

**SITE HAZARD ASSESSMENT
BORDEN PACKAGING AND INDUSTRIAL PRODUCTS
421 FIRST AVENUE NORTH
KENT, WASHINGTON**

SITE BACKGROUND

Borden Packaging and Industrial Products manufactures formaldehyde, urea formaldehyde, and phenol formaldehyde thermoset resins at its 12 acre plant located at 421 First Avenue North in Kent, Washington. The resins are used by the wood products industry for particle board and plywood production.

There are numerous above-ground storage tanks at the Borden facility. A total of about 486,000 gallons of chemicals including phenol, formaldehyde, and methanol are stored at the site. Containment in the form of berms surround the tanks. The containment area is adequate to contain the volume of the largest tank in the event of tank rupture. In the past, the on-site tanks were filled by way of underground piping. These buried lines have since been abandoned.

In the past, urea and phenolic resin wastes were disposed of in a pond at the facility. In addition, there were a waste settling pond and a truck wash lagoon on the site. The lagoons were apparently unlined, and they were filled upon closure without apparent removal of any resinous sludges resulting from their years of operation.

Presently, resin waste is dried in drums on the site for future off-site disposal as non-hazardous waste. Liquid wastes are currently treated in an on-site wastewater treatment plant prior to discharge to Metro.

Beginning in March of 1987, Borden hired EMCON Northwest to investigate environmental concerns at the facility resulting from past or present chemical handling on the site. EMCON began its investigations by excavating test pits in the former lagoon areas on the site. Resinous material was encountered in each of the lagoon areas. The largest quantity of waste resin was encountered in the former truck wash lagoon on the site.

Between 1987 and 1991, additional environmental sampling was conducted at the Borden facility by EMCON. This included the installation of subsurface soil borings and groundwater monitoring wells, along with a number of temporary drive-point wells. These investigations detected an area of localized contamination in the vicinity of the abandoned underground piping previously used on the site. Concentrations of methanol and formaldehyde were detected in groundwater at this location at concentrations exceeding Washington Model Toxics Control Act (MTCA) Method B cleanup levels.

In early April 1992, the final report for EMCON's investigations at the Borden site was submitted to the Washington Department of Ecology (Ecology) as required by MTCA. In the cover letter submitted with the report, Borden indicated that it planned to remediate the contaminated area identified in the vicinity of the abandoned underground piping. Borden planned to remediate the area by extraction, and a Metro wastewater discharge permit for the remediation was reportedly pending.

On June 10, 1992, Ecology conducted an initial investigation of the Borden facility as a follow-up to receipt of the report. Upon completion of the site inspection, information contained on Ecology's Affected Media and Contaminants listing pertaining to the Borden location in Kent was modified to reflect the site's status as a confirmed contaminated site.

SITE HAZARD ASSESSMENT ACTIVITIES

In mid-June 1992, the Borden facility in Kent was selected by Ecology for a site hazard assessment (SHA) and subsequent ranking by the Washington Ranking Method (WARM). On June 15, 1992, a notification letter was mailed to Diane Strayer, Environmental Engineering Manager for Borden. Site access was granted for the SHA by Rico Yingling, the Plant Manager of the Borden Packaging and Industrial Products facility.

Field Investigation

On June 30, 1992, the SHA field investigation was conducted by Elaine Atkinson of Ecology. The inspection included a walk-through of the site and subsequent sampling activity.

The site walk-through identified chemical storage at the facility within three bermed tank farms. Each of the bermed areas had secondary containment adequate to contain the volume of the largest tank; however, the containment areas were not large enough to contain the volume of all of the tanks, which is considered optimum secondary containment capacity under WARM. Chemicals stored in tanks on the site include phenol, methanol, formaldehyde, urea formaldehyde, amines, fuel, and corrosive compounds.

There is also a large wastewater treatment pond at the facility. Treated wastewaters are discharged to Metro under a wastewater discharge permit. Drummed wastes are stored in a bermed location adjacent to the wastewater treatment pond.

Scrubber towers have been installed at the Borden facility under the oversight of the Puget Sound Air Pollution Control Agency (PSAPCA). However, the odor of formaldehyde was apparent intermittently during the SHA field investigation. Therefore, air monitoring was conducted for formaldehyde using a Sensidyne indicator tube. The Sensidyne tube is sensitive for formaldehyde

at concentrations of 5 parts per million (ppm) or less. Because the entire tube changed color with one stroke of the Sensidyne pump beyond the gradations of up to 5 ppm, the actual concentration of formaldehyde in ambient air was not determined. However, the formaldehyde concentration apparently exceeded 5 ppm.

A grab surface soil sample was collected from the vicinity of the former underground piping on the site for analysis for the volatile organic compounds. The soil sample was collected using a stainless steel spoon. The sample was placed directly into a sample jar without mixing in order to minimize the loss of volatile compounds.

The container used for the sampling activity was pre-cleaned and supplied by Ecology's Manchester laboratory. The sample was labelled following collection with sampling location, date and time of collection, and requested analysis. A sample chain-of-custody form was also completed for the sample. Chain-of-custody was maintained throughout the sampling event. The sample was then transferred to Ecology's locked custody refrigerator prior to pick-up by Manchester laboratory personnel. Sample analysis was contracted to Lauck's Testing Laboratory in Seattle.

Analytical Results

The analytical results for the soil sample collected during the SHA were received from the Manchester laboratory on August 12, 1992. The only volatile compound detected in the soil sample was acetone at 28 parts per billion (ppb). This concentration is well below MTCA Method B cleanup levels for soils. Acetone is also a common contaminant introduced during laboratory sample handling.

Quality assurance/quality control (QA/QC) measures implemented by the analytical laboratory during sample analysis determined that the generated data was acceptable for use with some qualification. For instance, methylene chloride was identified in a method blank sample at a concentration of 2 ppb. Methylene chloride was also detected in the submitted sample at a concentration of 19 ppb. According to EPA Functional Guidelines, common laboratory contaminants such as methylene chloride detected in the method blank should be at least ten times more concentrated in the analyzed sample, in order to conclude with certainty that the analyte is native to the sample and not the result of laboratory contamination. Therefore, the methylene chloride analytical result was qualified with a 'UJ', indicating that the analyte was not detected at or above the reported estimated result.

Other QA/QC measures implemented by the analytical laboratory included initial instrument calibration checks. Five standard samples of varying concentrations were analyzed during the initial calibration. The percent relative deviations between the standards and the five concentration levels were within 25% for all the analytes except acetone. Therefore, analytical results for acetone

were reported with the qualified 'J', indicating estimated results.

Conclusions

The final site ranking for the Borden Packaging and Industrial Products facility in Kent is a '1' (on a scale of 1 to 5, with 1 being the highest ranking). Some of the factors contributing to the high ranking include: the large quantity of material stored on the site; the toxicity and relative mobility of the materials stored and released to the environment; the proximity of the site to populated areas; shallow groundwater beneath the site; widespread useage of groundwater for drinking water in the Kent area; a documented release to groundwater and air; the proximity of the site to Spring Brook Creek, a fishery resource; and the fact that the secondary containment surrounding the tanks on the site is not large enough to contain the volume of all of the tanks in the event of catastrophe.

WORKSHEET 1
SUMMARY SCORE SHEET

Site Name/Location (City, County, Section/Township/Range):

Borden Chemical
421 First Avenue North
Kent, Washington 98032

Site Description (Include management areas, compounds of concern, and quantities):

This 12 acre facility manufactures formaldehyde, urea formaldehyde, and phenol formaldehyde thermostat resins for use by the wood products industry for particle board and plywood production. In the past, urea and phenolic resin wastes were disposed of in a pond at the site. In addition, there is a former waste settling impoundment and a truck wash lagoon at the site. Also in the past, buried line(s) were used for product loading. Elevated concentrations of methanol in groundwater beneath the site apparently resulted from line leakage. In addition, elevated formaldehyde levels have been found in groundwater at the abandoned loading line location.

Special Considerations (Include limitations in site file data or data which cannot be accommodated in the model, but which are important in evaluating the risk associated with the site, or any other factor(s) over-riding a decision of no further action for the site):

ROUTE SCORES:

Surface Water/Human Health:	<u>14.6</u>	Surface Water/Environ.:	<u>39.7</u>
Air/Human Health:	<u>26.4</u>	Air/Environmental:	<u>22.8</u>
Ground Water/Human Health:	<u>69.2</u>		

OVERALL RANK: 1

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WORKSHEET 2
ROUTE DOCUMENTATION

1. SURFACE WATER ROUTE

List substances to be considered for scoring:

Source: 1

Methanol, formaldehyde, phenol.

Explain basis for choice of substance(s) to be used in scoring.

These materials are stored in above-ground storage tanks (ASTs) at the facility.

List management units to be considered in scoring:

Source: 1

Above-ground storage tanks.

Explain basis for choice of unit used in scoring.

Source: 1

Numerous ASTs are present at the facility.

2. AIR ROUTE

List substances to be considered for scoring:

Source: 1

Methanol, formaldehyde, phenol.

Explain basis for choice of substance(s) to be used in scoring.

These materials are stored in ASTs at the facility.

List management units to be considered in scoring:

Source: 1

ASTs.

Explain basis for choice of unit used in scoring.

Numerous ASTs are present at the facility.

WORKSHEET 2 (CONTINUED)
ROUTE DOCUMENTATION

3. GROUND WATER ROUTE

List substances to be considered for scoring:

Source: 1,2

Formaldehyde, methanol, phenol.

Explain basis for choice of substance(s) to be used in scoring.

Formaldehyde and methanol were detected in subsurface soil and/or groundwater near a former load line at the facility in concentrations exceeding Model Toxics Control Act (MTCA) standards. Phenol is also available to the groundwater route in that ASTs at the site contain the material.

List management units to be considered in scoring:

Source: 2

Contaminated soil.

Explain basis for choice of unit used in scoring.

Methanol and formaldehyde were detected in subsurface soil and/or groundwater at the site at concentrations exceeding MTCA cleanup criteria.

WORKSHEET 3
SUBSTANCE CHARACTERISTICS WORKSHEET
FOR MULTIPLE UNIT/SUBSTANCE SITES

Combination 1 Combination 2 Combination 3

Unit:

Substance:

SURFACE WATER ROUTE

Human Toxicity Value:

Environ. Toxicity Value:

Containment Value:

Surface Water Human
Subscore:

Surface Water Environ.
Subscore:

AIR ROUTE

Human Toxicity/Mobility
Value:

Environ. Toxicity/
Mobility Value:

Containment Value:

Air Human Subscore:

Air Environ. Subscore:

GROUND WATER ROUTE

Human Toxicity/
Mobility Value:

Containment Value:

Ground Water Subscore:

WORKSHEET 4
SURFACE WATER ROUTE

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

Substance	Drinking Water Standard		Acute Toxicity		Chronic Toxicity		Carcinogenicity		
	(ug/l)	Val.	(mg/kg-bw)	Val.	(mg/kg/day)	Val.	WOE	PF*	Val.
1. Formaldehyde	-	-	108	5	-	-	-	-	-
2. Methanol	-	-	143	5	-	-	-	-	-
3. Phenol	4,000	2	10	10	0.6	1	-	-	-
4.									
5.									
6.									

*Potency Factor

Source: 3,4,5
Highest Value: 10
+2 Bonus Points? -
Final Toxicity Value 10

1.2 Environmental Toxicity

Substance	Acute Criteria (ug/l)	Non-human Mammalian Acute Toxicity		Source: <u>3</u>	Value: <u>8</u>
		(mg/kg)	Value		
1. Formaldehyde	-	100	8		
2. Methanol	-	5,628	1		
3. Phenol	10,200	NA	2		
4.					
5.					
6.					

1.3 Substance Quantity

Source: 1 Value: 7

Explain basis: The total capacity for the above-ground tanks on the site is about 486,000 gallons.

WORKSHEET 4 (CONTINUED)
SURFACE WATER ROUTE

2.0 MIGRATION POTENTIAL

- 2.1 Containment Source: 1 Value: 7
Explain basis: Secondary containment for <50% of
volume of all tanks = 5 ; tanks maintained without
automatic level controls = 2.
- 2.2 Surface Soil Permeability: gravelly sand Source: 2 Value: 1
- 2.3 Total Annual Precipitation: 33 inches Source: 6 Value: 3
- 2.4 Max. 2-Yr/24-hour Precipitation: 2.2 inches Source: 6 Value: 3
- 2.5 Flood Plain: not in a floodplain Source: 7 Value: 0
- 2.6 Terrain Slope: <2 % Source: 1 Value: 1

3.0 TARGETS

- 3.1 Distance to Surface Water: <1,000 ft. Source: 8 Value: 10
- 3.2 Population Served within 2 miles: √pop.= 3 Source: 9 Value: 2
- 3.3 Area Irrigated within 2 miles: 0.75√no. acres=140 Source: 9 Value: 9
- 3.4 Distance to Nearest Fishery Resource: <1,000 ft. Source: 10 Value: 12
(Spring Brook Creek - coho)
- 3.5 Distance to, and Name(s) of, Nearest Sensitive
Environment(s) Spring Brook Creek (fishery) - Source: 10 Value: 12
<1,000 feet

4.0 RELEASE

- Explain basis for scoring a release to surface Source: 1 Value: 0
water: no release confirmed

WORKSHEET 5
AIR ROUTE

1.0 SUBSTANCE CHARACTERISTICS

1.1 Introduction (WARM Scoring Manual) - Please review before scoring

1.2 Human Toxicity

Substance	Air Standard		Acute Toxicity		Chronic Toxicity		Carcinogenicity		
	(ug/m ³)	Val.	(mg/m ³)	Val.	(mg/kg/day)	Val.	WOE	PF*	Val.
1. Formaldehyde	-	-	203	8	-	-	-	-	-
2. Methanol	-	-	-	-	-	-	-	-	-
3. Phenol	63.3	7	177	8	-	-	-	-	-
4.									
5.									
6.									

*Potency Factor

Source: 3,4,5
Highest Value: 8
+2 Bonus Points? 2
Final Toxicity Value: 10

1.3 Mobility (Use numbers to refer to above listed substances)

1.3.1 Gaseous Mobility

Vapor Pressure(s): 1= NA ; 2= NA ; Source: 3,4,5
3=0.34 mmHg ; 4= ; 5= ; 6= Value: 3

1.3.2 Particulate Mobility

Soil type: _____ Source: _____
Erodibility: _____ Value: _____
Climatic Factor: _____

1.4 Highest Human Health Toxicity/Mobility Matrix Value (from Table A-7)

Final Matrix Value: 15

1.5 Environmental Toxicity/Mobility

Substance	Non-human Mammalian Acute		Value	Mobility	Value	Matrix Value
	Inhalation Toxicity (mg/m ³)					
1. Formaldehyde	203		8	NA	-	-
2. Methanol	-		-	-	-	-
3. Phenol	177		8	0.34 mmHg	3	12
4.						
5.						
6.						

Highest Environmental Toxicity/Mobility Matrix Value (from Table A-7)

Final Matrix Value: 12

WORKSHEET 5 (CONTINUED)
AIR ROUTE

1.6 Substance Quantity: 486,000 gallons Source: 1 Value: 7
Explain basis: The total AST capacity at the
facility is about 486,000 gallons.

2.0 MIGRATION POTENTIAL

2.1 Containment: Containers sealed and in sound Source: 1 Value: 3
condition, but not protected from the weather.
Vents manually controlled, but not necessarily
with alarms.

3.0 TARGETS

3.1 Nearest Population: _____ <1,000 feet Source: 1 Value: 10

3.2 Distance to, and Name(s) of, Nearest Sensitive
Environment(s) Borden Playfield <1,000 feet Source: 1 Value: 7

3.3 Population within 0.5 miles: population=>5,625 Source: 1 Value: 75

4.0 RELEASE

Explain basis for scoring a release to air: _____ Source: 1 Value: 5
Air monitoring with Sensidyne tubes during the
SHA identified formaldehyde in ambient air at
elevated levels.

WORKSHEET 6
GROUND WATER ROUTE

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

Substance	Drinking Water Standard		Acute Toxicity		Chronic Toxicity		Carcinogenicity		
	(ug/l)	Val.	(mg/kg-bw)	Val.	(mg/kg/day)	Val.	WOE	PF*	Val.
1. Formaldehyde	-	-	108	5	-	-	-	-	-
2. Methanol	-	-	143	5	-	-	-	-	-
3. Phenol	4,000	2	10	10	0.6	1	-	-	-
4.									
5.									
6.									

*Potency Factor Source: 3,4,5
Highest Value: 10
+2 Bonus Points? -
Final Toxicity Value 10

1.2 Mobility (Use numbers to refer to above listed substances)
 Cations/Anions _____ Source: 10 Value: 3

OR
 Solubility(mg/l) 1,2,3 = >1,000 mg/L = 3

1.3 Substance Quantity Source: 1,2 Value: 2
 Explain basis: About 20 cubic yards of subsurface soil in the vicinity of the former load line are thought to be contaminated with methanol and/or formaldehyde.

2.0 MIGRATION POTENTIAL

2.1 Containment Source: 11 Value: 10
 Explain basis: Contaminated soils are assigned a containment value of '10' for the groundwater pathway under WARM.

2.2 Net Precipitation: 28.7 inches Source: 6 Value: 3

2.3 Subsurface Hydraulic Conductivity: >10E-5 Source: 2 Value: 3
 (gravelly silty sand)

2.4 Vertical Depth to Ground Water: <25 feet Source: 2 Value: 8

WORKSHEET 6 (CONTINUED)
GROUND WATER ROUTE

3.0 TARGETS

- 3.1 Ground Water Usage: Public, no alternate Source: 12,13 Value: 9
- 3.2 Distance to Nearest Drinking Water Well: app. 2000' Source: 12,13 Value: 3
- 3.3 Population Served within 2 Miles: √pop.=10,000 Source: 12,13 Value: 100
- 3.4 Area Irrigated by (Groundwater) Wells
within 2 miles: 0.75√no.acres= 361 Source: 9 Value: 14

4.0 RELEASE

Explain basis for scoring a release to ground Source: 2 Value: 5
water: Groundwater beneath the site is contaminated
with formaldehyde and methanol above MTCA standards

SOURCES USED IN SCORING

1. Washington Department of Ecology, Site Hazard Assessment Field Investigation, June 30, 1992.
2. EMCON Northwest, Summary Report, Hydrogeologic Investigations, Borden Packaging and Industrial Products Facility, April 1992.
3. Science Application International Corporation, Toxicology Database for Use in WARM Scoring, January 1992.
4. U.S. Environmental Protection Agency, Integrated Risk Information System database.
5. U.S. Department of Health and Human Services, Public Health Service, NIOSH Registry of Toxic Effects of Chemical Substances.
6. NOAA Atlas 2, Volume IX-Washington, Precipitation-Frequency Atlas of the Western United States, 1973.
7. King County, Sensitive Areas Map Folio, December 1990.
8. Topographic Map, Renton Quadrangle, 7.5 Minute Series, Photorevised 1968.
9. Washington Department of Ecology, Water Rights Information System.
10. Washington Department of Fisheries, A Catalog of Streams and Salmon Utilization, 1975.

11. Washington Department of Ecology, Washington Ranking Method Scoring Manual, April 1992.
12. Washington Department of Social and Health Services, State of Washington Public Water Supply Systems Listing.
13. Washington Department of Ecology, Water Well Reports.