groundwater monitoring and landfill gas monitoring will also be conducted.

An impermeable cap that meets the requirements of NR 660 WAC (2 feet of clay, a synthetic membrane liner, 1.5 to 2.5 feet of soil, and a minimum of 6 inches of topsoil) would be constructed over the landfills, including the mercury brine pit. The cap would cover an area of approximately 10.5 acres. This cap would significantly reduce infiltration into the waste and minimize leachate production. Minimizing leachate production will significantly reduce the potential for leachate to enter groundwater.

The impermeable cap will greatly increase the potential for landfill gas to migrate off site because landfill gas is naturally venting to the atmosphere through the the current cap which is permeable. Upon placement of an impermeable cap on the landfills, landfill gas will either build up under the cap or migrate horizontally from under the cap. For this reason, an active landfill gas control system will be installed as part of this alternative. Active landfill gas control consists of extracting gas from the landfill using a blower connected to gas extraction wells by a pipe system. The extracted gas is then either vented to the atmosphere or burned in a flare if toxic contaminants are present.

Leachate will be collected through the same wells as the landfill gas. Leachate will not be collected from within the mercury brine pit because the contents of the pit are relatively impermeable and pumping the leachate out would be a slow process that would take years to accomplish, and even then complete leachate removal is unlikely because of residual pore water. The collected leachate from the landfills will be treated either on or off the site. On-site treatment would include a combination of chemical, physical, and biological treatment technologies. The treatment will address both organic and inorganic contaminants. Treatment processes for organic contaminants could include biodegradation, air stripping, carbon adsorption, reverse osmosis and chemical oxidation. Treatment processes for inorganic contaminants could include precipitation and ion exchange. Treated leachate would then be discharged to the wetlands area near the property, to a Publicly Owned Treatment Works (POTW), or to the nearest surface water body. Treatment levels for leachate will be determined when the discharge location is identified and will be in accordance with applicable

or relevant and appropriate State and Federal standards. Treatment residuals will be tested by the Toxic Characteristic Leachability Procedure (TCLP), to determine if the waste is characteristic of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA). Disposal of the waste will be determined based on the results of the TCLP test.

Capital Cost: $4,600,000
Annual Operation and Maintenance (O&M) Cost: $72,000
Present Net Worth (over 30 years): $5,200,000

Alternative 3: Fencing and Deed Restrictions; NR 504 Cap on the Landfills; NR 660 Cap on the Brine Pit; Active Landfill Gas Control; Leachate Collection and Treatment; Groundwater Monitoring.

This alternative includes the access restrictions and site monitoring described in Alternative 2. A cap which meets the requirements of NR 504 WAC (2 feet of clay, 1.5 to 2.5 feet of soil, and a minimum of 6 inches of topsoil) will be placed over the landfill, but not over the mercury brine pit. This cap limits infiltration to two to four inches per year, maintaining a moist environment within the landfill that will encourage biological degradation and ultimately stabilize the waste.

An impermeable cap meeting the requirements of NR 660 WAC will be constructed over the mercury brine pit. The impermeable cap will be placed over the mercury brine pit to stop the production of leachate in the pit and therefore greatly reduce the potential for any contaminants in this pit to reach the groundwater. Leachate is produced when rain water mixes with the landfill wastes. Leachate can then contaminate groundwater if it is moves down through the ground to where the groundwater is located.

An active gas control system and a leachate collection and treatment system will be installed as described in Alternative 2.

Capital Cost: $3,600,000
O&M Cost: $113,000
Present Net Worth: $4,600,000

Alternative 4: Fencing and Deed Restrictions; NR 504 Cap on the Landfill; Solidify/Stabilize the Brine Pit and Cap it with an NR 660 Cap; Active Landfill Gas Control; Leachate Collection and Treatment; Groundwater Monitoring.

This alternative is identical to alternative 3, except that the contents of the mercury brine pit will be solidified and/or stabilized after treatability tests have been conducted. Treatability tests will be conducted to determine the feasibility of solidifying and/or stabilizing the wastes in the mercury brine pit. Solidification/stabilization of the mercury brine pit will

ensure that leachate in the pit will not pose a threat to the groundwater in the future, and future generation of leachate in the pit will be minimized.

Leachate treatment residuals will be tested by the Toxic Characteristic Leachability Procedure (TCLP), to determine if the waste is characteristic of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA). Disposal of the treatment residual waste will be determined based on the results of the TCLP test.

Capital Cost: $3,833,000
O&M Cost: $113,000
Present Net Worth: $4,900,000

Alternative 5: Fencing and Deed Restrictions; NR 504 Cap on the Landfill; Solidify/Stabilize the Brine Pit and Cap it with an NR 660 Cap; Active Landfill Gas Control; Leachate Collection and Treatment; Groundwater Pump and Treat.

This alternative is identical to alternative 4, except that it includes a groundwater pump and treat system. Extracted groundwater will be treated to address both organic and inorganic contaminants. Treatment processes for organic contaminants could include biodegradation, air stripping, carbon adsorption, reverse osmosis and chemical oxidation. Treatment processes for inorganic contaminants could include precipitation and ion exchange. Treated groundwater will be discharged either to the wetland to the northwest of the property, to a POTW, or the closest surface water body. Treatment residuals will be tested by the Toxic Characteristic Leachability Procedure (TCLP), to determine if the residual is characteristic of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA). Disposal of the waste will be determined based on the results of the TCLP test.

Groundwater modelling was conducted as part of the Feasibility Study in order to estimate the time for groundwater to reach cleanup standards (NR 140 WAC Preventive Action Limits). Modelling was conducted to estimate the time for groundwater to naturally attenuate to cleanup standards versus the time for groundwater to meet cleanup standards if a pump and treat system were utilized. It was estimated that natural attenuation to cleanup standards would occur in 38 years. Estimated cleanup time with a pump and treat system was 12 to 23 years depending on the amount of dispersion during pumping (dispersivity of 10 feet versus dispersivity of 40 feet). The pumping and treatment of the groundwater is estimated to reduce the groundwater cleanup time from 38 years to between 12 and 23 years.

Capital Cost: $4,300,000
O&M Cost: $217,000
Present Net Worth: $6,400,000

VIII. COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the NCP, the relative performance of each alternative is evaluated using the nine criteria, 40 CFR Section 300.430(e)(9)(iii), as a basis for comparison. An alternative providing the "best balance" of trade-offs with respect to the nine criteria is determined from this evaluation.

A detailed analysis was performed on the five alternatives using the nine evaluation criteria in order to select a site remedy. Alternatives 4 and 5 are identical except for the groundwater pump and treat. Because a final remedy for groundwater will be addressed in the ROD for the second operable unit, Alternative 5 will not be evaluated further in this ROD. The following is a summary of the comparison of each alternative's strength and weakness with respect to the nine evaluation criteria. The nine criteria are: 1) overall protection of human health and the environment, 2) compliance with applicable or relevant and appropriate requirements (ARARs), 3) long-term effectiveness and permanence, 4) reduction of toxicity, mobility or volume through treatment, 5) short-term effectiveness, 6) implementability, 7) cost, 8) state acceptance, and 9) community acceptance.

Overall Protection of Human Health and the Environment. All of the alternatives, except Alternative 1 (no action), are protective of human health and the environment. As the No Action alternative does not provide protection of human health and the environment, it is not eligible for selection and will not be discussed further. Alternatives 2 through 4 reduce human exposure to contaminants through institutional controls, site monitoring, capping of the landfill and mercury brine pit, landfill gas control and leachate collection and treatment. Capping will reduce risks associated with wind transport of exposed asbestos and surface soils contaminated by leachate seeps; it will also substantially reduce surface water infiltration into the waste material, which will reduce leachate production presently migrating to the groundwater. The active landfill gas control system will reduce risks associated with migrating gas from the landfill to adjacent structures (e.g., basements) which could pose an explosion hazard. The leachate extraction and treatment system will protect the groundwater from any further contamination from landfill leachate. Alternative 4 includes solidification/stabilization of the mercury brine pit which will ensure that the contents of the mercury brine pit do not leach into the groundwater in the future.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs). Alternatives 2 through 4 will meet all ARARs associated with this first operable unit, and are described in detail in Section X of this ROD, Statutory Determinations.

Long Term Effectiveness and Permanence. Alternatives 2 through 4 provide for long term effectiveness and permanence by controlling the source (landfill waste). Alternative 2 is the most effective at controlling the source in the long term because the NR 660 WAC impermeable cap will virtually eliminate any leachate generation in the future. Alternatives 3 and 4, although effective, are not as permanent at controlling the source because leachate will continue to be generated, thus requiring continuous leachate collection and treatment. Alternative 4 is more permanent at controlling the source than alternative 3, however, because it addresses the contents of the mercury brine pit. Solidification/stabilization of the contents of the mercury brine pit will ensure that the pit can support a hazardous waste cap and minimize the likelihood that groundwater will become contaminated from the contents of the mercury brine pit in the future.

Reduction of Toxicity, Mobility, or Volume Through Treatment. All of the alternatives (2 - 4) will utilize treatment to reduce the toxicity, mobility and volume of leachate. None of the alternatives propose to treat the contents of the landfill because this would be very costly and would not significantly reduce risks below the level which will be achieved through capping. Alternative 4 will utilize solidification/stabilization to stabilize the brine pit.

Short-Term Effectiveness. Alternatives 2 through 4 involve construction at the site. Protection of site workers and the community during the implementation of the alternatives will be addressed by site safety plans. Capping of the landfill, leachate extraction and treatment, and landfill gas control, as provided in Alternatives 2 through 4, are expected to have an immediate beneficial effect on groundwater contamination.

Implementability. There will be some implementation problems for all the alternatives. Institutional controls typically pose problems with implementation and enforcement. The capping of the landfills may cause access problems to the site, as there is only one access road to the property, which abuts the toe of the landfills in places. The cap may render part or all of the road inaccessible. The combination solid waste/hazardous waste caps proposed for the landfills/mercury brine pit may pose construction problems since this type of mixed cap construction does not appear to be typical. A final determination regarding groundwater remediation will not be made until the second operable unit ROD is issued.

Cost. The estimated capital, annual operation and maintenance, and 30-year present worth costs for each of the alternatives are presented below:

Alternative	Capital Cost	O&M	Present Worth
1	$ 0	$ 0	$ 0
2	$ 4,587,000	$ 72,000	$ 5,217,000
3	$ 3,561,000	$113,000	$ 4,587,000
4	$ 3,833,000	$113,000	$ 4,859,000
5	$ 4,300,000	$217,000	$ 6,400,000

Alternative 3 is the least costly of Alternatives 2 through 5.

State Acceptance. The WDNR concurs with U.S. EPA's decision.

Community Acceptance. U.S. EPA received two comments from the public. Both of the comments are addressed in the attached Responsiveness Summary.

IX. SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, U.S. EPA has determined that Alternative 4 (fencing and deed restrictions; NR 504 cap on the landfills; solidification/stabilization of the mercury brine pit and NR 660 cap; active landfill gas control; leachate collection and treatment; and groundwater monitoring) is the most appropriate remedy for the first operable unit for the Spickler Landfill site in Spencer, Wisconsin. The second operable unit will address a final remedy for groundwater.

Alternative 4 will achieve substantial risk reduction through capping of the landfills with a NR 504 cap, solidification/stabilization of the mercury brine pit and capping the mercury brine pit with a NR 660 cap, active landfill gas control, and leachate treatment. The capping of the landfills and leachate collection will considerably slow down the rate at which contaminants from the waste mass enter groundwater. An NR 504 cap is considered protective for the landfill, excluding the mercury brine pit, because it provides protection against direct contact with waste and will reduce infiltration of precipitation; an NR 660 cap would not provide any significant increase in protection in connection with the landfill. An NR 660 cap is appropriate for the mercury brine pit because the wastes disposed in the pit are RCRA listed waste K071, mercury brine sludge. The NR 660 cap is appropriate because the purpose of closing the mercury brine pit is to eliminate, not simply reduce, infiltration into the pit. Stabilization/solidification and an impermeable cap on the mercury brine pit will ensure that leachate currently in the pit will not enter the groundwater and

the impermeable cap will significantly reduce any future leachate production in the mercury brine pit. Groundwater monitoring will be used to detect any changes in groundwater quality and extent of groundwater contamination at the site. Groundwater monitoring will not reduce potential risks associated with future use of the contaminated groundwater. The second operable unit will consist of a final remedy decision for groundwater. The active gas control will ensure that nearby buildings are protected from the possibility of landfill gas migrating to basements with the potential for an explosion. Alternative 4 is cost-effective because the effectiveness of solidification/stabilization of the mercury brine pit and groundwater monitoring will be proportional to the cost of these measures. Alternative 4 provides the best balance of benefits, with respect to the nine evaluation criteria, among all of the alternatives considered for closure of the Spickler Landfill site.

X. STATUTORY DETERMINATIONS

Under its legal authorities, U.S. EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that, when complete, the selected remedial action for this site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment as a principle element that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances. The following sections discuss how the selected remedy meets these statutory requirements.

A. Protection of Human Health and the Environment

The selected remedy protects human health and the environment through containment of long-term, low-level threat hazardous substances, solidification/stabilization of the mercury brine pit followed by an impermeable cap, landfill gas control, treatment of leachate and groundwater monitoring. Extracted leachate will be treated to appropriate discharge levels as specified by Federal and State requirements prior to discharge to the wetlands, surface water or a POTW. Solidification/stabilization of the mercury brine pit will be preceded by treatability tests to determine the viability of these processes. The mercury brine pit will be capped with an impermeable cap meeting the requirements of NR 660 WAC. The landfills will be capped with a solid waste cap meeting the requirements of NR 504 WAC.

Groundwater monitoring will be conducted to detect any change in the quality or location of the groundwater contamination associated with the site.

B. Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy will comply with the Federal and more stringent State ARARs listed below:

Chemical Specific ARARs

Chemical-specific ARARs regulate the release to the environment of specific substances having certain chemical characteristics. Chemical-specific ARARs typically determine the extent of clean-up at a site.

i. Surface Water

Federal ARARs

Surface water quality standards for the protection of human health and aquatic life were developed under Section 304 of the Clean Water Act (CWA). The Federal Ambient Water Quality Criteria (AWQC) are nonenforceable guidelines that set pollutant concentration limits to protect surface waters that are applicable to point source discharges, such as from industrial or municipal wastewater streams.

State ARARs

The State has promulgated Wisconsin Water Quality Standards and Criteria (WWQC) under Chapters NR 102 and 105, WAC, and the procedures for calculating the toxic effluent limits under Ch. NR 106, WAC, based on the Federal AWQC developed by U.S. EPA. NR 102, 104 and 207 WAC also apply in determining water quality based limits. The State WWQC are applicable if leachate from the Spickler Landfill site is pumped, treated and discharged into the wetlands or surface water body, as are the antidegradation standards in Ch. NR 207 WAC.

The State is authorized to implement the National Pollutant Discharge Elimination System (NPDES) program. For discharge of treated water and/or leachate, the applicable or relevant and appropriate requirements are dependent on the point of discharge. The procedural and substantive requirements of a Wisconsin Pollutant Discharge Elimination System (WPDES) permit, under Ch. NR 220, WAC, would be applied to the discharge of leachate into the wetland, POTW or surface water body, since these discharge points are considered to be off-site. Subject to the approval of the U.S. EPA, effluent limits for surface water or

wetland discharge will be established by the WDNR. Ch. NR 220, WAC, requires that the effluent limits be based on the application of best available technology (BAT) prior to discharge.

ii. Publicly Owned Treatment Work (POTW)

State ARARs

Ch. NR 211, WAC, is applicable to pretreatment effluent limits for the discharge of wastewater to a POTW.

iii. Air Emission Standards

Federal ARARs

42 U.S.C. Section 7401 et. seq. (Clean Air Act) is applicable to any off gases produced by the gas control system and/or leachate treatment systems.

State ARARs

Ch, NR 445, WAC provides air pollution control standards and is applicable to any off gases produced by the gas extraction and/or leachate treatment systems.

iv. Land Disposal Restrictions

Federal ARARs

40 CFR Part 268 is applicable for placement of the contents of the mercury brine pit (RCRA listed K071 waste) and any leachate treatment residuals which are RCRA characteristic under the TCLP.

State ARARs

Ch. NR 675.20, WAC, provides land disposal restrictions treatment standards and are applicable for placement of the contents of the mercury brine pit (RCRA listed K071 waste) and any leachate treatment residuals which are RCRA characteristic under the TCLP.

Location-specific ARARs

Location-specific ARARs are those requirements that relate to the geographical position of a site. These include:

Federal ARARs

Executive Order 11990 - Wetland Protection - is applicable for this site if the discharge of treated leachate and groundwater is to the wetlands.

Section 404 of the CWA regulates the discharge of dredge or fill material to waters of the United States. Construction of surface water discharge points may be regulated under section 404 of the CWA; therefore, the substantive requirements of section 404 would be relevant and appropriate to the remedial action at the site if the discharge of the treated leachate and groundwater is to the wetlands or a surface water body.

State ARARs

Ch. NR 115, WAC - Wisconsin's County Shoreland Protection Program, Ch. NR 1.95, WAC - Wetlands Preservation, Protection, and Management, and Ch. NR 103 - Water Quality Standards for Wetlands are applicable for this site if treated leachate is discharged to the wetlands, if any structure is built or any fill is placed in a wetland area, or if any construction is done in a shoreland area.

Ch. NR 112, WAC, which requires that no drinking water wells be located within 1,200 feet of a landfill, unless a variance is obtained from the WDNR, is applicable to the site.

Action-specific ARARs

Action-specific ARARs are requirements that define acceptable treatment and disposal procedures for hazardous substances.

Federal ARARs

For landfill closure, RCRA Subtitle D is relevant and appropriate because the majority of the wastes that were placed in the landfills are low level threat wastes (municipal waste). The current cap on the landfill does not meet Federal closure requirements for a solid waste landfill.

For closure of the mercury brine pit, RCRA Subtitle C requirements are relevant and appropriate because the wastes disposed in the mercury brine pit are RCRA listed waste K071, mercury brine sludge, and the wastes were disposed in the mercury brine pit prior to 1980, the effective date of RCRA. The Subtitle C cap is appropriate because the purpose of closing the

mercury brine pit is to eliminate infiltration into the pit and achieve long-term effectiveness and permanence of protection of human health and the environment.

RCRA Land Disposal Restrictions (40 CFR Part 268) are applicable to any leachate treatment residuals from the landfill if they are determined to be characteristic RCRA wastes.

Disposal of nonhazardous wastes are regulated under 40 CFR Part 257 and these requirements are applicable to disposal of nonhazardous wastes associated with this remedial action.

Treated leachate may be discharged to a POTW, surface water or wetlands. These discharge points are regulated under 40 CFR Section 403.5, and the National Pollution Discharge Elimination System (NPDES).

Federal regulations at 40 CFR Section 264.310 regarding post-closure care to ensure that the site is maintained and monitored are applicable.

State ARARs

Ch. NR 30, Wisconsin Statutes, regulates dredging, relocation, enlargement, grading and structures in or near navigable waters of the State. These statutes would be applicable for any structures built in or near the surface water body. Such structures may be needed for discharge of treated leachate.

The discharge of wastewater (treated leachate) to the land and/or surface waters; effluent limits; discharge permits; sampling/testing methods is regulated by Ch. 147, Statutes - Wastewater Management Programs and Chs. NR 102, 104, 105, 106, 200, 207, 214, 217, 219, 220, WAC Surface Water Discharge Regulations (WPDES). These requirements are all applicable to the discharge of treated leachate to the wetlands or surface water body. These regulations state that no discharge shall contain quantities of listed pollutants greater than that would remain after subjecting the water to best available technology economically achievable (BATEA).

Ch. NR 108, WAC, regulates the plan review and standards for wastewater treatment facilities and Ch. 211, WAC - pretreatment requirements for discharge to a POTW. These requirements are applicable to this site if leachate is to be discharged to a POTW.

The States' Solid and Hazardous Waste Programs are regulated by Ch. 144, Statutes. The Solid Waste regulations are Ch. NR 500-520 WAC. The NR 500 series is applicable at this site.

Ch. NR 504.07, NR 506.08(3), 514.07, 516.07, WAC - Landfill Capping and Closure Requirements are applicable at this site. This cover system is a necessary first step to prevent future and abate current exceedences of the groundwater standards found in Ch. NR 140, WAC. Whether or not active groundwater remediation will be necessary to meet the groundwater quality standards in Ch. NR 140 will be determined in the second operable unit ROD.

Ch. NR 508, WAC - Landfill Monitoring Requirements are applicable to this site for the long-term groundwater monitoring.

Ch. NR 504.04(4)(e)&(f), 506.07(3), and 508.04(2), WAC - These requirements are applicable to this site for controlling explosive gas migration and levels and for soil gas monitoring. Ch. NR 506.08, WAC, may be applicable for this site. This requirement regulates active gas extraction systems which effectively collect and combust the gas.

Ch. NR 506.08(3)(b), WAC - This requirement is applicable to this site to control stormwater runoff from the site.

Ch. NR 504.05 is applicable because it provides the minimum design criteria for all aspects of the remedial measures.

The Hazardous Waste Regulations are the Ch. NR 600-685, WAC, series. These requirements are either applicable or relevant and appropriate for the remedial actions at the site.

Ch. NR 605, WAC - Hazardous Waste Listing and Identification.

Ch. NR 610, 615, WAC - Standards for Small and Large Quantity Hazardous Waste Generators.

Ch. NR 620, WAC - Hazardous Waste Transporter Standards and Licensing Requirements.

Ch. NR 630, WAC - Hazardous Waste Storage, Treatment and Disposal Facility Standards.

Ch. NR 635, WAC - Leachate Monitoring Standards and Corrective Action Requirements.

Ch. NR 660, WAC - Hazardous Waste Landfill and Surface Impoundment Standards.

Ch. NR 675, WAC - Land Disposal Restrictions.

CH. NR 685, WAC - Closure and Long-term Care Requirements.

Ch. NR 400-499, WAC, provides air pollution control standards and is applicable to this site for any off gases produced by the gas extraction system and/or waste water treatment system.

Ch. NR 149, WAC, regulates the State's Laboratory Certification Program. This requirement is applicable to any analytical testing done at the site.

C. Cost Effectiveness

The first operable unit for this site is cost effective because it has been determined to provide overall effectiveness proportional to its costs, the net present worth value being $4,900,000. Solidification/stabilization of the mercury brine pit will ensure that leachate in the pit will not pose a threat to the groundwater in the future, and future generation of leachate in the pit will be eliminated; therefore the added costs of the solidification/stabilization of the mercury brine pit are justified given the additional level of protection provided.

D. Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

U.S. EPA has determined that the first operable unit represents the maximum extent to which permanent solutions and treatment technologies can be utilized for closure of the landfills in a cost-effective manner for the Spickler Landfill site. U.S. EPA has determined that this selected remedy for the first operable unit provides the best balance of tradeoffs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, cost, also considering the statutory preference for treatment as a principal element and considering State and community acceptance.

The selected remedy for the first operable unit will significantly reduce the inherent hazards posed by the waste mass and the mercury brine pit by capping the landfills and mercury brine pit, solidification/stabilization of the mercury brine pit, landfill gas control, collection and treatment of leachate and groundwater monitoring.

E. Preference for Treatment as a Principal Element

The statutory preference for treatment as a principal element of a remedy is satisfied by the first operable unit.

The selected remedy for the first operable unit satisfies the statutory preference for remedies that employ treatment as a principal element because stabilization of the mercury brine pit constitutes treatment of the principal threat. Short-term effectiveness is similar for all the alternatives considered. All of the alternatives will have similar implementability problems except the alternatives that require solidification/stabilization of the mercury brine pit. Solidification/stabilization of the mercury brine pit could pose implementation problems, but these will be considered during the treatability tests.

XI. DOCUMENTATION OF SIGNIFICANT CHANGES

A significant change has been made in the remedy selected for the Spickler Landfill site since the publication of the FS and the Proposed Plan in December 1991. The remedy recommended in the Proposed Plan was Alternative 5: Fencing and Deed Restrictions; NR 504 cap on the landfill; solidification/stabilization and capping with an NR 660 cap of the mercury brine pit; active landfill gas control; leachate collection and treatment; and groundwater pump and treat. Since publishing the proposed plan, U.S. EPA has determined that an operable unit approach is more appropriate for this site than one final remedy at this time.

U.S. EPA has determined that the first operable unit, which is addressed by this ROD, will consist of solidification/stabilization and capping of the mercury brine pit and capping the landfill, landfill gas control, leachate extraction and treatment, and groundwater monitoring. The second operable unit will consist of a final remedy decision for groundwater. The Agency has determined that the operable unit approach is more appropriate at this time because it allows a more focused, logical approach, whereby the landfill, which is the source of groundwater contamination, is remediated first. Solidification/stabilization and capping of the mercury brine pit in conjunction with leachate extraction and a solid waste cap on the landfill, may improve groundwater quality. The observation and analysis, including groundwater monitoring, of the effects of these control measures on the landfill and mercury brine pit are needed to allow for an informed decision on a final remedy decision for groundwater.

The remedy selected for the first operable unit is Alternative 4: fencing and deed restrictions; NR 504 cap on the landfill; solidify/stabilize the mercury brine pit and cap it with an NR 660 cap; active landfill gas control; leachate collection and

treatment and groundwater monitoring. This change in remedy selection, to an operable unit approach, is a logical outgrowth based on the information available during the public comment period and the comments submitted. Among the four alternatives considered for this first operable unit, Alternative 4 has been determined to provide the most appropriate balance of tradeoffs among the alternatives, with respect to the nine criteria.

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RESPONSIVENESS SUMMARY

This Responsiveness Summary has been prepared to meet the requirements of Sections 113(k)(2)(B)(iv) and 117(b) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), which requires the U.S. EPA to respond "...to each of the significant comments, criticisms, and new data submitted in written or oral presentations" on a proposed plan for remedial action. The Responsiveness Summary addresses concerns expressed by the public, potentially responsible parties (PRPs), and governmental bodies in the written and oral comments received by the U.S. EPA and the State regarding the proposed remedy for the Spickler Landfill Superfund site.

A. Overview

The selected alternative for the Spickler Landfill site includes:

* Solidification/stabilization of the contents of the mercury brine pit, followed by installation and maintenance of an impermeable cap which meets the requirements of NR 660 Wisconsin Administrative Code (WAC).

* Install and maintain a solid waste cap which meets the requirements of NR 500 WAC over the New and Old Fill areas.

* Install and maintain a leachate extraction and treatment system.

* Install and maintain an active landfill gas collection system.

* Site monitoring of groundwater and landfill gas and site inspection of the fence and the landfill cap.

* Institute deed restrictions on the property to prohibit installation of drinking water wells 1,200 feet from the toe of the landfill and prohibit construction on the landfill itself.

The selected alternative was identified as Alternative 4 in the Feasibility Study Report dated November, 1991, and in the Proposed Plan dated December, 1991. More detailed information on the selected alternative, as well as other alternatives considered to remediate this site, is available in these documents. The documents are available in the information repository and administrative record for the site at the Spencer Village Hall.

A significant change has been made in the remedy selected for the Spickler Landfill site since the publication of the FS and the Proposed Plan in December 1991. The change is based in part from comments the Agency received during the public comment period. The remedy recommended in the Proposed Plan was Alternative 5: Fencing and Deed Restrictions; NR 504 cap on the landfill; solidification/stabilization and capping with an NR 660 cap of the mercury brine pit; active landfill gas control; leachate collection and treatment; and groundwater pump and treat. Since publishing the proposed plan, U.S. EPA has determined that an operable unit approach is more appropriate for this site than one final remedy at this time. U.S. EPA has determined that the first operable unit will address closure of the mercury brine pit and the landfill, and will include groundwater monitoring. The second operable unit will consist of a final remedy decision for groundwater. The Agency has determined that the operable unit approach is more appropriate at this time because the groundwater contamination has not moved off the property, which makes it easy to monitor and control exposure, and groundwater contaminant concentrations are relatively low. In addition, U.S. EPA anticipates that the source control measures which will be implemented as the first operable unit will improve the groundwater quality. Finally, treated groundwater discharge options present unique difficulties in implementation. The three discharge location options considered in the FS were a POTW, surface water, or wetlands to the northwest of the site. Discharge to a POTW would have to be via truck because there are no sewer lines in the area of the site. Trucking large quantities of groundwater may not be feasible. Discharge to a surface water body would require building a pipeline to the East Branch of the Yellow River which is located approximately 1 mile from the site. Discharge of treated groundwater to the wetlands will probably require more treatment than was anticipated in the FS, depending on the discharge limitations. Also discharge to the wetlands could cause flooding of the wetlands and this option would need to be considered in more detail before determining if it would be a feasible or not.

The remedy selected for the first operable unit is Alternative 4: fencing and deed restrictions; NR 504 cap on the landfill; solidify/stabilize the mercury brine pit and cap it with an NR 660 cap; active landfill gas control; leachate collection and treatment and groundwater monitoring. This change in remedy selection is a logical outgrowth of the alternatives discussed in the proposed plan, the information available during the public comment period and the comments submitted. Alternative 4 has been determined to provide the most appropriate balance of tradeoffs among the alternatives, with respect to the nine criteria, in light of public comment.

B. Background on Community Involvement

The Remedial Investigation (RI) report, Feasibility Study (FS) report and the Proposed Plan for the Spickler Landfill site were released to the public for comment on December 9, 1991. These documents were made available to the public in both the administrative record file and an information repository maintained at the U.S. EPA offices in Region V and at the Spencer Village Hall. The notice of availability for these documents was published in the Marshfield Herald on December 4, 1991. A public comment period on the documents was originally planned for December 9, 1991, through January 9, 1992. The comment period was extended upon the request of the PRPs to February 10, 1992. Notice of the extension of the public comment period was published in the Marshfield Herald on December 30, 1991. The public was afforded the opportunity to request a public meeting, as indicated in the Proposed Plan Fact Sheet dated December 1991, but no requests for a public meeting were received. Comments received during the public comment period are responded to in this Responsiveness Summary.

C. Summary of Comments Received and Agency Responses

The public comments regarding the Spickler Landfill site are organized into two categories:

- Summary of comments from the community;
- Summary of comments from the PRPs;

Many of the comments below have been paraphrased in order to effectively summarize them in this document. The Administrative Record contains copies of written comments submitted during the public comment period. No comments were received from the State of Wisconsin on the Proposed Plan during the public comment period.

Comments from the Community

Comments received from the community and responses are listed below:

1. Comment: One commenter favors Alternative 4 over Alternative 5 because of the difference in cost and because there does not appear to be a significant leaching problem.

   Response: U.S. EPA has determined that an operable unit approach is more appropriate for this site at this time because the groundwater contamination has not moved off the property, which makes it easy to monitor and control exposure, and groundwater contaminant concentrations are relatively low. In addition, U.S. EPA anticipates that the

source control measures which will be implemented as the first operable unit will improve the groundwater quality. Finally, treated groundwater discharge options present unique difficulties in implementation. U.S. EPA has selected Alternative 4 as the final remedy for the first operable unit, which will consist of closure of the landfill and groundwater monitoring. The second operable unit will consist of a final remedy decision for groundwater.

2. Comment: One commenter indicated that there was a Court Order for the removal of the mercury brine pit in 1971, and wants to know why the mercury brine pit was not removed per the court order. The commenter also wants to know if the Town of Spencer will be made a responsible party to the cleanup.

   Response: U.S. EPA does not have any information in its files at this time regarding the 1971 court order for removal of the mercury brine pit, who obtained the court order, or why Frederick Spickler, who owned the landfill in 1971 did not comply with the court order.

   Based on information which the U.S. EPA has to date, the Town of Spencer is not considered to be a potentially responsible party (PRP) by U.S. EPA.

Comments from the Weyerhaeuser Co. and BASF Corp.

1. Comment: Vinyl Chloride (VC), which was detected in 1 of 30 groundwater samples during Round 1 sampling, and is therefore of questionable certainty, should not be used in the baseline risk assessment or as part of the groundwater modelling.

   Response: U.S. EPA disagrees that the VC sampling data should not be considered in the baseline risk assessment and the groundwater modelling for this site. Generally, the sampling data collected during the RI was determined to be of very good quality. Section 4.1.2 of the RI report (August 1991) discusses data usability and explains that:

   > [d]ata use limitations were assessed from laboratory and field Quality Control (QC) criteria described in the Quality Assurance Project Plan (QAPP) for the Site (Warzyn 1989b). Based on data validation performed by Warzyn, the results of laboratory analyses were quantitative and acceptable. Overall, data quality is very good. Data considered totally unusable (Qualified R) were rejected for use in this evaluation, but few data were considered unusable...

The vinyl chloride data was unqualified during the Round 1 sampling event and was qualified with a J-qualifier (estimated value) during the Round 2 sampling event. A J-qualifier does not make the data unusable; rather it signals that the quantity reported is an estimated value.

In addition, the use of the vinyl chloride data in the baseline risk assessment (BRA) was appropriate and in accordance with U.S. EPA guidance. U.S. EPA's guidance document entitled "Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A), Interim Final, EPA document no. EPA/540/1-89/002, dated December 1989, page 5-20 states that the list of chemicals of potential concern to be evaluated in the baseline risk assessment should include chemicals that were: "(1) positively detected in at least one CLP [Contract Laboratory Program] sample in a given medium, including (a) chemicals with no qualifiers attached (excluding samples with unusually high detection limits), and (b) chemicals with qualifiers attached that indicate known identities but unknown concentrations (e.g., J-qualified data);(emphasis added) (2) detected at levels significantly elevated above levels of the same chemicals detected in associated blank samples; (3) detected at levels significantly elevated above naturally occurring levels of the same chemicals; (4) only tentatively identified but either may be associated with the site based on historical information or have been confirmed by SAS [special analytical services]; and/or (5) transformation products of chemicals demonstrated to be present."

VC was detected in two CLP samples during the RI. Sample SP-GWMWS01A-01 collected on 7/18/90 contained 39 ug/l of VC and sample SP-GWMWS01A-02 collected on 1/9/91 contained 47 ug/l of VC. The 1/9/91 sample was qualified with a J-qualifier. Blank samples contained no VC. Background groundwater samples (taken from monitoring wells numbered 15S, 15D, 17S and 18S) contained no VC. VC was appropriately selected as a chemical of concern to be considered in the BRA in accordance with U.S. EPA guidance.

2. Comment: The commenter believes that if the landfill was the source of vinyl chloride (VC) in the groundwater, it would be expected to have been detected in the leachate samples, and specifically in leachate headwells numbered LH6, S4 and S5.

Response: U.S. EPA disagrees that, because VC was detected in monitoring well numbered S1A, it would necessarily detect VC in leachate headwells numbered LH6, S4 and S5. Non-detection of VC in leachate does not mean that the landfill is not the source of VC in the groundwater. A review of the

leachate and groundwater data indicates that other compounds such as tetrachloroethene (PCE) at 14 ug/l, and trichloroethene (TCE) at 69 ug/l, were detected in leachate headwell LH6. Monitoring well S1A contained 9 ug/l DCE, 2 ug/l trichloroethene (TCE) and 47 ug/l VC as well as other contaminants. VC is the less complex (yet more toxic) derivative at the end of the decomposition chain for PCE, TCE and DCE. Thus the VC in the groundwater may reflect decomposition of contaminants which were found in the leachate which was previously released from the landfill.

3. Comment: The VC reported concentration shows a wide difference between the sample collected on 1/9/91 and the duplicate collected on the same day.

Response: The duplicate sample collected on 1/9/91 did contain VC, but the laboratory instrument identified it as a Tentatively Identified Compound (TIC) instead of VC, probably due to a calibration error in the laboratory instrument.

4. Comment: The commenter argues that U.S. EPA cannot state that a vinyl chloride (VC) exceedence occurred because chapter NR140.20 paragraph (3) of the Wisconsin Administrative Code (WAC) states that Wisconsin may allow the use of a statistical procedure to determine if a preventive action limit (PAL) or enforcement standard (ES) exceedence exists when the reported value is between the detection limit and the quantitation limit. There is no indication in the RI or the FS whether the limit of quantitation was determined or whether the significance of the reported value was determined by using an appropriate statistical test.

Response: The reference should be to NR 140.14(3)(b) WAC which states "[i]f a substance is reported to be present in a sample above the limit of detection but below the limit of quantitation, and if the preventive action limit or enforcement standard for that substance is below the limit of detection, the preventive action limit or enforcement standard shall be considered to have been attained or exceeded only if the presence of that substance has been confirmed by the use of an appropriate statistical test at a significance level of 0.05."

The cleanup standards set forth in NR 140 WAC are promulgated standards which are ARARs because they are substantive and more stringent than Federal cleanup standards. EPA procedures as delineated in the approved Sampling and Analysis Plan and QAPP provide a method for determining the validity of sampling results. These procedures are intended to address the same concerns as

NR 140.14(3)(b), which delineates statistical procedures to be followed to determine if an exceedence of a PAL or an ES has occurred. In addition, NR 140.14(3)(b) is not more stringent than the CLP procedures used in CLP Statements of Work to determine if an exceedence of a cleanup standard has occurred. In any event, the commenter's concern does not bear upon the remedy selected as part of this operable unit; a final remedy decision for groundwater will be addressed as part of the second operable unit for this site, and ARARs for any groundwater remedy will be finalized at that time.

5. Comment: One commenter is concerned that the implementability problems with stabilization/solidification (S/S) of the mercury brine pit were not discussed adequately in the Feasibility Study and in the Proposed Plan. The commenter concludes that cement is required to achieve the S/S.

Response: The Feasibility Study (FS) Report indicates that S/S of the mercury brine pit is technically and administratively feasible and the required services, materials and equipment are available to implement S/S.

U.S. EPA recognizes that treatability studies will be required to determine the feasibility of solidifying the wastes in the mercury brine pit, as stated in the description of Alternative 4 in the proposed plan. The purpose of S/S of the mercury brine pit is to ensure that the mercury brine pit can support a cap meeting the requirements of NR 660 WAC and to ensure that leachate that currently exists in the mercury brine pit does not pose a threat to groundwater.

The proposed plan does not indicate that cement is the only admixture that would be allowed as the commenter seems to believe. The proposed plan states that a "cement-type material" would be added to the mercury brine pit and then it would be mixed in-situ. This language was not meant to indicate that cement was the required S/S agent. The treatability study will determine the optimal way to complete S/S of the mercury brine pit.

6. Comment: The commenter is concerned that of the three discharge options for treated leachate or groundwater, which include discharge to a publicly owned treatment works (POTW), surface water body, or wetlands, the only viable alternative is discharge to a surface water body and this will require construction of a two mile pipeline to the East Branch of the Yellow River.

Response: U.S. EPA recognizes that there are implementation problems with all three of the discharge options which were considered in the FS. However, U.S. EPA believes it is premature to conclude that only one of the discharge options is viable. Effluent discharge requirements to the wetlands and to a surface water body have not been determined yet. In regards to the reference that two miles of pipeline would be required to reach the East Branch of the Yellow River, the East Branch of the Yellow River is actually 3/4 to 1 mile north of the site. Discharge to a POTW may not be viable due to the need to truck the water to the POTW. However, at this time, all of the discharge options are considered viable by the Agency. Further analysis regarding the viability of these three discharge options will be conducted as part of the second operable unit for this site.

7. Comment: The additional degree of protection provided by a groundwater pump and treat system is not justifiable at the site because: (1) the hydrogeology is complex at the site; (2) the contaminant levels are low; and (3) clean water will be drawn into the recovery system. Also pump and treat is not effective in meeting Federal and State cleanup standards.

Response: A final remedy decision for the groundwater will be addressed in the ROD for the second operable unit for this site. However, the only indication that the commenter gives regarding complexity of the hydrogeology of the site is that the primary water bearing unit is a fractured sandstone unit. Fractured sandstone does not constitute "complex" hydrogeologic conditions per se. Fractured flow in an aquifer would be considered to be complex. However, there is no indication that the flow in the sandstone aquifer at the Spickler Landfill site is fractured flow. Data from the packer tests, which were conducted during the remedial investigation, indicate that flow is in the pores of the sandstone and is not fractured flow. The commenter states the contaminant levels are "low." U.S. EPA agrees that contaminant concentrations are relatively low, however, groundwater contaminant concentrations in the groundwater at the site exceeded maximum contaminant levels (MCLs) established by the Federal Safe Drinking Water Act for vinyl chloride, benzene and barium. Therefore the groundwater in the immediate vicinity of the site could pose adverse human health effects if it were utilized as a drinking water source.

8. Comment: The commenter is concerned that U.S. EPA has used groundwater modelling timeframes in selecting the preferred alternative which includes a groundwater pump and treat.

Response: U.S. EPA has determined that a two operable unit approach is more appropriate for this site. This ROD addresses the first operable unit only, which addresses closure of the mercury brine pit and the landfill and will include groundwater monitoring.

9. Comment: The commenter believes there is enough uncertainty in the cleanup timeframe calculations that it is not possible to determine from these calculations that long term effectiveness and permanence is greater for Alternative 5 (which includes groundwater pump and treat) and Alternative 4 (which does not include groundwater pump and treat).

Response: Implementation of a groundwater pump and treat system will always remediate groundwater faster than natural attenuation. Modelling is a tool used to estimate how much faster the pump and treat will achieve cleanup standards over natural attenuation. U.S. EPA recognizes that modelling presents only an estimate of cleanup times; however, this uncertainty does not preclude use of modelling output information in weighing the benefit which will be derived from the pump and treat system over natural attenuation.

U.S. EPA has determined that an operable unit approach is appropriate for this site in order to obtain additional data on the extent and concentration of groundwater contamination, prior to making a final decision on a remedial action for groundwater.

10. Comment: The commenter states that the fractured sandstone aquifer under the site is sufficiently complex that the use of simple one- and two-dimensional models such as those used by BASF and Weyerhaeuser's contractor lends itself to such great uncertainty that U.S. EPA cannot rely on the output of the modelling to make a decision regarding the performance of a groundwater pump and treat at this site. The commenter does state, however, that "the simplified hydrogeochemical analysis detailed in the FS is a reasonable preliminary approximation at characterizing the behavior of groundwater contaminants at the site,..."

Response: As indicated in response to comments numbered 8 and 9, above, U.S. EPA does not make the determination of whether active remediation is required based exclusively on modelling results. That determination is based on risk posed to human health and the environment from contamination in the media and exceedences of chemical-specific ARARs. This decision is made based on sampling and modelling data. At the Spickler Landfill site, maximum contaminant levels (MCLs), set forth in the Federal Safe Drinking Water Act, have been exceeded for benzene, vinyl chloride, and barium. Carcinogenic risk associated with ingestion and dermal contact with the contaminated groundwater is 3 X 10-3 and the non-carcinogenic hazard index is 30. A carcinogenic risk greater that 1 X 10-4 (3 X 10-3 is greater than 1 X 10-4) is considered to pose an unacceptable lifetime cancer risk by U.S. EPA. A hazard index which is greater than 1 is considered to pose an unacceptable non-carcinogenic risk.
U.S. EPA has not had to rely on the output of the modelling in making a decision as to whether or not active remediation is required at this site. Simplified modelling of groundwater at Superfund sites is commonly used, as here, to obtain a relative comparison of cleanup timeframes for contaminants of concern identified through sampling.

11. Comment: The commenter indicates that biodegradation was not included in the modelling of the groundwater cleanup timeframes and argues that, based on biodegradation half-lives from a literature source, the groundwater should naturally attenuate in 0.2 to 11.3 years.

Response: The commenter correctly indicates that biodegradation was not part of the modelling conducted by Weyerhaeuser and BASF's contractor in the FS report. However, biodegradation is commonly not included in modelling efforts because it is very difficult to predict. There is no site-specific data which conclusively shows that biodegradation is occurring at the Spickler Landfill site. The commenter assumes that biodegradation is occurring at the Spickler Landfill site at a rate equal to literature value half-lives for benzene and xylene, but does not have any site-specific data to verify this claim. The commenter has been critical of the groundwater modelling in the FS report because of its simplicity; however, the commenter then calculates a cleanup time for groundwater contaminants based only on literature value biodegradation half-lives, with no information or data on site-specific hydrogeology and without addressing the likelihood that the landfill waste mass may act as a continuing source of groundwater contamination indefinitely.

U.S. EPA does not necessarily agree that biodegradation would reduce groundwater contamination at the site to cleanup standards in 0.2 to 11.3 years.

12. Comment: The commenter states that a groundwater pump and treat will "likely be counterproductive by contaminating clean groundwater."

Response: Every groundwater extraction system will pump some clean groundwater; if it did not, all contaminated groundwater could not be assured of being captured. The amount of clean water that an extraction system will pump will be determined by the design of the system. A poorly designed system could pump large quantities of clean groundwater, a well designed system would not pump any more clean groundwater than was necessary to ensure that all contaminated groundwater was captured. A final remedy decision for groundwater will be addressed in the second operable unit ROD for this site.

13. Comment: The commenter states that the costs associated with the alternatives as calculated in the FS are "uncertain" for the mercury brine pit solidification/stabilization, and groundwater and leachate treatment. The commenter provides its own cost estimates for the alternatives, which the commenter believes should be higher than the costs estimated in the FS.

Response: U.S. EPA has numerous concerns regarding assumptions made by the commenter in re-estimating the costs associated with the alternatives. It is pertinent to note that the Agency uses a cost estimate primarily for the purpose of comparing the different alternatives analyzed in the FS. Cost estimates are accurate within a range of plus 50% to minus 30%. The Agency therefore realizes that there is a degree of uncertainty regarding the accuracy of any particular cost estimate; however, our primary purpose is to compare the costs, and the cost figures presented in the FS present a reasonably accurate estimation of the costs of the alternatives, relative to one another. U.S. EPA has decided not to adopt the commenter's revised cost estimate for Alternative 5 for the purposes of this ROD.

14. Comment: The commenter states that the selection by U.S. EPA of "Alternative 5 as the chosen remedy for the Site would not be appropriate nor in accordance with either Section 121 of CERCLA or U.S. EPA's remedy selection criteria."

Response: U.S. EPA disagrees with this comment; however, after review of public comments the Agency has determined that an operable unit approach is more appropriate at this time and a final groundwater remedial decision will be made during the second operable unit for this site.

15. Comment: The commenter argues that the proposed plan selects the use of pump and treat in part based on the view that Chapter NR 140, WAC, requires preventive action limits (PALs) to be achieved at the waste boundary of a Superfund site. This position is based on a draft WDNR guidance document. This non-final interpretation of NR 140 WAC is therefore not a "promulgated" state standard and cannot be an ARAR for the site.

Response: The commenter is incorrect in its understanding that the remedy originally selected for this site -- or any selected remedy -- is based, in whole or in part, on what is or is not an ARAR. Remedial alternatives protective of human health and the environment (with the exception of the no action alternative) are presented in the FS, and ARARs for each alternative are then identified. In other words, ARARs flow from the remedy, not vice-versa. All remedial alternatives evaluated in the FS must meet or waive ARARs in order to satisfy the criteria for selection as a site remedy.

With respect to the particular state guidance document at issue, neither U.S. EPA nor WDNR are contending that the draft guidance is a promulgated rule or law, and therefore an ARAR, as the commenter suggests. The determination by U.S. EPA that the point of compliance for groundwater is the waste boundary is based on the preamble to the NCP and U.S. EPA guidance. The preamble to the NCP states that:

> EPA believes that remediation levels should generally be attained throughout the contaminated plume, or at and beyond the edge of the waste management area, when the waste is left in place. However, EPA acknowledges that an alternative point of compliance may also be protective of public health and the environment under site-specific circumstances.
>
> In particular, there may be certain circumstances where a plume of groundwater contamination is caused by releases from several distinct sources that are in close geographical proximity. In such cases, the most feasible and effective ground-water cleanup strategy may be to address the problem as a whole, rather than source-by-

source, and to draw the point of compliance to encompass the sources of release...

55 FR 8753 (March 8, 1990). In addition, U.S. EPA's guidance document CERCLA Compliance with Other Laws Manual: Interim Final, August 1988, EPA/540/G-89/006 states that "[f]or groundwater, remediation levels should generally be attained throughout the contaminated plume, or at and beyond the edge of the waste management area when waste is left in place." See page 1-8. U.S. EPA's guidance document Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites, December 1988, EPA/540/G-88/003 reiterates that the area of attainment of cleanup standards is the area outside the boundary of any waste remaining in place and up to the boundary of the contaminant plume. See Section 5.2.1, page 5-1.

16. Comment: The commenter argues that U.S. EPA's position that the point of compliance for groundwater is the waste boundary misconstrues the National Contingency Plan (NCP). The preamble to the NCP states that ARARs generally should be attained at the waste boundary, but also indicates that an alternative point of compliance may be protective under site-specific circumstances. The low and limited groundwater contaminant levels found at the site support the use of an alternate point of compliance.

Response: U.S. EPA disagrees that the alleged "low and limited groundwater contaminant levels found at the site support the use of an alternate point of compliance." The preamble to the NCP indicates when an alternate point of compliance may be appropriate. An alternate point of compliance may be appropriate " ...where a plume of groundwater contamination is caused by releases from several distinct sources that are in close geographical proximity." See 55 FR 8753 (March 8, 1990). There is only one source of groundwater contamination (the waste mass) at the Spickler Landfill site and therefore it is not a site where an alternate point of compliance might be appropriate, as indicated in the preamble to the NCP. Groundwater contamination which exceeds the maximum contaminant levels set forth in the Federal Safe Drinking Water Act are considered to be unsafe for human consumption. Therefore, characterization of the groundwater contamination at this site as being "low" does not convey the reality that levels of contamination in the groundwater at the site are high enough to potentially cause adverse human health effects.

17. Comment: The commenter argues that, because NR 140 groundwater cleanup standards are being used as an ARAR, the specific regulatory provisions which set forth the manner in which the NR 140 standards are to be applied also must be

followed in applying these ARARs. It is not proper to use part of a state rule (cleanup standards) and then ignore the portions of the rule that specifies the manner in which that rule is to be applied.

Response: Generally, ARAR's are those cleanup standards, standards of control, and other substantive environmental protection requirements that are promulgated and are either applicable or relevant and appropriate to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. See CERCLA Compliance with Other Laws Manual: Interim Final, August 1988, EPA/540/G-89/006, page 1-10. The cleanup standards set forth in NR 140 WAC are promulgated standards which are ARARs because they are more stringent than Federal cleanup standards. The portion of NR 140 WAC which specifies the manner in which that rule is to be applied is not more stringent than the point of compliance specified in the NCP (i.e., the waste boundary), and, therefore, is not an ARAR. Thus, it would not be proper to ignore the more stringent federal standard when designating the point of compliance.

18. Comment: The commenter requests that U.S. EPA not specify in the Record of Decision a methodology for stabilizing the mercury brine pit.

Response: U.S. EPA has not specified a methodology for solidification/stabilization of the mercury brine pit.