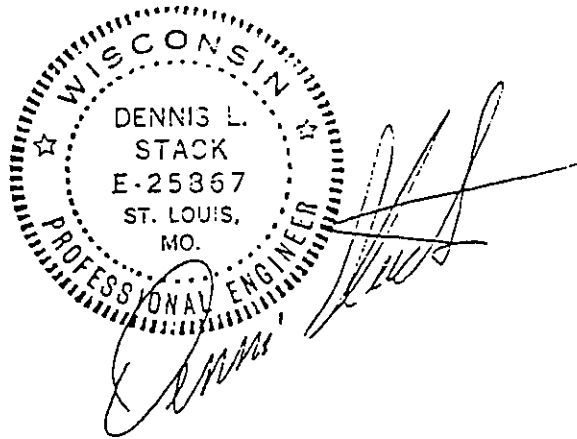


C

This Engineering Report for the Contamination Evaluation at Truax Field, Madison, Wisconsin has been prepared to make a preliminary determination of the presence or absence of chemical contamination which may have been caused by DOD-related activities. Engineering aspects of this Report have been reviewed and approved by the undersigned Registered Professional Engineer.

Dennis Stack  
Wisconsin Registration Number E-25867  
(Issued September 1988)



## 1.0 EXECUTIVE SUMMARY

A contamination evaluation was performed at Truax Field in Madison, Wisconsin. The site is currently owned by several entities, including the Dane County Airport Commission, Madison Housing Authority, State of Wisconsin, Madison Area Technical College, and numerous private companies. The contamination evaluation included a records review and visual site inspection; installation of three groundwater monitoring wells; collection of groundwater samples from ten new or previously-existing monitoring wells and water supply wells; collection of soil samples at twelve locations; and collection of surface water samples at four locations. Samples from each site were analyzed for petroleum hydrocarbons, volatile organics, and total metals (including arsenic, selenium, silver, mercury, barium, cadmium, chromium, and lead). In addition, groundwater samples were analyzed for total iron, manganese, and sodium.

During the records review and site inspection, a site map was developed and the locations and uses of the former DOD facilities were identified. Four areas were identified as potential sources of soil, surface water, and/or groundwater contamination. The potential sources included a practice burn pit, landfill, wastewater treatment plant, and JP-4 fuel storage area.

The fireman training area practice burn pit was probably created in the early 1950s by the DOD and was in use by DOD and numerous other organizations until December 1987. The DOD excavated a sand and gravel pit in the 1930s or 1940s and may have disposed of some wastes in this area, which was used by Oscar Mayer as an open burning pit until 1953 and then as a landfill until 1972 by the City of Madison. Numerous parties disposed of wastes in the landfill. The DOD operated the former Burke Wastewater Treatment Plant during the period 1942-1946. Numerous other parties operated the treatment plant before and after the DOD's ownership. The JP-4 fuel area, including four large above-ground fuel tanks, was constructed by the DOD. It has since been used by the Air National Guard and ownership has been transferred to Dane County. The tanks were empty at the time of the site inspection.

Sampling and analysis at each of the areas described above was performed in accordance with the Plan approved by the Corps of Engineers. Sampling sites were chosen to represent areas where chemical contamination would be most likely to occur.

Results of the sampling and analysis programs are presented in the following sections.

### 1.1 GROUNDWATER

Samples were collected from three newly installed groundwater monitoring wells, four previously existing monitoring wells, and three deep supply wells. These wells were downgradient of the landfill, former wastewater treatment plant, and practice burn pit. Analysis of samples indicated that standards, including Maximum Contaminant Levels (MCLs) or Maximum Contaminant Level Goals (MCLGs), were exceeded for one or more parameters in eight of the ten wells. Contamination was present downgradient of each of the three sources identified. Contaminants for which MCLs and/or MCLGs were exceeded

included chromium, cadmium, mercury, lead, trichloroethylene, vinyl chloride, and xylène. Groundwater samples which exceeded MCLs and/or MCLGs are summarized in Table 1-1. It should be noted that elevated metals levels in groundwater samples may be due to presence of turbidity in the water samples and reflects the presence of these metals in background soils rather than dissolved metals in groundwater.

Groundwater near the practice burn pit (Site TG-3) was found to contain numerous organic chemicals present in fuels or solvents, and elevated levels of petroleum hydrocarbons. During installation of TG-3, cuttings from a depth of 24 feet exhibited elevated organic vapor meter readings and the odor of petroleum was noted. During well development and sampling, water in the well exhibited a strong solvent odor.

A relatively shallow monitoring well (TG-2) installed downgradient of the former treatment plant had concentrations of chromium, lead, and cadmium in excess of MCLs and/or MCLGs.

Monitoring wells downgradient of the landfill (TG-1, TG-5, TG-9, TG-10, and TG-11) contained a variety of metals, petroleum hydrocarbons, volatile organics, and chlorinated compounds. Trichloroethylene was found in the two deep Oscar Mayer water supply wells (TG-13 and TG-14) sampled. The City of Madison's water supply well (TG-12) was found to be free of contamination.

## 1.2 SURFACE WATER

Surface water samples were collected at four locations. A sample of standing water in a ditch near the practice burn pit (TW-3) was found to contain organics present in fuels or solvents (including methylene chloride, benzene, toluene, 1,2-transdichloroethylene, thiobismethane, and tetrachloroethylene). Petroleum hydrocarbons and lead were also found in TW-3. These analytical results further confirmed groundwater and soils analyses which are evidence of contamination related to the practice burn pit.

No contaminants were found in the surface water sample (TW-1) collected from the creek near the practice burn pit.

No contaminants were found in a surface water sample (TW-2) collected in one of the lagoons at the former treatment plant.

A sample was obtained from the culvert which discharges water from the former wastewater treatment plant lagoons to a ditch connected to Starkweather Creek. This sample contained elevated levels of petroleum hydrocarbons (65 mg/l) and a trace of tetrachloroethylene.

## 1.3 SOILS

Soil samples were collected at twelve locations believed to have the highest potential for contamination. Contaminants were detected at most of the sites. At the burn pit area (soil samples TS-1 and TS-2), elevated levels of petroleum hydrocarbons and detection of numerous organic chemicals confirmed surface contamination related to burning of fuels and solvents. Soil within the diked area at the JP-4 fuel area (samples TS-3 and TS-4) was found to

TABLE 1-1

SUMMARY OF CONTAMINANTS PRESENT IN GROUNDWATER  
IN EXCESS OF MCLS AND MCLGS

Well Designation	Site Description	Level of Contaminants, (MCLG/MCL), ug/l						
		Chromium (120*/50)	Cadmium (5*/10)	Mercury (3*/2)	Lead (20*/50)	TCE <sup>a</sup> (0/5)	Vinyl Chloride (0/2)	Xylene (440*/-)
TG-1	Downgradient of landfill				30			
TG-2	Downgradient of WWTP	94	7		124			
TG-3	Near Burn Pit				24			705
TG-5	Well 200S Downgradient of landfill							
TG-9	Well 152 Downgradient of landfill	302	12		333			
TG-10	Well 104 Downgradient of landfill	178	5		157	3.9		
TG-11	Well 101 Downgradient of landfill			2	62		16.7	
TG-12	Madison Well No. 7							
TG-13	Oscar Mayer Well No. 3					11.0		
TG-14	Oscar Mayer Well No. 5					2.2		

\* = Proposed

a = TCE = Trichloroethylene

MCLG = Maximum Contaminant Level Goal

MCL = Maximum Contaminant Level

Blank entries indicate MCLs and/or MCLGs were not exceeded

contain elevated levels of petroleum hydrocarbons, lead, and organic chemicals potentially related to leaks or spills from the fuel tanks. Presence of lead may have been due to lead-based paints possibly used in and around the tank farm. A soil sample (TS-5) collected at the drum and container storage area near the JP-4 fuel tanks showed elevated levels of petroleum hydrocarbons, lead, and organics. Three samples collected from sludge drying bed cells (TS-7, TS-8, and TS-9) were found to contain varying levels of organic chemicals and indicated that solvents may have been present in sludges disposed at the former Burke Wastewater Treatment Plant. Sediment samples collected from a lagoon (TS-11) and from near the outfall from the former wastewater plant to a ditch connected to Starkweather Creek (TS-12) showed presence of petroleum hydrocarbons and organic chemicals. Analytical interferences present in samples TS-8, TS-9, TS-11 and TS-12 inhibited identification and quantification of the organic chemicals believed to be present.

#### 1.4 HAZARDOUS RANKING SYSTEM (HRS) SCORE

The Hazardous Ranking System Score for the site (for toxic materials) is 35.59. The score results primarily from detection of trichloroethylene in deep supply wells, and petroleum hydrocarbons in surface water near the former wastewater treatment plant. The form is presented in its entirety in Appendix J.

### 2.3.2 Physiography

Truax Field lies on relatively flat ground, with elevations ranging from approximately 860 feet AMSL at the south end to approximately 900 AMSL at the north end. However, just north of the study area lies an area of approximately 120 feet of relief. The differences in elevation are due to the remnants of a glacial moraine. The physiography of the area includes glacial deposits of fine gravel, sand, silt and clay of Pleistocene age. Regionally, the thicknesses of these deposits vary with the depth of bedrock. The local stratigraphy consists of sandy or clayey silt for the first 5 to 15 feet followed by silty sand or fine to medium-grained sands down to the top of the water table which lies between twenty-five and thirty feet. Depth to bedrock varies throughout the site.

As seen from data in this report, depth to the uppermost groundwater aquifers at Wells TG-1, TG-2 and TG-3 was between 25 and 30 feet. These depths are believed to vary seasonally. Water levels were also measured in the deeper monitoring wells installed by Kaufmann. [7]

Prior to the presence of Oscar Mayer, the groundwater in the study area is believed to have flowed south or southwest towards what is now the landfill. The landfill is lying on a Pleistocene Age glacial lake bed which was at one time a large marsh. The areas surrounding the marsh were areas of recharge which flowed towards the marsh. Oscar Mayer now pumps several million gallons of groundwater per day. This is believed to have caused a cone of depression in the vicinity of the water supply wells which lie southwest of Truax Field. Although the wells of Oscar Mayer are relatively deep, it is felt that they are creating a drawdown on the upper aquifer. The upper aquifer appears to recharge the lower aquifer through percolation, fractures and faults. Therefore groundwater flow beneath the Truax Field is probably towards the south or southwest with the exception of the WWTP area. Groundwater flow in the wastewater treatment plant area is believed to be towards the west. The WWTP lies on a clay barrier between 30 and 120 feet thick which blocks the effects of the cone of depression created by the Oscar Mayer groundwater wells.

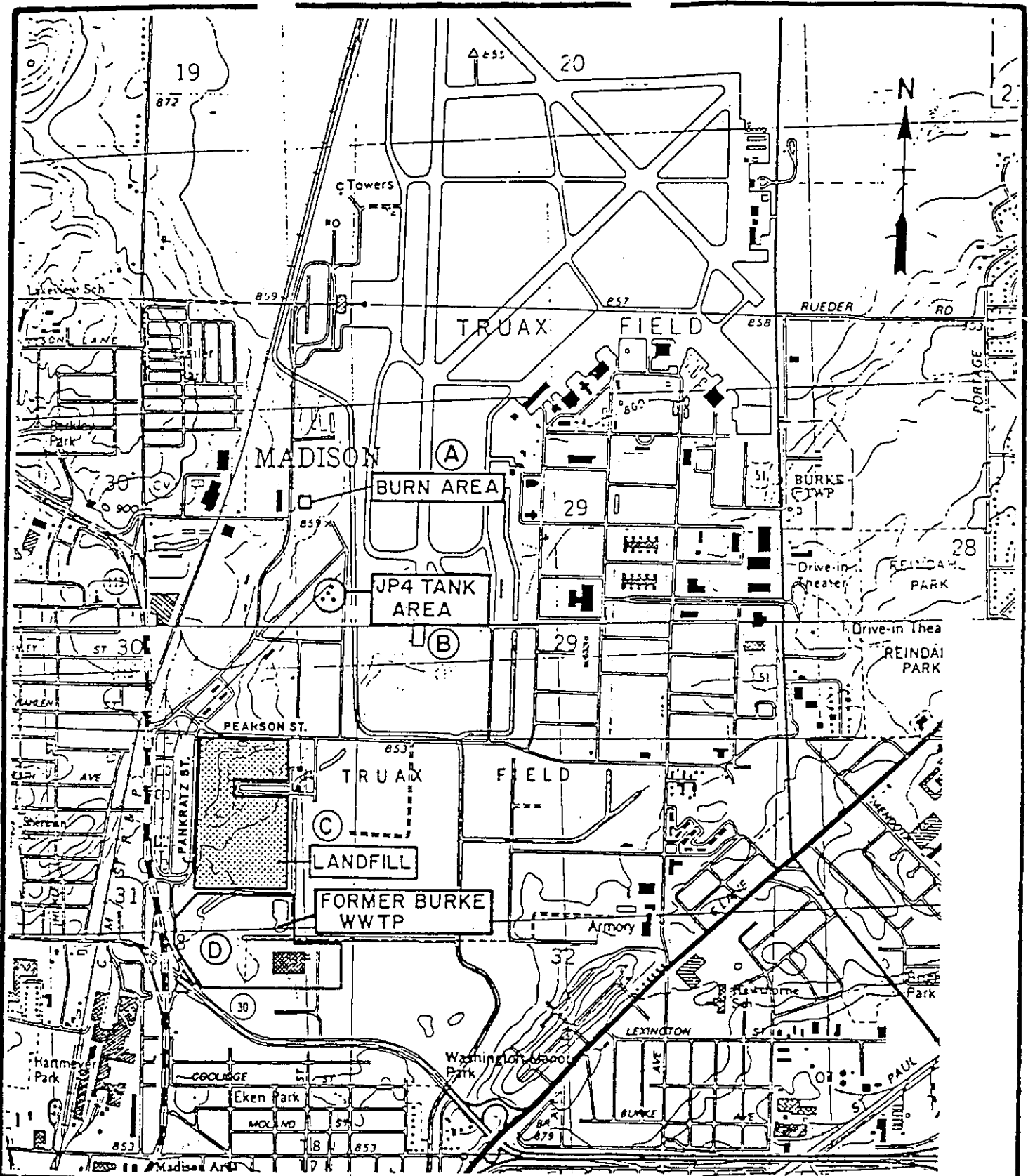
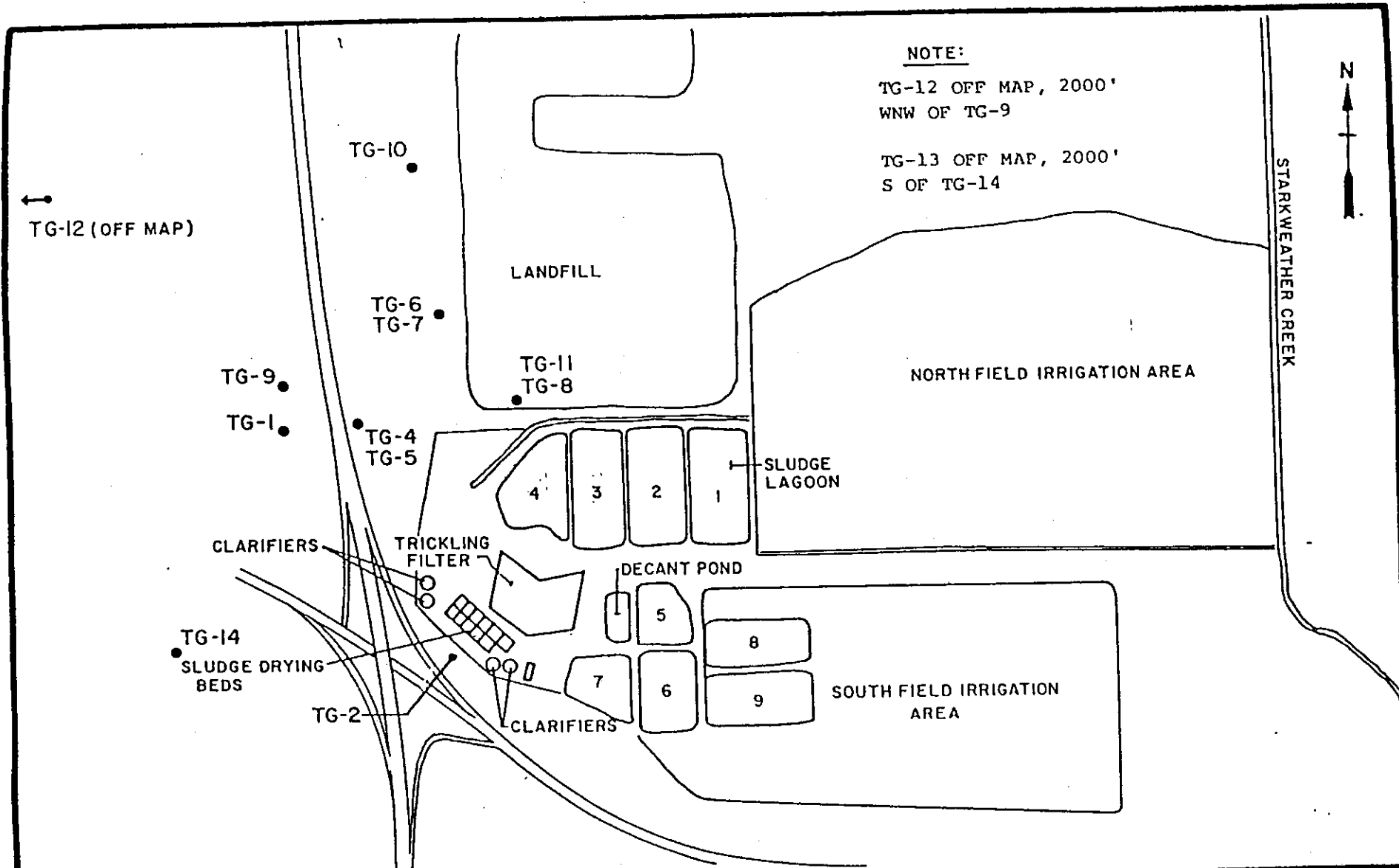


FIGURE 3-1

Potential Sources of Contamination Truax Field  
Madison, Wisconsin





**NOTE:**

TG-12 OFF MAP, 2000'  
WNW OF TG-9

TG-13 OFF MAP, 2000'  
S OF TG-14



← TG-12 (OFF MAP)

STARKWEATHER CREEK



FIGURE 3-2

Location of Groundwater Wells

3-6



TABLE 4-5

FINAL MCLGs AND MCLs AND STATE OF WISCONSIN  
 DRINKING WATER STANDARDS FOR ORGANIC CHEMICALS AND COMPARISON  
 WITH MAXIMUM CONCENTRATIONS DETECTED IN GROUNDWATER

Compound	Final MCLG (ug/l)	Final MCL (ug/l)	State of Wisconsin <sup>(a)</sup> Standards (ug/l)	Highest Observation (ug/l)	Sample
Benzene	0	5	5	Not Detected	
Vinyl Chloride	0	2	2	16.7	TG-11
Carbon Tetrachloride	0	5	5	Not Detected	
1,2-Dichloroethane	0	5	5	Not Detected	
Trichloroethylene	0	5	5	11.0	TG-13
1,1-Dichloroethylene	7	7	7	Not Detected	
1,1,1-Trichloroethane	200	200	200	Not Detected	
p-Dichlorobenzene	75	75	75	Not Detected	
Toluene	-	-	343	452.4	TG-16
Ethylbenzene	-	-	1,360	33.4	TG-16
Xylene	-	-	620	705 <sup>b</sup>	TG-3, TG-16
Tetrachloroethylene	-	-	20	8.8	TG-14

NOTES: (a) Current Wisconsin Drinking Water Health Advisory Standards [14]

(b) Two isomers of xylene were found in TG-3 and its blind duplicate TG-13.

The concentration reported is the total concentration of the two isomers.

TABLE 4-6

COMPARISON OF MAXIMUM GROUNDWATER CONCENTRATIONS  
WITH STANDARDS FOR INORGANIC CHEMICALS

<u>Parameter</u>	<u>Proposed MCLG (ug/l)</u>	<u>Promulgated<sup>(a)</sup> MCLs (ug/l)</u>	<u>Highest Observation (ug/l)</u>	<u>Well Designation</u>
Arsenic	50	50	12.9	TG-10
Barium	1,500	1,000	793	TG-2
Cadmium	5	10	12	TG-9
Chromium	120	50	302	TG-9 <sup>b</sup>
Lead	20	50	333	TG-9 <sup>c</sup>
Mercury	3	2	2.0	TG-11
Selenium	45	10	<2	All
Silver	-	50	4.62	TG-9

## NOTES:

<sup>a</sup>State of Wisconsin Community Drinking Water Standards identical. [14]

<sup>b</sup>Samples TG-2, TG-10 and TG-16 also exceeded 50 ug/l.

<sup>c</sup>Samples TG-2, TG-10, TG-11 and TG-16 were also greater than 50 ug/l.



TABLE 4-7

ADDITIONAL PROPOSED MCLGs FOR VOLATILE ORGANIC CHEMICALS  
AND COMPARISON WITH MAXIMUM CONCENTRATIONS DETECTED IN GROUNDWATER

<u>Parameter</u>	<u>Proposed MCLG (mg/l)</u>	<u>Maximum Groundwater Concentration Observed</u>	<u>Well</u>	<u>Parameter</u>	<u>Proposed MCLG (mg/l)</u>	<u>Maximum Groundwater Concentration Observed</u>	<u>Well</u>
Acrylamide	0	-		Ethylbenzene	0.68	0.0334	TG-10
Alachlor	0	-		Heptachlor	0	-	
Aldicarb,		-		Heptachlor Epoxide	0	-	
Aldicarb sulfoxide,				Lindane	0.0002	-	
Aldicarb sulfone	0.009			Methoxychlor	0.34	-	
Carbofuran	0.036	-		Monochlorobenzene	0.06	0.0012	TG-10
Chlordane	0	-		Pentachlorophenol	0.22	-	
cis-1,2-Dichloroethylene	0.07	-		Styrene	0.14	-	
DBCP	0	-		Toluene	2.0	0.4524	TG-16
1,2-Dichloropropane	0.006	-		2,4,5-TP	0.052	-	
o-Dichlorobenzene	0.62	-		Toxaphene	0	-	
2,4-D	0.07	-		trans-1,2-Dichloroethylene	0.07	0.0276	TG-10
EDB	0	-		Xylene	0.44	0.501	TG-16
Epichlorohydrin	0	-					

## Notes:

TG-3 and TG-16 are field duplicates.

## 5.0 SUMMARY AND CONCLUSIONS

### 5.1 SUMMARY

As a result of the records review and visual site inspection, several potential sources of environmental contamination were identified at Truax Field, Madison, Wisconsin. These include a practice fire-fighting burn pit, a former open burning grounds and landfill, the former Burke Wastewater Treatment Plant, and the JP-4 fuel storage area. The Department of Defense has formerly owned and has partial responsibility for contamination at each area. However, current and other former owners share responsibility for the contamination.

Sampling and analysis was performed to determine concentrations of total metals, petroleum hydrocarbons, and volatile organics in soil, surface and groundwater. Sampling locations are summarized as follows:

#### 5.1.1 Soil Samples

Soil samples were collected at twelve locations, to evaluate potential contamination at the practice burn pit, near JP-4 fuel tanks, at an outdoor drum storage area, in three sludge drying bed cells, in sediments of the former treatment plant lagoon and its outfall to a ditch, and to define background levels.

#### 5.1.2 Surface Water Samples

Surface water samples were collected in four locations. These included standing water and a creek east of the practice burn pit, water in a lagoon at the former Burke Wastewater Treatment Plant, and at the outfall of the treatment plant to a surface ditch connected to Starkweather Creek.

#### 5.1.1 Groundwater

Three groundwater monitoring wells downgradient of the burn pit, wastewater treatment plant, and landfill were installed by EEI, and samples from these were collected and analyzed. Four previously existing monitoring wells downgradient of the landfill were also sampled. Two water supply wells owned by Oscar Mayer downgradient of the landfill and former Burke Treatment Plant were also sampled. A sample of water from the City of Madison water supply well located about one mile away was collected to determine if contamination at Truax Field has affected municipal water supplies. A sample of water used in well installation was collected to assess whether this source was a source of any contaminants.

### 5.2 CONCLUSIONS

#### 5.2.1 Contamination at the Fire-Training Burn Pit

The practice burn pit had relatively large dimensions (approximately 200 feet by 100 feet). The soil was contaminated with petroleum hydrocarbons and solvents. A surface water sample collected within the burn pit contained

elevated levels of some metals (lead and arsenic), petroleum hydrocarbons, and volatile organics. No contaminants were found in surface water (a creek) east of the burn pit. A monitoring well was installed near the burn pit. Groundwater collected from this well contained methylene chloride, xylene isomers, benzene derivatives, cyclohexane, and unknown organics. The results indicate fuels, solvents, or other chemicals used during fireman training exercises have entered the groundwater. The DOD was partially responsible for this contamination. The Air National Guard, City of Madison, Dane County, and volunteer fire departments were also partially responsible. Fire training exercises took place at frequent intervals at the site from 1953 through 1987.

#### 5.2.2 JP-4 Fuel Area

Four large fuel tanks at the JP-4 fuel area were emptied by the Air National Guard in about 1982. Possible evidence of past spills of fuels or solvents was found in soil and sediment samples within the diked disposal area, including elevated levels of petroleum hydrocarbons and lead and presence of organic solvents.

A small fuel tank (estimated 500 gallons) could not be accessed to determine its contents, but was believed to be empty.

#### 5.2.3 Outdoor Drum Storage Area

Five 55-gallon drums and two 5-gallon containers were found stored out-of-doors near the diked JP-4 fuel area. Contents were not sampled, in accordance with direction from the Corps of Engineers. Markings on these containers indicated they may have contained naptha, solvent, waste oil, waste fuel, and unknown chemicals. Most of the containers were at least partially full of liquid; one was empty. Markings indicated one of the containers may have originated in about 1982 (when ownership of the property was transferred from the Air National Guard to Dane County). It is unlikely that the drums are former DOD property.

#### 5.2.4 Previously Existing Groundwater Monitoring Network

Samples could not be collected from several wells scheduled for sampling under the Scope of Work. These wells were located downgradient of the land-fill. Well TG-4 (Kaufmann's Well 200D) could not be sampled due to a non-functioning bladder pump. Wells TG-6 (121A) and TG-7 (121D) could not be accessed due to their very narrow diameters and well sections out of alignment. Well TG-8 was not found and was believed to have been destroyed during excavations at the site.

#### 5.2.5 Former Burke Wastewater Treatment Plant Area

The former Burke WWTP consisted of a trickling filter, sludge lagoons, sludge drying beds and irrigation fields. Portions of the property are currently owned by Reynolds Brothers, Shop-Ko, and Oscar Mayer. At the time of EEI's work on-site, the trickling filter was being demolished, above ground tanks were being removed, and lagoons were being filled with soil.

No contaminants were found in a surface water sample (TW-2) collected in one of the lagoons at the former WWTP.

A sediment sample (TS-12) collected at a former decantation pond at the former WWTP was found to contain petroleum hydrocarbon (4200 ug/g), and organic solvents (including methylene chloride, 1,1,1-trichloroethane, trichlorofluoromethane, and toluene). Matrix effects interfered with analysis of sample TS-12, making identification of the organics detected tentative and quantification uncertain.

A sediment sample (TS-11) collected from beneath the surface water discharge point to the ditch which connects with Starkweather Creek was also found to contain petroleum hydrocarbons (5500 ug/g), methylene chloride, toluene, and 1,1,1-trichloroethane, as well as ethylbenzene, unidentified organics, and elevated levels of mercury and lead. Matrix effects also interfered with organic analysis of Sample TS-11.

The surface water discharge (TW-4) from the former Burke lagoons to the ditch connected to Starkweather Creek contained a trace of tetrachloroethylene (3.2 ug/l) and relatively high levels of petroleum hydrocarbons (65 mg/l).

Three soil samples (TS-7, TS-8, and TS-9) collected at sludge drying bed cells showed the presence of methylene chloride at all sites, numerous additional organic chemicals (including toluene, 1,1,1-trichloroethane, hexane, and benzene) at TS-8 and TS-9, and numerous fluorinated organics (trichlorofluoromethane, a trichlorofluoroethane isomer and a tridecafluorohexane isomer) in TS-9. Matrix effects interfered with organic analysis of samples TS-8 and TS-9, making identification of these compounds tentative.

Contaminants detected in a groundwater well (TG-2) positioned downgradient of the former Burke WWTP included lead, chromium, and cadmium. The level of lead exceeded the MCLG and MCL. The level of cadmium exceeded the MCLG but not MCL. The levels of chromium exceeded the MCL but not MCLG. No petroleum hydrocarbons or organics were found in this well.

The contaminants found in surface soil, sediment, and water samples at the former Burke WWTP were not found in the groundwater well (TG-2) positioned downgradient of the WWTP in the surficial aquifer. This may be further evidence that a clay barrier does exist and that contaminants are migrating around the clay barrier toward the Oscar Mayer wells that are responsible for the drawdown.

#### 5.2.6 Groundwater Contamination Downgradient of the Landfill

No organic contaminants were found in TG-1, positioned downgradient of the landfill. The level of lead (30 ug/l) exceeded the MCLG.

No organic or inorganic contamination was found in TG-5 (City Well 200S). No organic contaminants had been detected during previous sampling and analyses performed by the City of Madison at this site.

Monitoring Well TG-9 (City Well 152) was found to contain trichlorofluoromethane (9.7 ug/l), dichlorofluoromethane (9.0 ug/l), and trans-1,2-dichloroethylene (1.5 ug/l). There are no final MCLs or MCLGs for the organic compounds detected. The level of trans-1,2-dichloroethylene was much lower than

the proposed MCLG for that compound (70 ug/l). Levels of chromium (302 ug/l), cadmium (12 ug/l) and lead (333 ug/l) exceeded proposed MCLGs and promulgated MCLs. The well also contained elevated levels of petroleum hydrocarbons (85 mg/l). Compounds previously detected by the City of Madison included 1,1-dichloroethylene, fluorotrichloromethane, tetrachloroethylene, and trichloroethylene. This well had a very low yield.

Samples collected from Monitoring Well TG-10 (Well 104) contained trans 1,2-dichloroethylene (27.6 ug/l), chloroethane (9.1 ug/l), trichloroethylene (3.9 ug/l), chlorobenzene (1.2 ug/l), and chromium (178 ug/l). The level of trichloroethylene exceeded the MCLG (zero). The level of trans 1,2-dichloroethylene was less than the proposed MCLG (70 ug/l). Levels of lead (157 ug/l) and chromium (178 ug/l) exceeded proposed MCLGs and promulgated MCLs. Numerous chlorinated organics had previously been detected by the City of Madison in samples from this well, including: 1,2-dichloroethane, 1,1-dichloroethane, 1,2-dichloroethylene, 1,1-dichloroethylene, trans 1,2-dichloroethylene, tetrachloroethylene, trichloroethylene, and vinyl chloride.

Contaminants found in TG-11 (Well 101) included vinyl chloride (16.7 ug/l) and lead (62 ug/l). The concentrations measured exceeded MCLs and MCLGs.

There was a lack of continuity in the levels and identities of contaminants found at the different monitoring wells downgradient of the landfill. The specific contaminants found at individual wells vary over time. The variability in results is attributable to the large volume and variety of wastes disposed in the landfill and the differing depths of the monitoring wells, which intercept different aquifers.

#### 5.2.7 Oscar Mayer Wells

Trichloroethylene was found in TG-13 (Oscar Mayer Well No. 3) at a level (11.0 ug/l), exceeding its MCL (5.0 ug/l) and MCLG (zero). These results confirmed previous analyses performed by the Wisconsin DNR. Trichlorofluoromethane was also detected (10.0 ug/l) but had not been previously found by Wisconsin DNR.

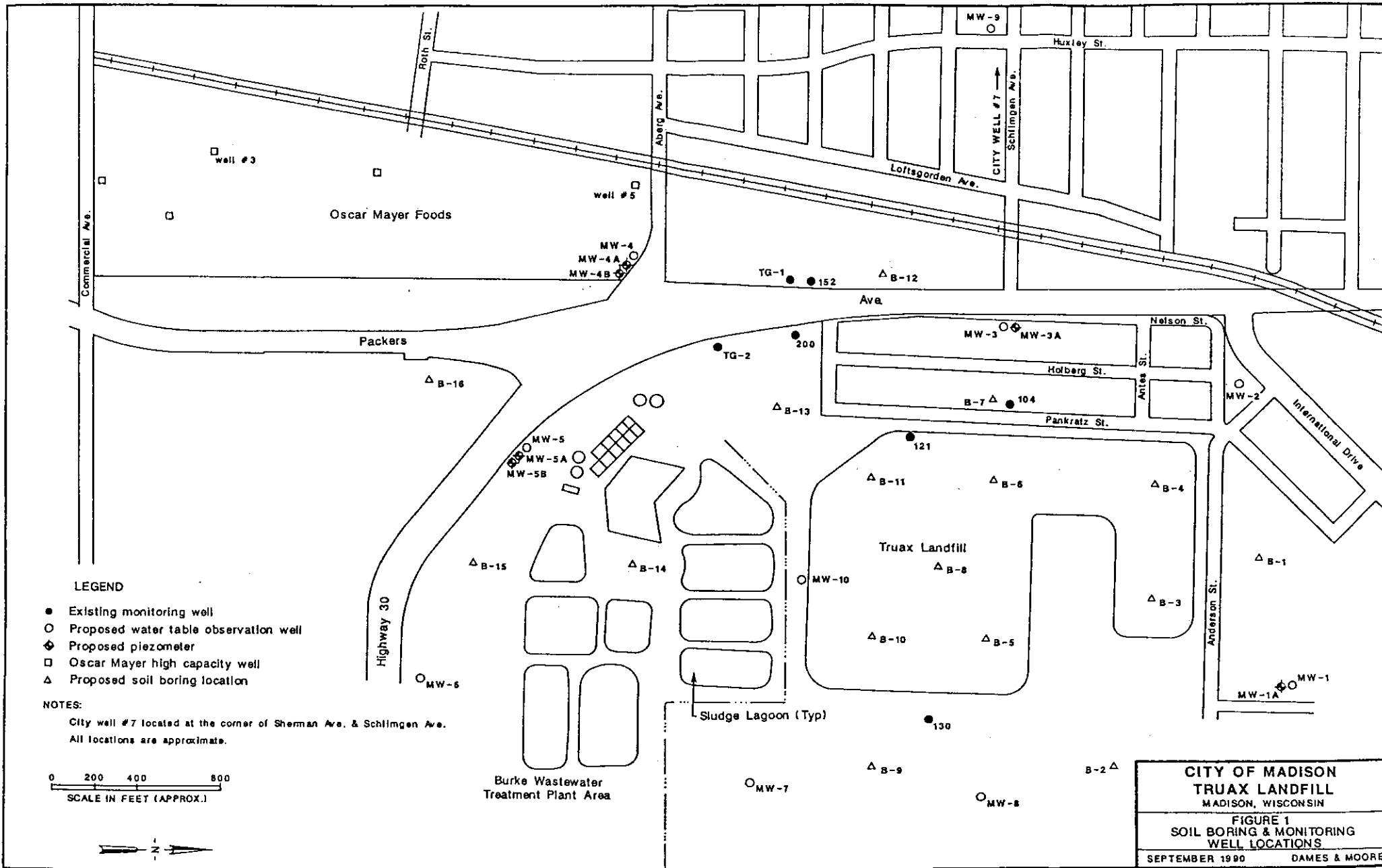
Trichloroethylene was found in TG-14 (Oscar Mayer Well No. 5) at 2.2 ug/l. This level exceeds the MCLG (zero) but not the MCL (5.0 ug/l). Tetrachloroethylene was also found in TG-14 (8.8 ug/l). There are no MCLs or MCLGs for tetrachloroethylene but the level was less than the State of Wisconsin Drinking Water Health Advisory (20 ug/l). Presence of trichloroethylene and tetrachloroethylene confirms results of sampling and analysis performed previously by Wisconsin DNR.

No metals contamination was found in Oscar Mayer wells.

#### 5.2.8 Madison Water Supply Well No. 7

No evidence of organic or inorganic contamination was found in TG-12, the sample collected from the Madison Water Supply Well.



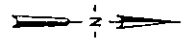


**LEGEND**

- Existing monitoring well
- Proposed water table observation well
- ◆ Proposed piezometer
- Oscar Mayer high capacity well
- △ Proposed soil boring location

**NOTES:**

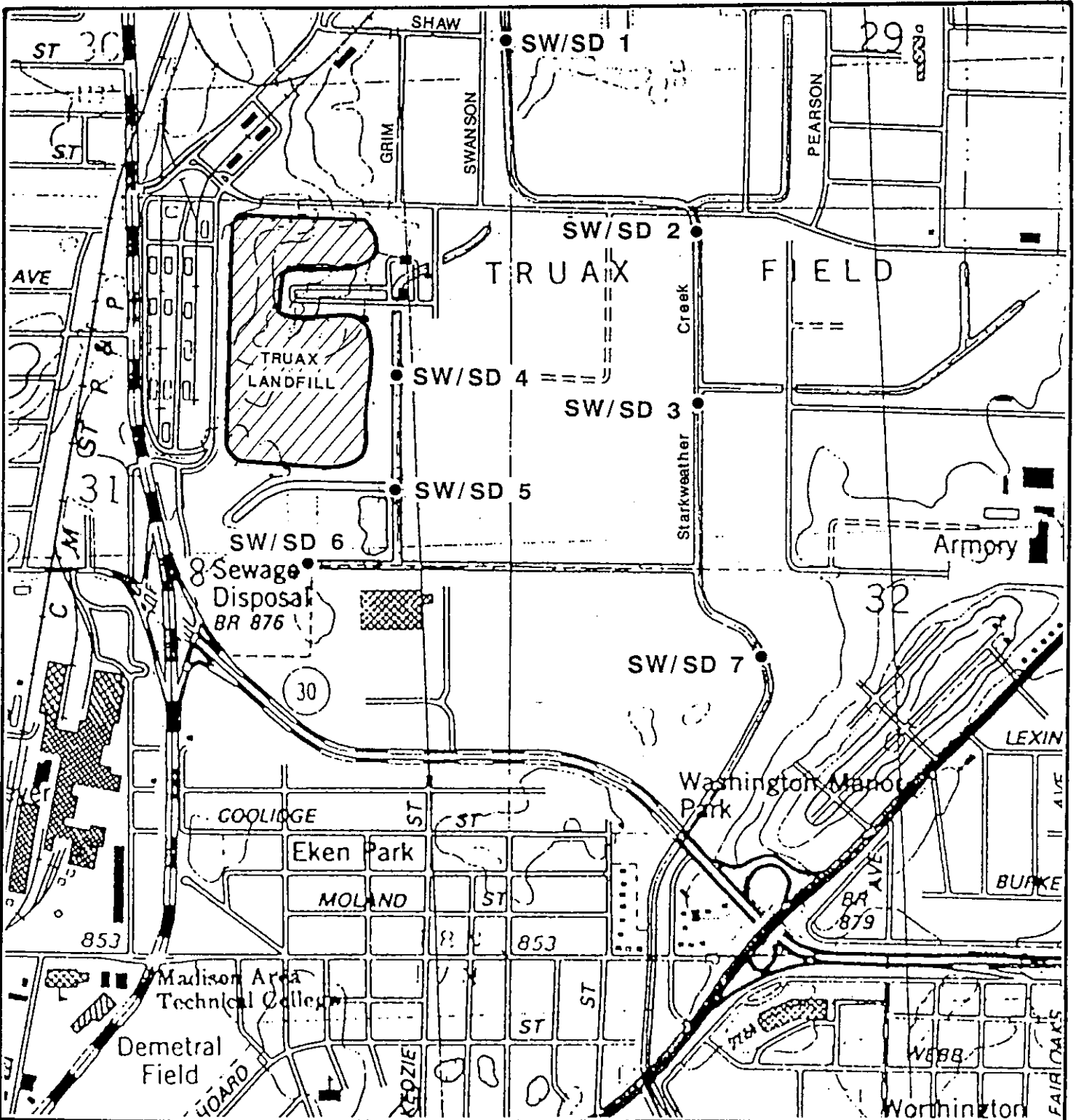
City well #7 located at the corner of Sherman Ave. & Schlimgen Ave.  
 All locations are approximate.



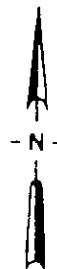
**CITY OF MADISON**  
**TRUAX LANDFILL**  
 MADISON, WISCONSIN

**FIGURE 1**  
**SOIL BORING & MONITORING**  
**WELL LOCATIONS**

SEPTEMBER 1990      DAMES & MOORE



BASE MAP REFERENCE: U.S.G.S 7.5 minute topographic quadrangle map, Madison East, Wisconsin, 1983.



<p><b>CITY OF MADISON</b>  <b>TRUAX LANDFILL</b>          MADISON, WISCONSIN</p>
<p>FIGURE 2          SURFACE WATER/          SEDIMENT SAMPLING          LOCATIONS</p>
<p>SEPT 1990 DAMES &amp; MOORE</p>

Bill WTP

ONE EAST MAIN STREET  
POST OFFICE BOX 2719  
MADISON, WI 53701-2719  
FACSIMILE 608-257-0609  
TELEPHONE 608-257-3911

603 WATER STREET  
POST OFFICE BOX 148  
SAUK CITY, WI 53583-0148  
TELEPHONE 608-643-2408

113 EAST MAIN STREET  
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PHILIP E. LAFOLLETTE (1892-1965)

GORDON SINYKIN  
EARL H. MUNSON  
CHRISTOPHER J. WILCOX  
HOWARD A. SWEET  
THOMAS A. HOFFNER  
DAVID E. MCFARLANE  
BRADY C. WILLIAMSON  
ROBERT E. CHRITTON  
TIMOTHY J. MULDOWNEY

MICHAEL E. SKINDRUD  
TERESA M. ELGUÉZABAL  
LINDA M. CLIFFORD  
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MARGARET J. VERGERONT  
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LAW OFFICES

LaFollette  
Sinykin

October 2, 1990

James L. Nemke  
Chief Engineer & Director  
Madison Metropolitan Sewerage District  
1610 Moorland Road  
Madison, WI 53713-3398

PERSONAL AND CONFIDENTIAL  
RECEIVED  
OCT 3 1990

Truax Landfill  
~~Burke Treatment Plant~~

Dear Mr. Nemke:

My apologies for not including a copy of the PRP agreements negotiated so far between the City and County and with Oscar Mayer. I enclose them with this letter.

Referring to the first round of tests at the landfill, I enclose a copy of the "Preliminary Sampling Results, Truax Landfill Investigation." The results suggest detects and exceedances for arsenic, cadmium, and selenium concentrated at wells MW-5, MW-5A, MW-5B, and MS-6 located in the vicinity of the former sludge lagoons. This information leads to the conclusion that hazardous substances are being released from the treatment plant facility.

We appreciate your continuing interest in attending steering committee meetings, and hope to hear from you soon about the District's intention to participate financially in this effort.

Very truly yours,

LA FOLLETTE & SINYKIN

By   
Linda M. Clifford

LMC/jad  
Encl.  
1:jad(C-6.1)NEM

- cc: Peter A. Peshek (w/o enc.)
- James A. Voss (w/o enc.)
- Griffin G. Dorschel (w/enc.)
- Jeanie Sieling (w/o enc.)
- David P. Trainor (w/o enc.)

PRELIMINARY SAMPLING RESULTS  
TRUAX LANDFILL INVESTIGATION

	MW-1	MW-1A	MW-2	MW-3	MW-3A	MW-4	MW-4A	MW-4B	MW-5	MW-5A	MW-5B	MW-6	DL
Alkalinity	268	315	280	750	310	680	370	420	220	198	310	520	mg/L
Arsenic	-	-	-	-	-	-	21	-	-	29.4	-	-	1 ug/L
Barium	-	-	-	-	-	-	-	-	-	-	-	-	0.2 mg/L
Cadmium	-	0.9	-	-	-	-	-	-	-	-	-	0.2	0.2 ug/L
C.O.D.	14	<5	21	360	210	450	200	570	940	450	85	440	mg/L
Chloride	24	20	29	260	10	260	23	175	13	-	-	105	1 mg/L
Chromium	2.5	-	1.1	1.3	2.5	2.3	-	-	-	-	-	-	1 ug/L
Color	<5	<5	15	<5	<5	15	5	20	28	18	30	50	5 C.P.U.
Copper	2.1	2	-	-	-	-	-	-	-	-	-	-	0.03 ug/L
Fluoride	0.31	0.77	-	0.26	0.38	0.33	0.3	0.35	0.63	0.27	0.23	0.61	0.1 mg/L
Hardness	325	370	580	980	420	940	440	1000	460	170	760	1380	mg/L
Iron	-	-	-	0.15	-	-	0.16	0.17	-	-	1.02	0.99	0.1 mg/L
Lead	-	-	1.2	-	-	-	1	-	-	-	-	1	1 ug/L
Manganese	0.14	0.17	0.1	0.94	-	0.22	0.1	0.2	0.59	-	0.05	1.05	0.02 mg/L
Mercury	-	-	-	-	-	-	-	-	-	-	-	-	0.2 ug/L
Nitrogen (NO2+NO3 as N)	0.22	0.26	0.78	6.66	4.96	10.2	0.06	-	65	-	1.09	-	0.05 mg/L
Selenium	-	-	-	-	-	-	-	-	9.6	-	-	-	6 ug/L
Silver	-	-	-	-	-	-	-	-	-	-	-	-	0.5 ug/L
Solids (TDS)	310	360	380	1220	410	1180	430	940	690	200	315	1680	mg/L
Sulfate	18	26	19	20	54	80	33	110	108	0.19	17	720	2 mg/L
Surfactants	0.035	0.91	0.13	0.17	0.24	0.022	0.053	0.08	0.2	-	0.038	0.029	0.02 mg/L
Zinc	-	-	-	-	-	-	-	-	-	-	-	-	0.5 mg/L
Metals Digestion - soil													
Metals Digestion - water													
Tetrachloroethene	-	-	-	-	-	-	-	-	-	-	-	-	0.5 ug/L
Trichloroethene	-	-	-	-	-	-	-	-	-	-	-	-	0.5 ug/L
Benzene	-	2.7	-	-	-	-	-	-	-	-	-	-	1 ug/L
Ethylbenzene	-	1.6	-	-	-	-	-	-	-	-	-	-	0.5 ug/L
Toluene	-	9.2	-	-	2.1	-	1.5	-	-	-	-	0.9	0.5 ug/L
Xylenes	-	3.3	-	-	-	-	-	-	-	-	-	-	2 ug/L
Atrazine	-	-	-	-	-	-	-	-	-	-	-	-	1.5 ug/L
EPTC (Eptam)	-	-	-	-	-	-	-	-	-	-	-	-	1.3 ug/L
Symazine	-	-	-	-	-	-	-	-	-	-	-	-	2 ug/L
Carbofuran	-	-	-	-	-	-	-	-	-	-	-	-	2.2 ug/L

NOTE: - indicates non-detect



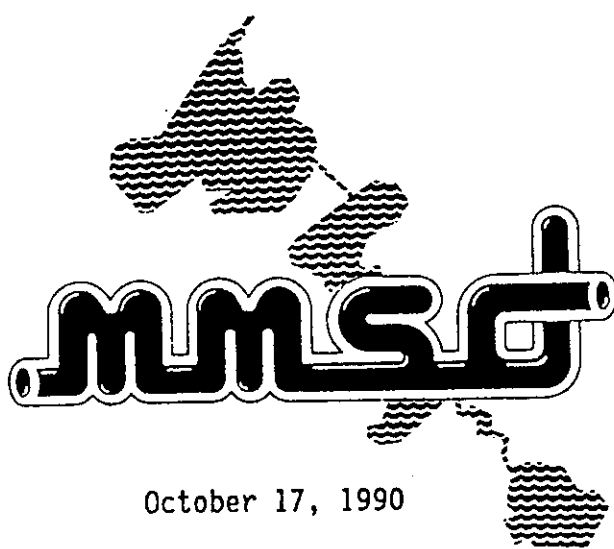


MADISON METROPOLITAN  
SEWERAGE DISTRICT

1610 Moorland Road  
Madison, WI 53713-3398

Telephone (608) 222-1201

James L. Nemke  
Chief Engineer & Director



October 17, 1990

COMMISSIONERS

Lawrence B. Polkowski  
President  
Edward V. Schlen  
Vice-President  
Harold L. Lautz  
Secretary  
Eugene O. Gehl  
Commissioner  
Gordon C. Johnson  
Commissioner

Ms. Linda Clifford  
LaFollette & Sinykin  
1 E. Main Street  
Madison, WI 53703-3310

Subject: Truax Investigation

Dear Ms. Clifford:

The District feels strongly that any pollutants which might be confirmed in the Truax area are not a result of the District's operation of the Burke plant. However, we do understand the importance of ensuring all municipal agencies have a progressive attitude toward examining the problem. Based on the District's desire to cooperate with the City and the County, the Commission has authorized me to offer \$15,000.00 toward the investigative work. Please let me know to whom we should issue the check.

I will leave it up to you and our attorney, Griffin Dorschel, to draft an agreement which recognizes that any contribution toward the effort does not indicate ultimate responsibilities for further investigative work or clean-up. Once an appropriate agreement is negotiated, we will make the indicated contribution.

Sincerely,

James L. Nemke  
Chief Engineer & Director

JLN/cmm



# AXLEY BRYNELSON

Attorneys Since 1885

October 29, 1990

Mr. William T. Cormack  
Wausau Insurance Companies  
Suite 500  
901 Warrenville Road  
Lisle, IL 60532-4307

RE: City of Madison and Dane County  
Madison Metropolitan  
Sewerage District (Truax Landfill/Burke Plant)  
Our File: 35906

Dear Mr. Cormack:

This letter responds to your October 8, 1990 correspondence and the questions posed therein:

1. Please provide a brief history of the facility and its operation including a description of the product manufactured and information on previous owners.

Response: The Burke Wastewater Treatment Plant was constructed by the City of Madison in 1914. At that time, the Burke Outfall Sewer was constructed and carried effluent from the plant to the Yahara River at East Johnson Street in Madison, Wisconsin. From there it flowed to Lake Monona. The plant contained no sludge storage lagoons. Sludge was dried on sludge drying beds which had underdrains. The underdrains collected any water drained from the sludge and discharged the water to the effluent channel for eventual discharge through the Burke Outfall. Dried sludge was used as compost or fertilizer.

The City of Madison operated the Burke Plant from 1914 to 1933, at which time the plant was deeded to the Madison Metropolitan Sewerage District (MMSD). We have no knowledge of any effluent in the plant vicinity or storage of sludge on the plant grounds during the period of operation by the city.

## Madison

Manchester Place  
2 East Mifflin Street  
Post Office Box 1767  
Madison, WI 53701-1767  
Telephone (608) 257-5661  
Facsimile (608) 257-5444

Direct Dial:

## Wisconsin Dells

Richard W. Cross  
Eric J. Wendorff  
313 Broadway  
Post Office Box 237  
Wisconsin Dells, WI 53965  
Telephone (608) 254-2000  
Facsimile (608) 254-8582

MADISON METROPOLITAN SEWERAGE DISTRICT RECEIVED

NOV 6 1990

Ralph E. Axley  
of Counsel  
Floyd A. Brynolson  
of Counsel  
James C. Herrick  
Frank J. Bucalda  
Griffin G. Dorschel  
Bradley D. Armstrong  
John H. Schmid, Jr.  
Timothy D. Fenner  
John C. Milby  
Daniel T. Hardy  
John Walsh  
Bruce L. Harms  
David Easton  
Peter Weisenberger  
Curtis C. Swanson  
Michael S. Anderson  
Patricia M. Gibeault  
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Catherine J. Furay  
Michael J. Westcott  
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Richard E. Petershack  
Richard W. Cross  
Eric J. Wendorff  
Steven A. Brezinski  
Arthur E. Kurtz  
Steven M. Streck  
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Joy L. O'Grosky  
Michael J. Modl  
Colleen J. Reinka  
Caryl J. Shortridge  
Sabin S. Peterson  
Terry J. Finman



# AXLEY BRYNELSON

Mr. William T. Cormack  
October 29, 1990  
Page 2

Attorneys Since 1885

MMSD operated the Burke Plant from June 16, 1933 to December 4, 1936, at which time the plant was inactivated. During this period of operation no effluent was surfaced applied at the plant site nor was sludge stored. Sludge was de-watered on drying beds, and the water was collected and discharged to the Burke Outfall.

On April 17, 1942, the United States of America condemned the Burke Plant site. The plant was turned over to the United States by warranty deed. It was reconditioned and began operating under federal control on October 15, 1942. It was operated by the United States until some time in early 1946.

Prior to May 1, 1946, at the request of the agency in charge at Truax Field, the City of Madison operated the plant for a period of months and billed the United States and Madison Housing Agency for services rendered. On May 1, 1946, MMSD took over the operation of the plant at the request of the City of Madison. The city paid the operating expenses at the plant and charged the Madison Housing Agency and the United States. The United States ceased operation of the plant in October, 1946 and ownership reverted to MMSD on October 15, 1947. We do not know if effluent was surface discharged or that sludge was stored in on-site lagoons during the time of operation by the United States.

From October 15, 1947, to May 11, 1950, MMSD continued to use the Burke Plant to treat wastewater which could not be transported to the Nine Springs Wastewater Treatment Plant. During this period, the East Interceptor and associated pumping stations were built to provide additional transmission capacity. Effluent was discharged to the Burke Outfall and sludge was dried on drying beds. No surface discharge occurred and no sludge storage facilities existed. Effluent from the Burke Outfall was diverted from the Yahara River to the East Interceptor on May 8, 1950.

From May 11, 1950 to July 3, 1952, the Burke Treatment Plant was used by Oscar Mayer and Company for experimental pre-treatment of its discharge. On September 7, 1951, Oscar Mayer and MMSD entered into a formal agreement for the leasing of the Burke Plant. The agreement allowed Oscar Mayer to use the Burke Plant for pre-treatment of the waste water from its plant. The agreement obligated Oscar Mayer to save MMSD harmless for any and all liability for damages to person or

property arising from the operation of the facilities by Oscar Mayer. In 1961, MMSD and Oscar Mayer entered into a successor agreement containing a similar hold-harmless clause.

During the time Oscar Mayer operated the Burke facility, it built a series of sludge lagoons. Although our records are not clear as to the number of sludge lagoons built, it appears two were built on property owned by MMSD and leased to Oscar Mayer, and at least four were built on adjacent property owned by Oscar Mayer. In 1968, MMSD granted Oscar Mayer permission to build a third sludge lagoon on MMSD property but we do not know if it was ever built.

Oscar Mayer ran the Burke Plant until approximately June, 1978. The formal agreement was terminated on June 30, 1979. On February 12, 1980, MMSD offered the Burke site to the City of Madison under the conditions of the 1933 Purchase Agreement. ON August 28, 1980, the city turned down the purchase of the Burke Plant. On September 15, 1981, MMSD sold the Burke site and plant facilities to the Reynold's family.

2. Provide a description of the past and present waste disposal operations or the process operations suspected of causing the alleged pollution. This should include:

- a. Inventory of chemicals used.
- b. Volumes and methods of waste disposed both on-site and off-site.
- c. The size and type of chemical and waste storage containers or impoundments.

Response: The treatment plant was used to treat domestic wastewater while operated by the City of Madison, MMSD and the Department of Defense. It was used to treat industrial wastewater while operated by Oscar Mayer. MMSD is not aware of the use of chemicals associated with the treatment process during the period when it was operated by the City of Madison, MMSD, or the Department of Defense. All effluent was discharged to a sewer which eventually discharged into the Yahara River. Sludge processing was done on sludge drying beds which had an underdrain system designed to recycle any filtered water back to the treatment process or the effluent outfall. There are no records of any liquid or solid waste

# AXLEY BRYNELSON

Mr. William T. Corry  
October 29, 1988  
Page

Attorneys Since 1885

having been placed on the ground during that period of operation.

Once the plant was leased by Oscar Mayer, sludge lagoons were constructed on-site and were eventually used to store sludge generated at the plant. The general location and design of the sludge lagoons are indicated on the attached drawing No. A-1075. The district has no records of the amounts of sludge held in the sludge lagoons.

3. Provide a history of any leaks, spills, and other releases at the site or facility and the clean-up operations or remediations conducted in response to those incidents.

Response: We are not aware of any leaks, spills or other releases at the site.

4. Provide information on potential other sources of contamination both on-site and off-site.

Response: There is a significant potential for contaminants generated by the Truax landfill operated by the City of Madison located immediately northeast of the site. There is also potential contamination from various Department of Defense operations associated with the Dane County Airfield.

5. Provide any summary reports or results of comprehensive environmental studies conducted to date which outline the extent and degree of the alleged contamination of soil, air, or surface and groundwater.

Response: We attach copies of the following documents in response to this question:

- a. Hydrogeology of Solid Waste Disposal Site: Madison, a 1970 report;
- b. Truax Landfill Leachate Migration Study: May, 1984 report;
- c. Installation Restoration Program Preliminary Assessment, Headquarters 128 Tactical Fighter Wing, Wisconsin International Guard, T. Field, an August, 1988 report;

- d. A November, 1988, installation restoration program decision document;
- e. Site No. 2-JP for fuel spill No. 2;
- f. A report written by Dennis Stack analyzing DOD-related activities in the Truax Field area; and
- g. A September, 1990 draft report, interim data summary, Truax Landfill.

6. Please provide a description of use of the surrounding land both contiguous to and within a two mile radius of the facility; e.g., residential, industrial, farmland, wooded, etc.

Response: The land immediately to the northeast of the Burke Treatment Plant was used for a City of Madison landfill. Further to the north and east is the Dane County Regional Airport, with associated commercial and military terminals and industrial and office buildings. Immediately north of the Burke Site are warehouses. The Oscar Mayer Plant is immediately to the southeast of the site. Residential areas exist to the northwest and southeast of the site.

7. Describe the specific costs or damages which you under City of Madison and Dane County seek to recover from Madison Metropolitan Sewerage District.

Response: Unknown at this time.

8. Please describe any other parties against whom City of Madison and Dane County are making the same claim.

Response: Oscar Mayer is considered a potentially responsible party. The Department of Defense is also considered a PRP, as well as people who may have contributed wastes to the Truax Landfill. We do not have a listing of the contributors to the landfill.

9. Identify any parties whom you feel you and/or Wausau may have claims of indemnity against, and the basic reasons.

Response: We believe we have an indemnification claim against Oscar Mayer as provided in the lease agreements. We have attached copies of the lease agreements dated September 7, 1951 and July 1, 1961. The agreements were amended from time to time but the amendments are not germane to this matter.

10. Please provide us with the current status of settlement negotiations, if any, with City of Madison and Dane County, including specifically the amount being sought from Madison Metropolitan Sewerage District.

Response: There have been no settlement negotiations. The city and county have sought our cooperation in determining if there are any pollutants of concern associated with the Burke Site. They have asked MMSD to make contributions toward the studies currently being conducted. On October 13, 1990, the Commissioners of MMSD resolved to make a \$15,000 contribution towards the conduct of the investigative work in the vicinity of the Truax Landfill and Burke Wastewater Treatment Plant if an agreement can be worked out which will provide that the contribution in no way constitutes an admission of liability by MMSD.

11. Identify all primary and umbrella carriers and their policy periods from the time your company first operated at this site to the present. Please forward copies of the letters sent notifying them of this incident.

Response: We believe that since 1955, all primary and umbrella coverage was provided by Wausau Insurance Companies. We believe Century Indemnity Company (represented by Fox Insurance Company) provided coverage from May, 1933 through May, 1934. We believe Employers Mutual Liability Company insured MMSD from May, 1934 through May, 1941. We have no information regarding insurance coverage from May, 1941 through August, 1955.

12. Please provide copies of all environment impairment liability policies that you have.

Response: To our knowledge, MMSD has no environmental impairment liability policies. We anticipate coverage under MMSD's general liability policies.

AXLEY BRYNELSON

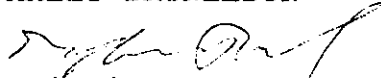
Mr. William T. Cormack  
October 29, 1990  
Page 7

Attorneys Since 1885

Please advise if you require any additional information.

Very truly yours,

AXLEY BRYNELSON



Griffin G. Dorschel

GGD:th

cc: James L. Nemke  
Connie Nieland

COPY

Office of the City Attorney

City of  
Madison



Henry A. Gempeler, City Attorney

City-County Building, Room 401  
210 Martin Luther King, Jr. Boulevard  
Madison, Wisconsin 53710  
608 266 4511  
FAX 608 266 5948

December 14, 1990

REYCO Madison Corporation  
P.O. Box 628  
Madison, WI 53701

Attn: Mr. David Reynolds

RE: Methane Gas Probe Site - Truax Landfill/Burke  
Treatment Plan Investigation

Dear Mr. Reynolds:

Pursuant to our telephone conversation on December 13, 1990, enclosed please find a revised draft Easement for the methane gas probe to be installed on REYCO property in order to determine the extent of landfill gas migration and to monitor the success of the landfill gas extraction system now being installed. It is our intent that the revised Easement would permit REYCO or its successor to renegotiate the location of the probe in order to accommodate development of your property.

By copy of this letter to Mr. David Benzschawel, City of Madison Engineering Division, I am requesting that he contact you for the purpose of locating the proposed easement on your property and notifying you of the proposed installation which is to occur soon. Please contact me if you have any further questions regarding the proposed Easement document. If you have any other questions regarding the installation of the probe, please contact Mr. Benzschawel at 266-4091. Please have the Easement executed and acknowledged by the appropriate REYCO officers and return it to me at the above address. Thank you for your consideration. By copy of this letter, I am also advising Attorney Linda Clifford to notify you of the next meeting of the Local Steering Committee. We welcome our attendance and participation.

Very truly yours,

James M. Voss  
Assistant City Attorney

JMV:sob

cc: David Benzschawel  
David Trainor  
Attorney Linda Clifford  
Attorney Peter Peshek  
James Nemke  
Ron Mengel

EASEMENT AND RIGHT OF ENTRY  
FOR THE INSTALLATION, MONITORING, MAINTENANCE  
AND REPLACEMENT OF GAS MONITORING PROBE  
(FORMER TRUAX LANDFILL SITE)

REYCO Madison Corporation, being owner of the following described property abutting the former City of Madison Truax Landfill Site located on the First Addition to Truax Air Park West, City of Madison, Dane County, Wisconsin, does hereby grant the City of Madison and County of Dane and their authorized agents, permission to enter upon the following described property in its ownership with the necessary equipment and materials for the purpose of installing, monitoring, maintaining and replacing a gas monitoring probe, as indicated on Exhibit (A) attached hereto and made a part of this Easement. The gas monitoring probe shall consist of a four inch diameter access valve box flush with the surface of the ground which is set over a twenty-five foot long one inch PVC gas probe which has been placed in a bore hole and backfilled for the purpose of monitoring any lateral movement of gas generated from the former Truax Landfill Site abutting the following described property. The area disturbed as a result of installing the probe or any alignment of the probe, as may be approved by the owner, shall be restored with top soil and leveled. Grantor, REYCO Madison Corporation, shall have the right to renegotiate the location of the probe with the city of Madison and County of Dane at any time and the grantees agree to give reasonable consideration to relocation of the said probe to accommodate development of the grantors' property.

THIS EASEMENT shall terminate without further action by either party thirty (30) days following removal of the gas probe by the City of Madison or County of Dane from the following described property:

Part of the Southwest one quarter of the northeast one quarter of Section 31, Town 8 North, Range 10 East, in the City of Madison, Dane County, Wisconsin, more fully described as follows:

A parcel of land 30 feet by 30 feet square, the center of which is 785 feet East of the North-South quarter section line of Section 31, Town 8 North, Range 10 East and 50 feet south of the North property line of Parcel No. 0810-314-0097-2, located at 1401 Packers Avenue and owned by grantor, REYCO Madison Corporation. Said point is also approximately 530 feet West of the East property line of said parcel.

Dated in Madison, Wisconsin, this \_\_\_ day of December, 1990.

REYCO MADISON CORPORATION

By: \_\_\_\_\_, President

By: \_\_\_\_\_, Secretary

ACKNOWLEDGEMENT

STATE OF WISCONSIN )  
                          ) SS  
COUNTY OF DANE     )

Personally came before me this \_\_\_ day of December, 1990, the above named \_\_\_\_\_ and \_\_\_\_\_, to me known to be the President and Secretary of REYCO Madison Corporation, who stated that they executed this document for and on behalf of said Corporation by its authority and acknowledged the same.

\_\_\_\_\_  
Notary Public, State of Wisconsin  
My commission \_\_\_\_\_

This instrument has been drafted  
by and should be returned to:

James M. Voss, Assistant City Attorney  
Room 401, City-County Building  
210 Martin Luther King Jr. Blvd.  
Madison, Wisconsin 53710



# EASEMENT TO BE ACQUIRED

DEPT. OF PUBLIC WORKS  
CITY ENGINEERING DIVISION  
MADISON, WISCONSIN

 DENOTES EASEMENT TO BE ACQUIRED

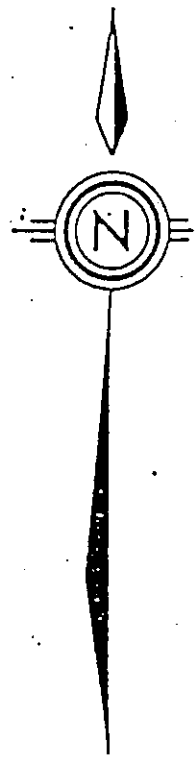
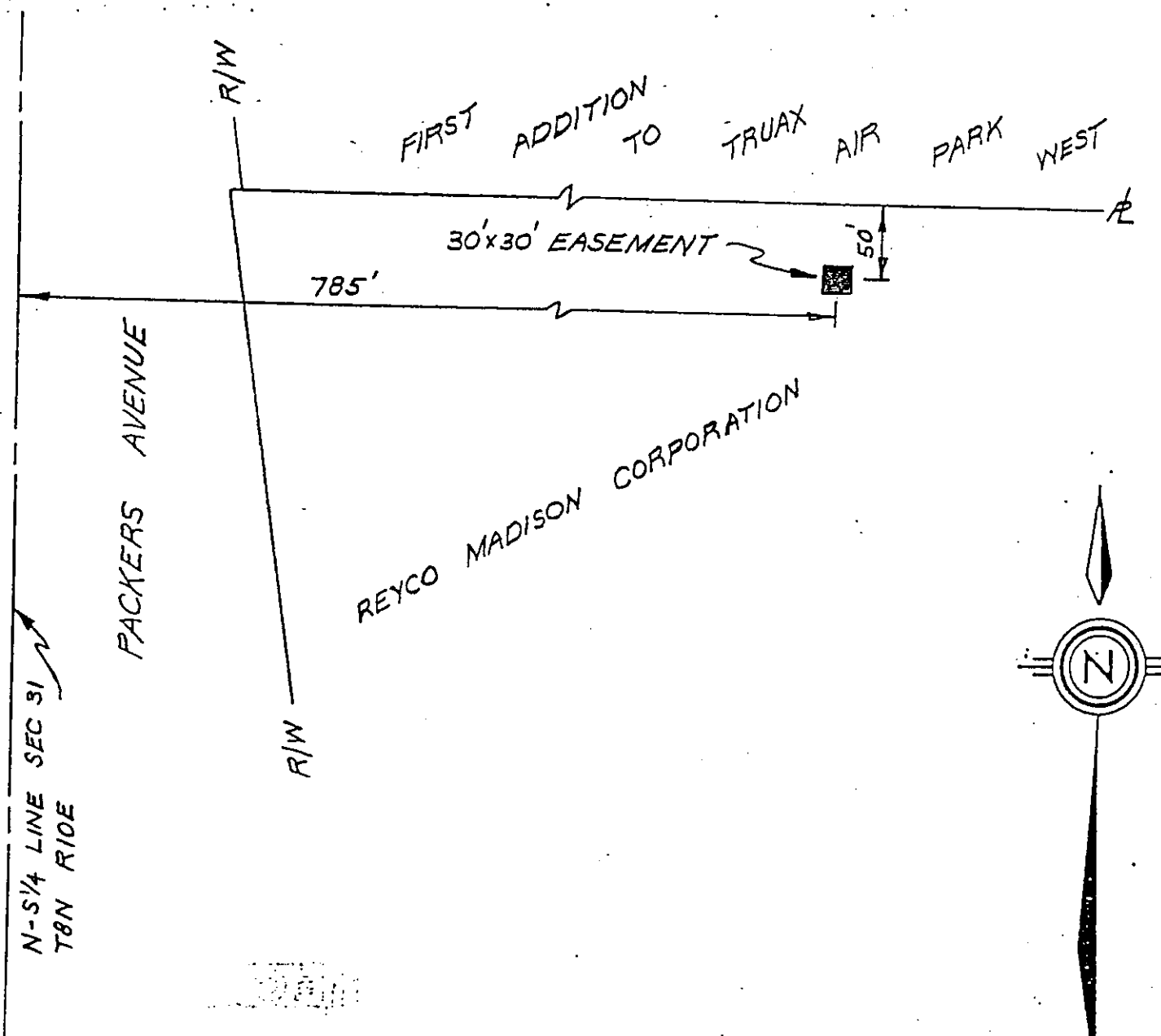


EXHIBIT "A"

DRAWN BY:     MK    

DATE: 12-6-90

**MADISON METROPOLITAN  
SEWERAGE DISTRICT**

610 Moorland Road  
Madison, WI 53713-3398

Telephone (608) 222-1201

James L. Nemke  
Chief Engineer & Director



December 14, 1990

**COMMISSIONERS**

Lawrence B. Polkowski  
President  
Edward V. Schien  
Vice-President  
Harold L. Lauz  
Secretary  
Eugene O. Gehl  
Commissioner  
Gordon C. Johnson  
Commissioner

Dames & Moore  
1846 Hoffman Street, Suite 101  
Madison, WI 53704-2586

Attn: Mr. David P. Trainor, P.E.  
Senior Engineer

Subject: Review of Draft Report  
City of Madison Truax Landfill  
Dated December 1990

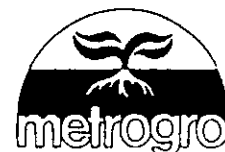
Dear Mr. Trainor:

Thank you very much for the opportunity to review your draft report. I found the report to be very comprehensive and well organized. I have several comments that you may want to consider in preparation of your final report.

On Page 7-17 you make the following statement:

"Due to the concentrations of barium, cadmium, copper, and zinc, the potential exists for those metals to leach out into the groundwater."

Although this statement is correct since there is always a potential for movement of these metals, I believe additional clarification is necessary to put that potential in perspective. While some of the concentrations you refer to are certainly above background levels for the metals in question, the concentrations themselves may not be of great concern relative to leaching into the groundwater. Most scientific evidence regarding heavy metals in a soil matrix concludes that soil pH and organic matter are critical to determining whether there is a significant potential for leaching. It has generally been found that these metals are tightly held to the soils and the potential for leaching is minimal.



To put the concentrations you discuss in perspective, the proposed Part 503 Sludge Regulations will allow application of metal-containing materials until the cadmium in the soil reaches 9 mg/kg, the copper concentration reaches 522 mg/kg, and the zinc concentration reaches 1,170 mg/kg. These numbers were developed by EPA under strict review by a highly qualified Technical Advisory Committee of national experts. It would seem unlikely that concentrations would be allowed at those levels if there was any significant concern for leaching to the groundwater.

On Page 7-32 the following statement is made:

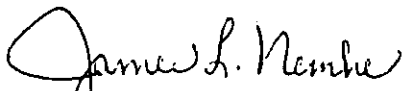
"M-10 is located between the Burke Wastewater Treatment Plant and the Truax Landfill at the point of previous discharge from the wastewater plant."

The District is unaware of any discharge that would have occurred in the vicinity of Well M-10. If you have evidence that suggests otherwise, we would like to be aware of that evidence. Are you referring to a discharge of wastewater effluent, sludge, or some other materials? If you have no specific evidence of discharge in that area, I believe your statement could be very misleading.

I have some general concern that the isoconcentration maps included as Pages 15, 16, and 17 of your plan sets are stretching the data a bit. I personally feel uncomfortable with drawing these types of concentration curves with the limited amount of data available. If you look at the significant variation in some of the data from Sampling Set 1 to Sampling Set 2, my concern is more evident.

Thanks again for the opportunity to review the report. I look forward to receiving a final copy and hope you will consider our comments positively.

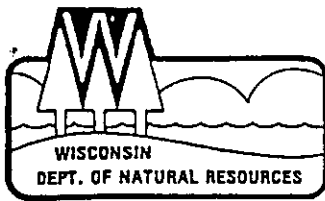
Sincerely,



James L. Nemke  
Chief Engineer & Director

cc: Peter Peshek  
James Voss  
Dave Benzschawel  
Ken Kosciak  
W. Gerald Thursby  
Ronald Menge  
Linda Clifford  
Griffin Dorsche

JLN/cmm



Carroll D. Besadny  
Secretary

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

101 South Webster Street  
Box 7921  
Madison, Wisconsin 53707  
TELEPHONE 608-266-2621  
TELEFAX 608-267-3579  
TDD 608-267-6897

August 28, 1991

IN REPLY REFER TO: 8300

Ms. Linda Clifford  
Attorney at Law  
LaFollette & Sinykin  
P.O. Box 2719  
Madison, WI 53701

→ Mr. Peter Peshek  
Attorney at Law  
DeWitt, Porter, Huggett,  
Schumacher, & Morgan, S.C.  
P.O. Box 2509  
Madison, WI 53701

Mr. James Voss  
Assistant City Attorney  
City-County Building  
210 Martin Luther King, Jr. Blvd.  
Madison, WI 53710

SUBJECT: Truax Landfill  
Proposed Consent Order

Dear Counsel:

Enclosed is a revised draft consent order relating to the Truax Landfill. I believe that the revised draft reflects the concerns expressed in your August 16 letter, as we discussed at our subsequent meeting. The changes which were made are highlighted on this draft.

If the revised draft is acceptable to you, please let me know. We can then finalize the draft and have it routed for the appropriate signatures.

If you have any questions concerning this, please let me know.

Sincerely,

Charles Leveque  
Attorney at Law  
Bureau of Legal Services

CL:rh  
v:\9110\lc9truax.cxl

cc: Tim Coughlin - SD  
Lakshmi Sridharan - SW/3  
Barb Gear - SW/3

BEFORE THE  
STATE OF WISCONSIN  
DEPARTMENT OF NATURAL RESOURCES

In the matter of a groundwater	)	
investigation and submittal of an	)	
Environmental Contamination Assessment	)	Proposed Consent Order
Report, <del>Dane County</del> Truax landfill, Lic.	)	No. SOD-91-07
No. 3306 (formerly #0306), Dane County,	)	
Wisconsin.	)	

FINDINGS OF FACT, CONCLUSIONS OF LAW AND CONSENT ORDER

FINDINGS OF FACT

The Department finds that:

1. The City of Madison owned and formerly operated a landfill known as the Truax landfill, located in the NE 1/4 of Section 31, T8N, R10E, City of Madison, Dane County, Wisconsin.
2. The landfill is now owned by Dane County. The landfill and land surrounding it were conveyed to the County by the City in 1973.
3. The Department issued the City a license for the Truax landfill (license number 306) in 1972. In 1990, the Department assigned a new license number to the site (#3306) and a facility identification number (FID #113183620).
4. The landfill contains approximately 1,000,000 cubic yards of municipal waste. The City of Madison disposed of approximately 970,000 cubic yards of waste while it owned and operated the landfill from 1953 through 1972. Prior to operation by the City, the landfill was an open burning dump in the 1930's and a landfill for the U.S. Army in the 1940's.
5. The facility does not have a plan of operation approval under s. 144.44(3), Stats. It is considered to be a nonapproved facility under s. 144.441(1)(c), Stats. Prior to 1990, the Department had not approved any plans for the landfill.
6. On May 25, 1990, the Department, the County and the City entered into a consent order (#SOD-89-18) regarding the Truax landfill. Among other things, the consent order required the City and County to submit the following items to the Department within seven (7) months of the effective date of the order:
  - a. a Phase I In-field Conditions Report, and
  - b. plans for any additional proposed groundwater monitoring well locations and gas monitoring probes to complete data gaps identified in the Phase I report.

7. On December 26, 1990, the Department of Natural Resources received a Phase I In-field Conditions Report entitled "Final Report, City of Madison Truax landfill, Madison, Wisconsin". The report consisted of one volume of text, two volumes of appendices and 17 plan sheets. Dames and Moore submitted the report on behalf of the City and County. Dames and Moore submitted two corrected plan sheets on or about January 3, 1991.
8. On May 16, 1991, the Department of Natural Resources received a work plan entitled "City of Madison Truax Landfill Phase II Work Plan Madison, Wisconsin". The work plan consisted of one volume of text. A revised project schedule (page 4-18 of the report) was received May 17, 1991.
9. The Phase I In-field Conditions Report contains four (4) recommendations for further work to be done. They are:
  - a. Additional monitoring wells should be installed north and northwest of the landfill to more accurately determine the direction of groundwater flow in these upgradient areas. Discussions between the Department of Defense (DOD) and the PRPs (Potentially Responsible Parties) indicate that the DOD is planning an investigation of sources that appear to be upgradient of the landfill, and are potentially contributing contaminants to groundwater. The DOD should coordinate the location of these wells with the PRPs to optimize upgradient information for the landfill.
  - b. All monitoring wells in the existing network should be monitored for two more quarters to develop one complete year of data. These wells should be monitored for the parameters listed in NR 508.14 subsections (1) through (4), Wisconsin Administrative Code.
  - c. Completion of these proposed wells and incorporation into a site well network should be done to develop a monitoring program in coordination with the DOD and other PRPs. This will allow development of a database for accurate characterization of contaminant sources. The solid waste facility section, and the spill statute program should coordinate with companion sections within the facility department to develop investigation and remediation programs for these separate source areas.
  - d. Grading operations at the REYCO property south of the Truax landfill should be temporarily halted until final remedial action, if planned, is approved.
10. The Phase II Work Plan proposes that the County and City drill more borings, install additional wells and sample new and existing wells near the Truax landfill times before submittal of the Phase II report.
11. The Department considered the following documents while reviewing the Phase I In-field Conditions Report and the Phase II Work Plan:
  - a. "Hydrogeology of Solid Waste Sites in Madison, Wisconsin", R.J. Kaufman, Ph.D. thesis, University of Wisconsin, Madison, 1970.
  - b. May 23, 1984 report entitled "Truax Landfill Leachate Migration Study", prepared by the City of Madison Engineering Division.

- c. July 5, 1984 letter from Richard Schuff of the Department to David Benzschawel of the City responding to the May 23, 1984 report and requesting more information.
  - d. August 1, 1984 letter from the City, in response to the Department's July 5, 1984 letter, stating that Dane County owned the property and Dane County would have to conduct the additional studies.
  - e. September 25, 1984 letter from the Department to Dane County and the City of Madison.
  - f. March 1985 report entitled "An Informational Report for Truax Landfill" prepared by the City of Madison Engineering Division.
  - g. October 25, 1988 site inspection report.
  - h. May 1990 consent order between the Department of Natural Resources, the City and the County (Order number SOD-89-18).
  - i. October 16, 1990 letter from Barb Gear of the Department to Dave Trainor of Dames and Moore regarding possible locations for additional wells.
  - j. March 1, 1991 calculations of approximate volumes of leachate being generated at the landfill.
  - k. June 17, 1991 memo to the DNR file from Barb Gear outlining reasons for provisions of this order (see attachment A).
  - l. Other information found in the Department's files for this landfill.
12. In determining the need for additional investigation and the submittal of an Environmental Contamination Assessment Report, the Department considers the following facts to be significant:
- a. The Truax landfill is an unengineered landfill without a liner or a leachate collection system to retain and remove leachate. Based upon the information in the Phase I report, approximately 6 to 10 million gallons of precipitation are soaking into the landfill and becoming leachate each year. ~~Since the leachate is not being retained within and removed from the landfill, it is highly probable that the landfill is causing contamination of groundwater.~~
  - b. The Phase I report identifies a data gap north and northwest of the landfill, suggests that groundwater flows west of the landfill and recommends that additional wells be installed north and northwest of the landfill to "more accurately determine the direction of groundwater flow in these upgradient areas" (emphasis added). Although the report did not include specific plans for the additional wells as stipulated in provision 8 of the May 1990 consent order, the May 1991 work plan did include such plans.

- c. Department records indicate there are at least five nonpotable A-number of high capacity wells (of between 500 and 1000 foot depth) serving the Oscar Meyer Food Corp. plant and at least one high capacity public water supply well (Madison Well #7) existing in the immediate vicinity of the Truax landfill.
- d. A clay layer below the Burke Sewage Treatment Plant and part of the Truax landfill A thick lacustrine clay layer (maximum measured depth of 152 feet at MW-5B, but possibly thicker) is present under the south and southeast portions of the site. The layer appears to thin to the north and truncates to the northwest where it intersects with the wall of the subterranean bedrock valley. This clay is termed a CL in the Unified Soil Classification system. The hydraulic conductivity of the clay ranges between  $6 \times 10^{-6}$  cm/sec and  $9 \times 10^{-8}$  cm/sec. While the regional groundwater flow tends to be from North to south, the effect of the local hi capacity wells and the clay layer appears to greatly influence groundwater flow directions in the immediate area. \*
- e. Groundwater standards have been exceeded in monitoring wells near the landfill, as listed in Table 7.11 of the Phase I Infield Conditions Report. The cause of the exceedances has not been determined at this time.
- f. Enforcement standards have been exceeded outside the Design Management Zone. The cause of the exceedances has not been determined at this time.
- g. Other potential known sources of contamination in the area include a jet fuel storage area and a practice burn site, both of which are north of the Truax landfill, and the former Burke Sewage Treatment Plant, which is south of the landfill. \*
- h. The United States Army Corps of Engineers is scheduled to undertake various investigative efforts at the jet fuel storage area during 1991 and 1992. Those investigative efforts are being coordinated with the Wisconsin Department of Natural Resources in order to facilitate integration of those results with any groundwater investigative efforts required pursuant to this order.
13. The background and long-term environmental monitoring programs are necessary to monitor the effects that the landfill and any remedial actions may have on groundwater quality.
14. The Order set forth below is needed to determine the extent of any potential hazard to public health, safety, welfare or the environment and to assure compliance with chs. NR 500-520, NR 141 and NR 140, Wis. Adm. Code.

#### CONCLUSIONS OF LAW

The Department concludes that:

1. The facility does not comply with s. NR 504.04(4)(d), Wis. Adm. Code.
2. The Department has the authority pursuant to ch. NR 140 and the applicable portions of chs. NR 500 through 520, Wis. Adm. Codes, to require an owner or operator to sample groundwater.



3. The Department has the authority pursuant to s. NR 140.24(1), Wis. Adm. Code, to require an owner or operator to evaluate impacts to the groundwater and to submit a report by a specific deadline describing the degree and extent of groundwater contamination, if a preventive action limit has been attained or exceeded at a point of standards application.
4. The Department has the authority to require the owner or operator of a landfill to submit an infield conditions report under s. 144.431(2)(b), Stats., and s. NR 508.20, Wis. Adm. Code.
5. The Department has the authority to require the submittal of a closure plan under s. NR 514.07, Wis. Adm. Code. The Department has the authority to require that the closure plan address any or all of the information contained in chs. NR 504, 508, 512, 514, 516 and s. NR 506.08, Wis. Adm Code, under s. NR 514.07, Wis. Adm. Code.
6. Under s. 144.44(4)(f), Stats., the Department of Natural Resources may require by special order, the environmental monitoring of a closed, non-approved facility, as defined under s. 144.441(1)(c), Stats.
7. The Department has authority under secs. 144.44(8) and 144.431, Stats., to order necessary corrective action at a landfill where minimum standards established under NR 504, Wis. Adm. Code have not been complied with.
8. The Department has authority to require a response under s. 160.23, Stats., and s. NR 140.24(4), Wis. Adm. Code, if a preventive action limit for a substance of health or welfare concern has been attained or exceeded at a point of standards application.
9. The Department has authority to require a response under s. 160.25, Stats., and s. NR 140.26(2), Wis. Adm. Code, if an enforcement standard for a substance of health or welfare concern has been attained or exceeded at a point of standards application.
10. The Department has authority under ss. NR 140.20, NR 140.24(1)(c)1.a., and NR 508.14, Wis. Adm. Code, to require sampling for background water quality and to specify indicator parameters for such sampling.
11. The order set forth below is needed to ensure compliance with Chapters NR 500-520 and NR 140, Wis. Adm. Code.
12. In accordance with the foregoing, the Department has authority under ss. 144.431(2)(b), 144.44(4)(f), 144.44(8), 160.23, 160.24 and 227.44(5), Stats., and Chapters NR 500-520, Wis. Adm. Code, to issue the following Order.
13. This order is enforceable under ss. 144.98 and 144.99, Stats.

### ORDER

The Department, Dane County and the City of Madison agree to the following and the Department therefore orders that:

Further investigations

1. By September 1, 1991, Dane County and the City of Madison shall install monitoring wells and drill borings at the locations and according to the methods designated in the Phase II Work Plan, subject to the following conditions:
  - a. All exploratory borings shall be drilled to bedrock.
  - b. All bedrock wells shall be screened in competent bedrock.
  - c. Soil borings shall be sampled and soil samples analyzed according to s. NR 508.09, Wis. Adm. Code (in addition to NR 141, as proposed).
  
2. By March 1, 1992, Dane County and the City of Madison shall implement the rest of the Phase II Work Plan, subject to the following conditions:
  - a. Documentation of well installation, soil samples, well development, boring abandonment shall be submitted in the environmental contamination assessment report required in provision 4, below.
  - b. All new wells shall be sampled for the same parameters and at the same frequency as the other wells listed in conditions 5 and 6, below.
  
3. By November 1, 1991, Dane County and the City of Madison shall submit to the Department the following information and documentation. If any information is unavailable, the County and City shall document attempts to obtain the information.
  - a. An 8 1/2 by 11 inch map of the landfill. The map shall include, on a local grid system, the locations of: the limits of fill, property boundaries, all existing and abandoned monitoring wells, all stormwater retention basins and the Design Management Zone (DMZ). (The DMZ is 300 feet from the approved limits of fill or the property boundary, whichever is closer.)
  - b. A Well Information Form (WIF) listing all existing and abandoned groundwater wells; all surface water monitoring locations; all new groundwater and leachate wells; and names and addresses of all known private wells within one-half mile of the landfill. The WIF shall correctly designate groundwater monitoring wells as either water table observation wells or piezometers. All elevations shall be double checked for accuracy (for example the elevation of the top of the screen should equal the elevation of the bottom of well plus the length of screen).

Note: The Groundwater Monitoring Well Information Form, number 4400-89, updated 1/90, is being revised again. Call Jack Connelly (267-7574) to see if the revision is available when you are ready to fill out the form.
  - c. A description of the wells listed in paragraph 6e., below. The description should include known or probable well construction details and an opinion of the usefulness of each well for monitoring groundwater quality and water level elevation.

Environmental Contamination Assessment Report

4. By March 1, 1992, Dane County and the City of Madison shall prepare and submit to the Department for approval an Environmental Contamination Assessment report which shall contain the following:
  - a. Results of groundwater investigation (according to the "Phase II Work Plan", as approved in provisions 1 and 2, above) and data previously gathered at the landfill. The results shall be presented according to ss. NR 508.20(6) through (10), Wis. Adm. Code.
  - b. Revised versions of any plan sheets and geologic cross-sections previously submitted, if the results of the latest investigations alter previous interpretations.
  - c. A description of how the latest investigations change the conclusions drawn in the Phase I report.
  - d. A separate topographic plan sheet meeting the requirements of s. NR 508.20(6)(a), Wis. Adm. Code, except that the plan may have a minimum scale of 1" = 500' if necessary, and showing:
    - i. all public and private wells within one half mile of the landfill, noting the exact addresses and names (e.g, PW-1) of wells that have been sampled before.
    - ii. all active and abandoned groundwater monitoring wells .
    - iii. all known possible sources of groundwater contamination, such as landfilled areas, spills, areas where spills were likely to have occurred, areas of landspreading, salt storage, wastewater discharge points, storm and sanitary sewers, septic systems, channelized or unchannelized surface water flow.
  - e. An evaluation of the degree and extent of groundwater contamination, fully addressing the ten points of s. NR 140.24(1)(c), Wis. Adm. Code.
  - f. If necessary, proposals for additional investigations before final assessment and selection of responses may be made. Such proposals, if appropriate, shall evaluate the results of the Army Corps of Engineers investigations into groundwater contamination of the potential source areas in the vicinity of the landfill, provided that the information is available at the time of the submittal of the Environmental Contamination Assessment Report.
  - g. A proposal for potential responses which are economically and technically feasible for renovating or restoring groundwater and surface water quality if necessary.
  - h. Selection of a preferred alternative response which will result in compliance with the groundwater standards in NR 140, Wis. Adm. Code, and other objectives. Justification of why responses other than proposed are not technically or economically feasible to implement shall be included.

- i. Preliminary plans and specifications for the response, including costs for construction, operation and maintenance over the predicted life of the response.
- j. Justification of any requests for exemptions to the NR 140 Preventive Action Limits at any monitoring well at the facility.
- k. Documentation of wells and borings, as follows

Regarding any new, replaced or repaired wells:

- i. Well construction details, using Monitoring Well Construction Form 4400-113A (updated 4-90),
- ii. Well development information, using Monitoring Well Development Form 4400-113B (updated 4-90),
- iii. Soil boring information, using Soil Boring Log Information Form 4400-122, and
- iv. Other soils information, according to s. NR 508.09, Wis. Adm. Code.

Regarding abandoned wells or boreholes:

- i. Soil boring information, using Soil Boring Log Information Form 4400-122, and
  - ii. Abandonment details, using Well/Drillhole/Borehole Abandonment Form 3300-5B (updated 8-89).
- l. A proposal for long-term environmental monitoring designed to evaluate the effects both of the response(s) and of the continued performance of the facility. This proposal shall include sampling of groundwater, leachate, landfill gas and gas condensate.
  - m. Any groundwater data evaluated in the report which has not previously been submitted to the Department.

#### Background Groundwater Monitoring

- 5. Dane County and the City of Madison shall comply with background groundwater monitoring requirements as specified in s. NR 508.14, Wis. Adm. Code, for all existing, new, repaired and replaced wells installed to monitor groundwater conditions near the landfill. The background samples shall be taken quarterly until this requirement is fulfilled, beginning within 4 months of the effective date of this Order and ending within two (2) years of a well's installation. The City and County may include samples acquired prior to the date of this Order among its background samples, provided that the samples meet the requirements of s. NR 140.16, Wis. Adm. Code. The background data shall be submitted on "background TAD" forms supplied by the Department or on microdiskette (contact Tim Sagal, 267-0559, for information about this option).

Routine Groundwater Monitoring

6. Beginning within 120 days after the effective date of this Order, Dane County and the City of Madison shall collect, analyze and report samples from groundwater monitoring wells quarterly, as follows:

- a. Obtain water level elevation readings from all wells on site before purging wells for quarterly sampling. Report these data in feet above mean sea level (MSL), to an accuracy of 0.01 foot.
- b. Sample wells listed below and all new wells (according to the approved Phase II work plan and any subsequent plans), repaired wells or replacement wells for the parameters listed in points c. and d., below:

<u>Well Name/DNR ID No.</u>		<u>Well Name/DNR ID No.</u>	
MW-1	[001]	MW-9	[029]
MW-1A	[003]	MW-10	[031]
MW-2	[005]	MW-11	[063]
MW-3	[007]	MW-12	[065]
MW-3A	[009]	MW-13	[067]
MW-4	[011]	MW-13A	[069]
MW-4A	[013]	MW-14	[071]
MW-4B	[015]	TG-1	[033]
MW-5	[017]	TG-2	[035]
MW-5A	[019]	200S	[043]
MW-5B	[021]	Oscar #3	[203]
MW-6	[023]	Oscar #5	[205]
MW-7	[025]		
MW-8	[027]		

- c. Determine and record color, odor and turbidity qualitatively while collecting samples.

- d. Collect and analyze samples for the following parameters:

<u>Parameter</u>	<u>Parameter number</u>
Elevation in feet above MSL	00842
Field Temperature	00010
Field Specific Conductance (uncorrected)*	00402
Field Specific Conductance (corr. to 25 C)	00872
Field pH	00400
Chloride	00307
Iron, dissolved	01046
COD, dissolved	00341
Total Hardness, filtered	22413
Calcium, dissolved	00915
Magnesium, dissolved	00925
Total Alkalinity, filtered	39036
Nitrate-nitrogen, dissolved	00621
Total dissolved solids	00360
Volatile Organic Compounds - Scan	84085

\* May be omitted if meter corrects to 25 degrees Centigrade.

- e. Sample all other functioning wells for water level elevation. These wells shall include the following, unless they have been abandoned (in which case, submit abandonment documentation. See paragraph 3c., above):

Well Name/DNR ID No.

TG-3	[037]
TG-4	[039]
200	[041]
104	[051]
121A	[053]
113	[055]
130D	[057]
130E	[059]
21A	[061]

- f. Sample wells quarterly during the months of March, June, September and December for all parameters except the VOC scan.
- g. Sample wells semi-annually for the VOC scan during the months of June and December.
- h. Analyze the samples for VOCs using EPA Solid Waste Methods 8021, 8260, 8010/8020 or 8240. We prefer that you use methods 8021 or 8260. These methods are described in EPA Document SW-846, "Test Methods for Evaluating Solid Waste," third edition, November 1986, including updates from December 1987 and November 1990.

- i. Submit data on forms provided by the department (TAD forms, Background TAD forms and VOC Monitoring Report forms), or electronically on microdiskette. Submit forms within 60 days of the end of the sampling period.
  - j. Report the results from the analysis of a field blank, trip blank, and duplicate samples on a TAD form.
  - k. Dane County and the City of Madison may apply to the Department for a change in any of the monitoring requirements in this paragraph. Such applications shall include technical justification for the changes. The Department will not unreasonably withhold approval of the changes.
7. Dane County and the City of Madison shall collect and analyze all groundwater samples and document sampling procedures according to the Phase II work plan, as approved in provisions 1 and 2, above.

Remediation

8. By February 1, 1993, Dane County and the City of Madison shall submit to the Department for approval final plans for any remedial actions determined to be necessary based upon the groundwater investigations conducted pursuant to this Order. The report and plans submitted shall conform to applicable portions of ss. NR 500.05, 504.07, 512.17, 514.04, 514.05 and ch. 516, Wis. Adm. Code. The plans shall include:
- a. Narrative describing the remediation, including a phased installation plan.
  - b. Plan sheets showing details of all aspects of the proposed remediation.
  - c. Proposed sources and specifications for all materials to be used, including any of the following are proposed to be used: soils, topsoil, drainage materials, geotextiles, and seed mixtures.
  - d. Identification and characterization of potential borrow sources for fine-grained soils (see NR 512.18, Wis. Adm. Code).
  - e. Proposed erosion control measures to be taken during construction and storage of soil materials.
  - f. A proposed quality control plan.
  - g. A proposed health and safety plan for protecting site investigators and the general public during site remediations.
  - h. Cost estimates for the project.
  - i. Proposed schedule for completion of the project.
- ~~9. By February 1, 1994, Dane County and the City of Madison shall complete construction of the approved design features associated with the remedial actions approved by the Department.~~

~~10. By May 1, 1994, Dane County and the City of Madison shall submit site construction documentation for the remedial actions.~~

Other provisions

9. Dane County and the City of Madison shall contact the Department's area solid waste investigator, and either the plan review engineer or hydrogeologist assigned to the Truax landfill, at least one week before beginning each of the construction events listed below. The contact will allow the Department to inspect the construction. The County and City shall pay a fee to the Department for each required inspection which the Department actually completes, in accordance with s. NR 520.04(5), Wis. Adm. Code. The inspection fees shall be submitted with the pertinent construction documentation report.

Construction events:

- a. Boring completions and well installations
  - b. Other events to be listed in subsequent approvals
10. Any proposed changes to the consent order shall be submitted to and approved by the Department prior to implementation.
11. To the extent that work under this Order is required on property that is presently owned by parties other than those bound by this Order, Dane county and the City of Madison shall use their best efforts to obtain reasonable access from the present owners before the work on the site is scheduled to commence.
12. Dane County, the City of Madison and the Department expressly reserve all rights (including but not limited to any right of contribution possessed by Dane County and the City of Madison or against any other parties who may be responsible), claims, demands, and causes of action that they have or may have against all other persons and entities who are not parties to this Order.
13. Nothing in the Order shall be construed as an admission of liability on the part of Dane County or the City of Madison, for any purpose other than for action taken for failure to comply with the terms of this Order.
14. In the event Dane County or the City of Madison is unable to complete any of the above because of the happening of an event over which it had no control, including, but not limited to, an Act of the United States of America, the State of Wisconsin, or any government, or the unreasonable delay or failure of any agency of the State of Wisconsin, or any other government agency to act with respect to any necessary approval or permit issuance, compliance with the schedules set forth above shall be extended by the amount of time of delay caused by such an event. In the event that Dane County and the City of Madison are unable to complete any of the above because of a happening of any event over which they had little control, the Department shall not unreasonably refuse to modify this Order to allow more time to achieve the specified activity.



15. Unless specifically indicated, the provisions of the Order do not supersede or replace any previous orders or plan approvals for the Truax landfill. The Department acknowledges that the provisions of Order No. 89-SOD-18 have been complied with.

Dated at Madison, Wisconsin, this \_\_\_\_ day of \_\_\_\_\_, 1991.

STATE OF WISCONSIN  
DEPARTMENT OF NATURAL RESOURCES  
For the Secretary

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John L. LaFontaine  
Director  
Office of Environmental Enforcement

STIPULATION AND WAIVER

Dane County and the City of Madison hereby stipulate to the issuance of this Consent Order and waive further notice of their hearing rights, waive their statutory right to demand a hearing before the Department regarding this Consent Order and waive their right to challenge this Consent Order in Circuit Court under ss. 144.431, 144.44(8), 227.52 and 227.53, Stats., or under any other provision of law. Dane County and the City of Madison further stipulate that this Consent Order is enforceable under ss. 144.98 and 144.99, Stats., as soon as it is signed by the Department. The undersigned certify that they are authorized to sign this Consent Order and Stipulation and Waiver on behalf of Dane County and the City of Madison.

DANE COUNTY

Richard J. Phelps, Dane County Executive

Date

CITY OF MADISON

ATTEST:

Paul R. Soglin, City of Madison Mayor

Andre Blum, City Clerk

APPROVED AS TO FORM:

Linda M. Clifford, Special Environmental Counsel for Dane County

Date

Peter Peshek, Special Environmental Counsel for the City of Madison

Date

COUNTERSIGNED:

Paul R. Reilly, Comptroller

**MADISON METROPOLITAN  
SEWERAGE DISTRICT**

1610 Moorland Road  
Madison, WI 53713-3398

Telephone (608) 222-1201

James L. Nemke  
Chief Engineer & Director



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Commissioner  
Stephen J. Hiniker  
Commissioner

January 29, 1992

Ms. Linda Clifford  
LaFollette Sinykin  
One East Main Street  
P.O. Box 2719  
Madison, WI 53701

Re: Truax Landfill

Dear Ms. Clifford:

Pursuant to the recent meeting on the Truax Landfill investigation, I have checked on the status of closure activities for the decant pond and sludge lagoons associated with the former Burke wastewater treatment plant.

Enclosed is a copy of a letter from Reyco Madison, Inc. to the Wisconsin Department of Natural Resources proposing a plan for closure of the sludge facilities. Although this letter was sent November 4, 1991, there has been no reply as yet from the WDNR. Sludge samples were taken and analyzed for the constituents noted. No further action has been initiated.

I will continue to track activities related to the Burke wastewater treatment plant, and will be able to provide you with a further update at the next meeting of the Truax PRPs. Should you have any questions in the interim, please give me a call.

Sincerely,

Peter Ruffier  
Director of Special Projects

encl.

cc to Steering Committee 1/31/92:

David Benzschawel  
Peter Drahn  
Duane Hickling  
Ken Kosciak  
Ronald Mengel  
James Nemke  
Peter Peshek  
Dave Reynolds  
W. Gerald Thursby  
David Trainor  
James Voss  
Linda White  
Steve Wittmann

RECEIVED

JAN 30 1992

Ans'd.....



REYCO MADISON, INC.  
301 SOUTH BLOUNT STREET  
MADISON, WISCONSIN 53703

November 4, 1991

Wisconsin Department of Natural Resources  
Southern District  
3911 Fish Hatchery Road  
Fitchburg, Wisconsin 53711

Attn: Mr. Jim Perry

Dear Mr. Perry,

Reyco Madison, Inc currently owns the property where the former Burke Wastewater Treatment Plant was located. This property is located in section 31, T 8N, R 10E, of the City of Madison. It is directly to the west of the Shopko Store and is bordered by Packers Avenue and Aberg Avenue to the west and south respectively. A map showing the general site location is attached. The site was inspected by yourself and Mr. Dave Taylor of MMSD on October 18, 1991.

The site contains a sludge decant pond and a sludge lagoon that were used by Oscar Mayer for the treatment/storage of sludge generated as part of the treatment of meat processing wastes. These areas were last used for this purpose over twenty years ago. Both the pond and the lagoon contain a relatively thin layer (approximately 12 to 24 inches) of dry sludge with a "peat like" consistency. The total volume is estimated to be approximately 3000 to 4000 cubic yards, based on initial cores taken in these areas. A map showing the specific location of the decant pond and the sludge lagoon on the site is attached.

As part of ongoing activities at the former Burke Wastewater Treatment Plant, we would like to initiate closure activities for the decant pond and sludge lagoon. The following general approach is proposed for the closure activities:

One composite sludge sample will be collected from both the decant pond and the sludge lagoon. The composite samples will be comprised of five (5) individual cores taken at random locations within each "cell". Each composite sample will be analyzed for the following parameters: Total Solids, NH<sub>4</sub>-N, TKN, Total-P, Total-K, As, Ba, Cd, Cr, CU, Hg, Ni, Pb, Se, and Zn. This information will be submitted to the DNR.

The sludge will be stripped and temporarily stockpiled on site. Appropriate measures will be taken to prevent

runoff during the time that the material is stockpiled.


The decant pond and sludge lagoon will be filled in by using either fill currently at the site or imported fill material.

The stockpiled dry sludge will then be spread over the filled in areas as a soil conditioner.

The site will be allowed to revegetate naturally.

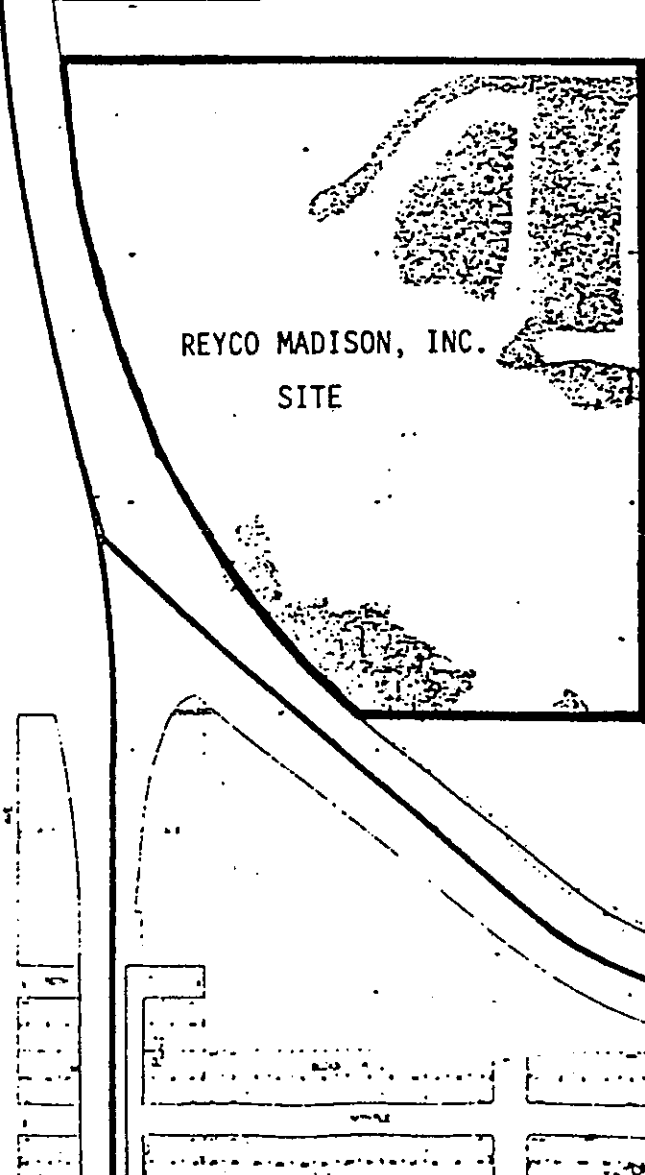
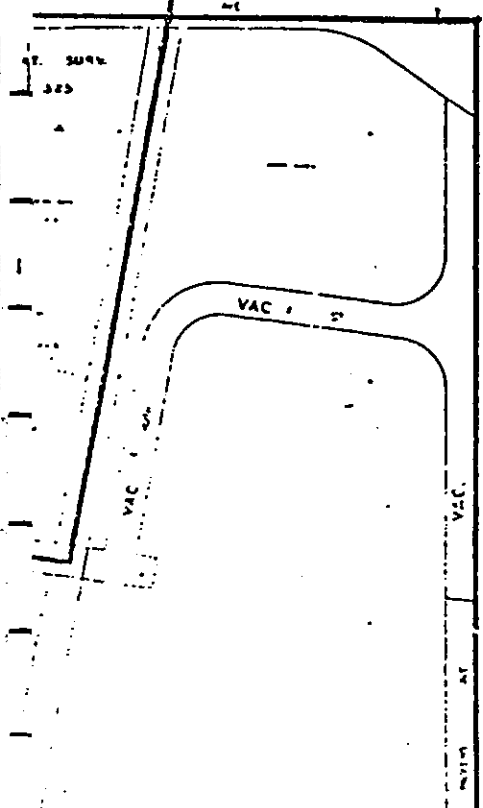
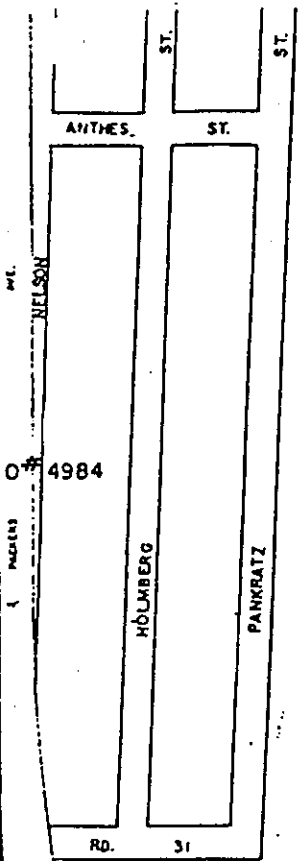
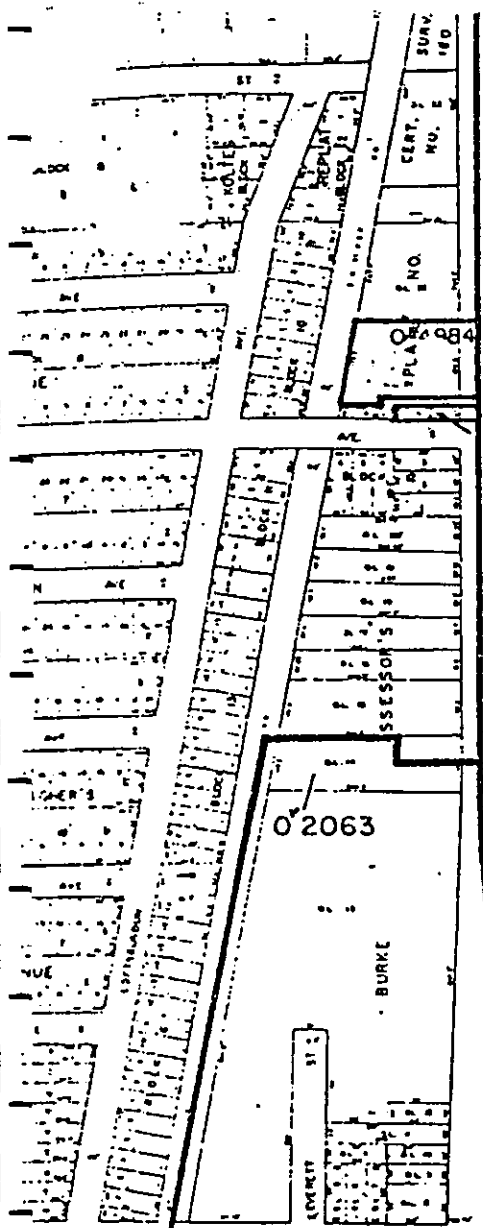
Following closure, we will provide you with a letter detailing all associated activities that took place. We would like to conduct closure activities this fall if possible. We appreciate your willingness to review this closure plan on such short notice. Please contact me if you need any additional information.

Sincerely,



David H. Reynolds, President

Phone 257-3914

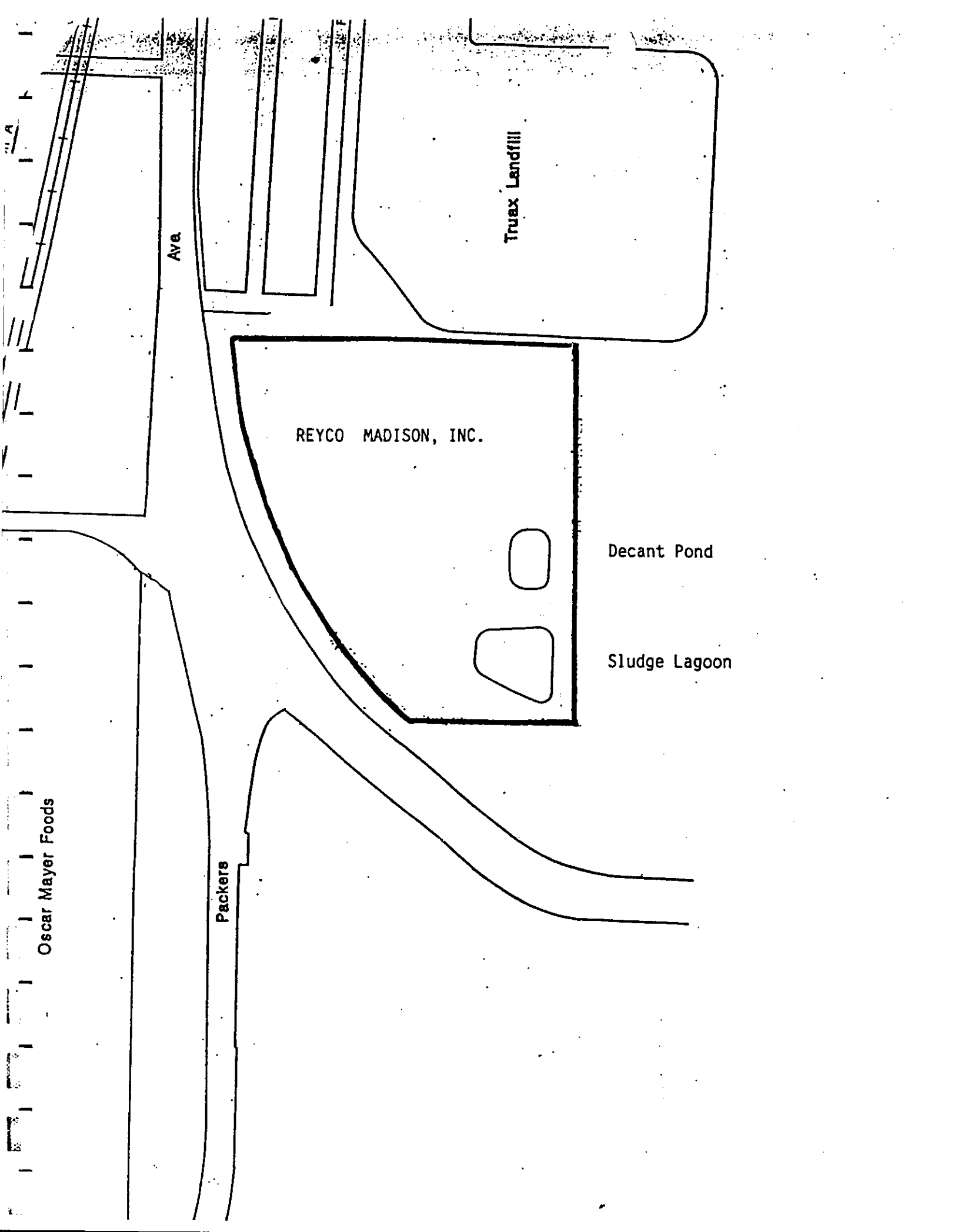


SHOPKO  
PROPERTY

ABERG AVENUE

EAST SIDE CONNECTOR





Ave.

Truax Landfill

REYCO MADISON, INC.

Decant Pond

Sludge Lagoon

Packers

Oscar Mayer Foods



**MADISON METROPOLITAN  
SEWERAGE DISTRICT**

1610 Moorland Road  
Madison, WI 53713-3398

Telephone (608) 222-1201

James L. Nemke  
Chief Engineer & Director



**COMMISSIONERS**

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Secretary  
Eugene O. Gehl  
Commissioner  
Stephen J. Hiniker  
Commissioner

February 4, 1992

Mr. David Reynolds  
REYCO Madison, Inc.  
301 South Blount Street  
Madison, Wisconsin 53703

Dear Mr. Reynolds:

Attached for your information is a copy of the laboratory results from the sludge samples analyzed from the Burke site.

These results are typical of a domestic wastewater sludge, and should not preclude the type of closure activities that you have proposed for the former Burke wastewater treatment plant.

If you should have any questions about the data, please contact David Taylor, Metrogro Manager for the District.

In regards to the actual closure project, I doubt that the District would be able to provide any direct involvement as may be suggested by the expected letter from the Department of Natural Resources. I would appreciate getting a copy of the approval letter once you receive it and would be happy to provide you with our comments or concerns, if any.

Sincerely,

Peter Ruffier  
Director of Special Projects

encl.



REYCO # 1 (South Fed)

SNR ID	Parameter	Wet Wt. (ppm)	Total Solids	Dry Wt.	Dry Wt. Detection Limit	Date Analyzed	Method used
61553	TS		56.40	56.4 %		11/27/91	see below
61571	TKN	9706	56.40	1.72 %	0.04 %	12/03/91	see below
61572	NH4-N	53	56.40	0.01 %	0.02 %	12/03/91	see below
61573	P	17572	56.40	3.12 %	0.02 %	01/10/92	see below
61570	K	256	56.40	0.05 %	0.001 %	12/10/91	see below
61527	Cd	2.5	56.40	4.5 mg/kg	0.1 mg/kg	12/06/91	see below
61506	Cu	87.5	56.40	155.1 mg/kg	1.8 mg/kg	12/16/91	see below
61512	Cr	10.3	56.40	18.3 mg/kg	0.4 mg/kg	12/16/91	see below
61503	Pb	53.2	56.40	94.3 mg/kg	0.9 mg/kg	12/06/91	see below
61500	Hg	2.5	56.40	4.5 mg/kg	0.1 mg/kg	01/10/92	see below
61515	Ni	10.0	56.40	17.7 mg/kg	0.4 mg/kg	12/05/91	see below
61509	Zn	1060.0	56.40	1879.4 mg/kg	5.3 mg/kg	12/17/91	see below

- 1) TS: Std methods 2540B
- 2) NH4-N: EPA 350.2
- 3) TKN: EPA 351.3
- 4) Cd, Cr, Cu, Ni, Pb, Zn, K: Std methods (17th edition) 3111B
- 5) Hg: EPA 245.5
- 6) P: Std methods (17th edition) 4500-PE

Sample analyzed by: 113002230  
 MMSD Labs  
 1610 Moorland Road  
 Madison, WI 53713

REYCO # 2 (North Decant Bed)

DNR ID	Parameter	Wet Wt. (ppm)	Total Solids	Dry Wt.	Dry Wt. Detection Limit	Date Analyzed	Method used
61553	TS		58.40	58.4 %		11/27/91	see below
61571	TKN	7994	58.40	1.35 %	0.03 %	12/03/91	see below
61572	NH4-N	55	58.40	0.01 %	0.02 %	12/03/91	see below
61573	P	10930	58.40	1.88 %	0.02 %	01/10/92	see below
61570	K	346	58.40	0.06 %	0.001 %	12/10/91	see below
61527	Cd	1.4	58.40	2.4 µg/kg	0.1 µg/kg	12/06/91	see below
61506	Cu	51.1	58.40	87.5 µg/kg	1.7 µg/kg	12/16/91	see below
61512	Cr	7.9	58.40	13.4 µg/kg	0.3 µg/kg	12/15/91	see below
61503	Pb	37.4	58.40	64.0 µg/kg	0.9 µg/kg	12/06/91	see below
61500	Hg	1.7	58.40	2.9 µg/kg	0.1 µg/kg	01/10/92	see below
61515	Ni	9.0	58.40	13.7 µg/kg	0.3 µg/kg	12/05/91	see below
61509	Zn	610.0	58.40	1044.5 µg/kg	5.1 µg/kg	12/17/91	see below

- 1) TS: Std methods 2540G
- 2) NH4-N: EPA 350.2
- 3) TKN: EPA 351.3
- 4) Cd, Cr, Cu, Ni, Pb, Zn, K: Std methods (17th edition) 3111B
- 5) Hg: EPA 245.5
- 6) P: Std methods (17th edition) 4500-PE

Sample analyzed by: 113002230  
MMSD Labs  
1610 Moorland Road  
Madison, WI 53713



Hazleton Environmental Services (HES) for Madison Metropolitan Sewerage District  
 HES Wisconsin Certification No.: 113016640  
 Purchase Order No.: B24109  
 Reyco Dry Sludge  
 Received: 11/27/91  
 Metals extraction (date set): 12/23/91

DNR Param ID No.	Parameter Name	Wet Weight Result (mg/kg)	Sample Total Solids	Dry Weight Result (mg/kg)	Date Analyzed
<u>Sludge: (Dry Sludge); Reyco #1; 11/26/91 (HES number 11105376)</u>					
61521	Arsenic	10.8 (0.01)	58.6 %	18.42 (0.017)	01/01/92
	Barium	26.1 (0.25)	58.6 %	44.53 (0.427)	12/31/91
61518	Selenium	1.53 (0.006)	58.6 %	2.61 (0.010)	01/06/92

<u>Sludge: (Dry Sludge); Reyco #2; 11/26/91 (HES number 11105377)</u>					
61521	Arsenic	8.40 (0.01)	61.5 %	13.66 (0.016)	01/01/92
	Barium	24.600 (0.25)	61.5 %	40.00 (0.407)	12/31/91
61518	Selenium	1.13 (0.006)	61.5 %	1.84 (0.010)	01/06/92

Method References

Arsenic  
 "Test Methods for Evaluating Solid Waste," EPA Publication No. SW-846, Second Edition, Methods (3030, 3040, or 3050) and 7060; U.S. EPA, Washington, D.C. (Revised April, 1984).

Barium  
 "Test Methods for Evaluating Solid Waste," EPA Publication No. SW-846, Second Edition, Methods (3030, 3040, or 3050) and 6010; U.S. EPA, Washington, D.C. (Revised April, 1984).

Selenium  
 "Test Methods for Evaluating Solid Waste," EPA Publication No. SW-846, Second Edition, Methods (3030, 3040, or 3050) and 7740; U.S. EPA, Washington, D.C. (Revised April, 1984).

Moisture for Environmental Samples  
 U.S. EPA Contract Laboratory Program, Statement of Work for Inorganic Analysis, Multi-Media, Multi-Concentration, 3/90 (ILMO 1.0), Part F, pg. D-98.



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Southern District Headquarters  
3911 Fish Hatchery Road  
Fitchburg, Wisconsin 53711  
TELEPHONE 608-275-3266  
TELEFAX 608-275-3338

Carroll D. Besadny  
Secretary

MADISON METROPOLITAN  
SEWERAGE DISTRICT  
RECEIVED

March 30, 1992

FILE REF: 3400

APR 1 1992

Mr. David H. Reynolds, President  
Reyco Madison, Inc.  
301 South Blount Street  
Madison, WI 53703

Subject: CLOSURE OF SLUDGE LAGOON

Dear Mr. Reynolds:

I have conditionally approved the closure operations for the decant pond and sludge lagoon located at the former Burke Wastewater Treatment Facility.

There are several minor modifications I would like to see incorporated within the management plan. Groundwater monitoring wells at the site shall be maintained and groundwater sampling shall occur at each well, at three-month intervals. Sampling parameters shall include nitrate-nitrogen, chlorides, fecal coliform and chemical oxygen demand. Well abandonment may proceed after our review of the well data shows that no detrimental impacts on the groundwater. Well abandonment must follow procedures described in Chapter NR 141 of the Wisconsin Administrative Code and documentation of well abandonment shall be provided to the Department. Any wells that are found to be in an inoperable condition must be properly abandoned. All abandoned and updated wells must be identified on a topographic plan sheet.

The stockpiled sludge shall be located a distance of greater than 500 feet from any public access area. The sludge shall be maintained in a manner to prevent erosion (by either wind or water) of sludge from the stockpiled area. This may necessitate berming the area or covering the pile. It is desirable that the sludge be landspread at the earliest practical time. The land-spreading must include incorporation. Loading rates shall be based on available nitrogen of the sludge and the nitrogen recommendations of the cover crop. The surface soil shall contain a minimum of six inches of soil material. The final topography of the area shall prohibit the ponding of run-off waters at the site. The site must be seeded with an appropriate cover crop to prevent erosion. A residence inspector shall be available at all times to direct the construction activities in a manner consistent with the management plan and applicable administrative codes.



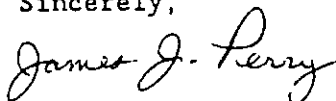
Mr. David H. Reynolds - March 30, 1992

2.

Please let me know if you are able to incorporate the modifications within your management plan. Also, when do you expect the project to start and end? Who will be the contact person at the site?

If you have questions or require additional information, please contact me at (608) 275-3325.

Sincerely,



James J. Perry  
Sludge/Septage Management Specialist

JPP:kas  
9205\WW1REYCO.JJP

cc: John Melby, Unit Leader, WW/2  
George Osipoff, Environmental Engineer, Madison Area  
Dave Taylor, Madison Metropolitan Sewerage District, 1610 Moorland Road,  
Madison, WI 53713-3398

**Appendix I**

**WDNR NR 720 Soil Cleanup Standards**

Unofficial Text (See Printed Volume). Current through date and Register shown on Title Page.

## Chapter NR 720

### SOIL CLEANUP STANDARDS

NR 720.01	Purpose.	NR 720.09	Determination of residual contaminant levels based on protection of groundwater.
NR 720.02	Applicability.	NR 720.11	Determining residual contaminant levels based on protection of human health from direct contact with contaminated soil.
NR 720.03	Definitions.	NR 720.19	Procedure for determining soil cleanup standards specific to a site or facility.
NR 720.05	General.		
NR 720.07	Procedures for establishing soil cleanup standards applicable to a site or facility.		

Note: Corrections made under s. 13.93 (2m) (b) 7., Stats., Register, January, 2001, No. 541.

**NR 720.01 Purpose.** The purpose of this chapter is to establish soil cleanup standards, for the remediation of soil contamination, which result in restoration of the environment to the extent practicable, minimize harmful effects to the air, lands and waters of the state and are protective of public health, safety and welfare, and the environment as required by ss. 292.11, 292.15, and 292.31, Stats., and which are consistent with ch. 160, Stats., and ch. NR 140. This chapter is adopted pursuant to ss. 227.11 (2), 289.06 (1), (2), 292.11, 292.15, and 292.31, Stats.

History: Cr. Register, March, 1995, No. 471, eff. 4-1-95; am., Register, February, 1996, No. 482, eff. 3-1-96.

**NR 720.02 Applicability.** (1) Except as provided in sub. (1m), this chapter applies to all remedial actions taken by responsible parties to address soil contamination after an investigation has been conducted at a site, facility or portion of a site or facility that is subject to regulation under s. 292.11 or 292.31, Stats., regardless of whether there is direct involvement or oversight by the department. This chapter also applies to soil contamination at all of the following:

(a) Solid waste facilities, where remedial action is required by the department pursuant to s. NR 508.04 (4);

Note: Chapter NR 720 does not apply to landspreading regulated under ch. NR 518 or solid waste facilities where ongoing operations are occurring, unless remedial action is required pursuant to s. NR 508.04 (4).

(b) Hazardous waste facilities, where the owner or operator is required to close the facility pursuant to s. 291.29, Stats., or ch. NR 685, to institute corrective action pursuant to s. 291.37, Stats., or s. NR 635.17, or to meet requirements imposed by the department under s. NR 600.07 where a discharge has occurred. However, if U.S. EPA requires that states employ soil cleanup standards for hazardous waste facilities that are more stringent than the standards in this chapter, the department is obligated under the state's hazardous waste management act, ch. 291, Stats., and its hazardous waste program RCRA authorization to apply the more stringent soil cleanup standards.

(c) Wastewater lagoons, storage structures and treatment structures that are abandoned pursuant to s. NR 110.09, 213.07 or 214.08.

Note: Chapter NR 720 applies to abandonment of lagoons, storage structures and treatment structures for sewage treatment facilities projects; abandonment of lagoons, storage structures and treatment structures that receive wastewaters, associated sludges, by-product solids and any resulting leachates from industrial, commercial or agricultural sources, except as provided in s. NR 213.02 (2); and abandonment of land treatment systems for industrial liquid wastes, by-product solids and sludges, except as provided in s. NR 214.02 (3). Chapter NR 720 does not apply to activities regulated under s. 281.48, Stats., or permitted activities regulated under 40 CFR 503 or ch. NR 204, 206 or 214, including permitted land spreading of sludge or land disposal of wastewaters from municipal and domestic wastewater treatment works and permitted land treatment of industrial liquid wastes, by-product solids and sludges.

(d) Sites where remedial action is being taken by a person who is seeking the liability exemption under s. 292.15, Stats.

(1m) This chapter is not applicable to sites contaminated with petroleum products discharged from petroleum storage tanks that satisfy all of the risk screening criteria in s. NR 746.06 (2) and are eligible for closure under s. NR 746.07 or 746.08.

Note: If sites and facilities that are contaminated with petroleum products discharged from petroleum storage tanks do not satisfy the risk screening criteria in s. NR 746.06 (2) or the closure requirements of s. NR 746.07 or 746.08, the site or facility would be still be subject to this chapter.

(2) This chapter applies to interim actions taken by responsible parties or other persons under s. 292.15, Stats., when at the completion of both the site investigation and interim action taken to address contaminated soil, the responsible parties or persons taking action under s. 292.15, Stats., request that the site or facility be closed out in accordance with ch. NR 726, without taking a subsequent remedial action to address the contaminated soil.

(3) This chapter applies to remedial actions taken by the department where a department-funded response action is being taken under the authority of s. 292.11 or 292.31, Stats.

(4) Concentrations of legally applied pesticides are exempt from the requirements of this chapter when all of the following conditions are met:

- (a) The application of the pesticide was done in compliance with:
  1. The pesticide label currently registered with the U.S. EPA;
  2. Sections 94.67 to 94.71, Stats.; and
  3. Rules adopted under ss. 94.67 to 94.71, Stats.

(b) For pesticides that are intended to be applied to the soil, pesticide concentrations exceeding soil cleanup standards are only found in the surface soil layer, where the pesticide is expected to perform its intended purpose, and only at concentrations that would be expected from pesticide application, in compliance with the pesticide label requirements.

Note: The depth of the surface layer of soil will vary depending on the type of pesticide applied and the appropriate intended use of that pesticide.

(5) The department may exercise enforcement discretion on a case-by-case basis and choose to regulate a site, facility or a portion of a site or facility under only one of a number of potentially applicable statutory authorities. However, where overlapping restrictions or requirements apply, the more restrictive control. The department shall, after receipt of a request from a responsible party, provide a letter that indicates which regulatory program or programs the department considers to be applicable.

Note: Sites, facilities or portions of a site or facility that are subject to regulation under s. 292.11 or 292.31, Stats., may also be subject to regulation under other statutes, including solid waste statutes, ch. 289, Stats., or the hazardous waste management act, ch. 291, Stats., and the administrative rules adopted pursuant to those statutes. One portion of a site or facility may be regulated under a different statutory authority than other portions of that site or facility. When necessary, the department will, to the best of its ability, facilitate coordination between the regulatory programs involved.

(6) The department may take any action within the context of regulatory programs established in statutes or rules outside this chapter, if those actions are necessary to protect public health, welfare or safety or prevent a damaging effect on the environment for present and future uses, whether or not a soil cleanup standard has been adopted under this chapter.

(7) Nothing in this chapter authorizes an impact on soil quality that would cause a violation of a groundwater quality standard contained in ch. NR 140, an impact on soil quality or groundwater quality that would cause a violation of a surface water quality standard



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contained in chs. NR 102 to 106 or an impact on soil quality that would cause a violation of an air quality standard contained in chs. NR 400 to 499.

History: Cr. Register, March, 1995, No. 471, eff. 4-1-95; cr. (1) (d), am. (2); Register, February, 1996, No. 482, eff. 3-1-96; emerg. am. (1) (intro.), cr. (1m), eff. 5-18-00; am. (1) (intro.), cr. (1m), Register, January, 2001, No. 541, eff. 2-1-01.

**NR 720.03 Definitions.** In this chapter:

(1) "Aquifer" means a saturated subsurface geological formation of rock or soil.

(2) "Contaminant of concern" means a hazardous substance that is present at a site or facility in such concentrations that the contaminant poses an actual or potential threat to human health, safety or welfare or the environment based upon:

(a) The toxicological characteristics of the hazardous substance that influence its ability to adversely affect human health or the environment relative to the concentration of the hazardous substance at the site or facility;

(b) The chemical and physical characteristics of the hazardous substance which govern its tendency to persist in the environment and the chemical, physical and biological characteristics at the site or facility which govern the tendency for the hazardous substance to persist at the site or facility;

(c) The chemical and physical characteristics of the hazardous substance which govern its tendency to move into and through environmental media;

(d) The naturally occurring background concentrations of the hazardous substance;

(e) The thoroughness of the testing for the hazardous substance at the site or facility;

(f) The frequency that the hazardous substance has been detected at the site or facility; and

(g) Degradation by-products of the hazardous substance.

(3) "Cumulative excess cancer risk" means the upper bound on the estimated excess cancer risk associated with exposure to multiple hazardous substances or multiple exposure pathways.

(4) "Direct contact" means human exposure to substances in soil through inhalation of particulate matter or incidental ingestion of soil.

Note: The definition of direct contact will be expanded in future revisions to include human exposures by inhalation of vapors and dermal absorption.

(5) "Hazard index" means the sum of 2 or more hazard quotients for multiple hazardous substances or multiple exposure pathways.

(6) "Hazard quotient" means the ratio of the exposure of a single hazardous substance over a specified time period to a reference dose, or reference concentration where appropriate, for that hazardous substance derived for a similar exposure period.

Note: Hazard quotients and the hazard index are measures of noncarcinogenic risk.

(7) "Incidental ingestion of soil" means ingestion of soil by humans as a result of normal hand-to-mouth behaviors.

(8) "Inhalation of particulate matter" means inhalation by humans of air with contaminated soil particles less than 10 microns in diameter.

(9) "Limit of detection" means the lowest concentration level that can be determined to be statistically different from a blank.

Note: This definition of "limit of detection" is consistent with ss. NR 140.05 (12) and 149.03 (15).

(10) "Limit of quantitation" means the lowest concentration for an analytical test method and sample matrix at which the quantity of a particular substance can be measured with a stated degree of confidence.

(11) "Pathway" means the route a substance takes in traveling to a receptor or potential receptor or the specific portal of entry, such as lungs, skin or digestive tract, the substance takes to potentially express its toxic effect, or both.

Note: The food chain pathway for cadmium, for example, refers to cadmium being taken up in plant tissue and the plant tissue being ingested by an organism.

(12) "Responsible parties" means:

(a) Persons who are required to address soil contamination under s. 292.31, Stats., or who agree to address soil contamination in a contract entered into under s. 292.11, Stats.

(b) Owners and operators of solid waste facilities that are subject to regulation under ch. NR 508;

(c) Owners and operators of hazardous waste facilities that are subject to the closure requirements of s. 291.29, Stats., or ch. NR 685 or the corrective action requirements of s. 291.37, Stats., or s. NR 635.17 or where the department has imposed special requirements where a discharge has occurred under s. NR 600.07; and

(d) Owners and operators of wastewater lagoons, storage structures or treatment structures that are abandoned and are subject to regulation under s. NR 110.09, 213.07 or 214.08.

(13) "Restricted access areas" means land immediately adjacent to highways or railroad right-of-ways, where the presence of structural controls, such as fencing, has eliminated pedestrian ingress by the public.

(14) "Risk" means the probability that a hazardous substance, when released to the environment, will cause adverse effects in exposed humans or other biological receptors.

History: Cr. Register, March, 1995, No. 471, eff. 4-1-95.

**NR 720.05 General.** (1) Responsible parties shall select and implement a remedial action to address soil contamination when, after any of the following investigations has been completed, information collected during the investigation indicates that a remedial action to address soil contamination is necessary to achieve compliance with the requirements of this chapter:

(a) Site investigation report developed in accordance with ch. NR 716 at sites or facilities subject to regulation under s. 292.11 or 292.31, Stats.

(b) Solid waste in-field conditions report prepared in accordance with the requirements of s. NR 508.04 (4).

(c) Investigation done under a hazardous waste closure plan or a RCRA facility investigation report, developed in accordance with the requirements of ch. NR 685 or s. NR 635.17 or 600.07.

(d) Investigation done under a wastewater facility, structure or system abandonment plan developed in accordance with the requirements of s. NR 110.09 (2) (r), 213.07 or 214.08.

Note: Remedial actions at some types of sites or facilities, such as the abandonment of wastewater lagoons, may only have to comply with ch. NR 720 and not other requirements in the NR 700 series, such as the minimum site investigation requirements in ch. NR 716. In this case, the department or responsible parties may choose to use the other chapters of the NR 700 rule series as guidance for complying with ch. NR 720.

(2) Remedial actions conducted by responsible parties to address soil contamination shall be designed and implemented to restore the contaminated soil to levels that, at a minimum, meet the soil cleanup standards for the site or facility determined in accordance with this chapter.

(3) If all soil contaminant concentrations meet applicable soil cleanup standards after a remedial action is completed, the department may not require further remedial action for soils, unless the department determines that the residual soil contamination:

(a) Presents a threat to public health, safety or welfare or the environment at the site or facility;

(b) Will cause a violation of a groundwater quality standard contained in ch. NR 140;

(c) Will cause a violation of a surface water quality standard contained in chs. NR 102 to 106; or

(d) Will cause a violation of an air quality standard contained in chs. NR 400 to 499.

History: Cr. Register, March, 1995, No. 471, eff. 4-1-95.

**NR 720.07 Procedures for establishing soil cleanup standards applicable to a site or facility.** (1) GENERAL. (a) Responsible parties shall use information from the sources listed in s. NR 720.05 (1) to determine the residual contaminant levels or performance standards for each exposure or migration pathway of con-

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cern for each soil contaminant of concern at a site or facility in accordance with ss. NR 720.09 to 720.19.

(b) In addition to meeting the requirements of par. (c), responsible parties shall establish the soil cleanup standard for each soil contaminant of concern at the site or facility as:

1. The residual contaminant level which is the lowest concentration of those determined in accordance with the requirements of ss. NR 720.09 to 720.19 (3); or

Note: Numeric residual contaminant levels are determined separately for each exposure or migration pathway of concern at a site. These residual contaminant levels are not the soil cleanup standard for the site. The soil cleanup standard for the site is determined by selecting the lowest concentration from among the individual residual contaminant levels determined for each pathway.

2. A performance standard determined in accordance with s. NR 720.19 (2).

(c) In addition to meeting the requirements of par. (b), a soil cleanup standard developed under this chapter shall comply with the following requirements:

1. Residual soil contamination at the site or facility shall not adversely affect surface water;

2. Residual soil contamination at the site or facility shall not adversely affect a sensitive environment; and

3. Residual soil contamination at the site or facility shall not concentrate through plant uptake and adversely affect the food chain.

Note: It is the department's intention to adopt in the future soil cleanup standards based on protection of human food chain exposures, protection of surface water quality and protection of terrestrial ecosystems after exposure assumptions and methods have been developed to allow the department to calculate soil cleanup standards for these pathways of exposure. Responsible parties are required by ss. NR 720.07 (2) and 720.19 (6) to consider human food chain exposures, the protection of surface water quality and the protection of terrestrial ecosystems, if these pathways are of concern, when determining a residual contaminant level at a site or facility.

(2) COMPLIANCE WITH SOIL CLEANUP STANDARDS. (a) Contaminant concentrations in soil samples shall be determined using a department-approved and appropriate analytical method and reported on a dry weight basis. An appropriate analytical method shall have limits of detection or limits of quantitation, or both, at or below soil cleanup standards where possible. Responsible parties shall report the limit of detection and the limit of quantitation with sample results. The department may require that supporting documentation for the reported limit of detection and limit of quantitation be submitted.

(b) If a soil contaminant concentration in a sample exceeds the soil cleanup standard at or above the limit of quantitation for that soil contaminant, the soil cleanup standard shall be considered to have been exceeded.

(c) If a soil cleanup standard for a soil contaminant is between the limit of detection and the limit of quantitation, the soil cleanup standard shall be considered to be exceeded if the soil contaminant concentration is reported at or above the limit of quantitation.

(d) The following applies when a soil cleanup standard for a soil contaminant is below the limit of detection:

1. If a soil contaminant is not detected in a sample, the soil cleanup standard shall not be considered to have been exceeded.

2. If a soil contaminant is reported above the limit of detection but below the limit of quantitation, the soil cleanup standard shall be considered to have been exceeded if the presence of that soil contaminant has been confirmed by the use of an appropriate analytical method.

History: Cr. Register, March, 1995, No. 471, eff. 4-1-95.

**NR 720.09 Determination of residual contaminant levels based on protection of groundwater.** (1) CRITERIA AND PROCESS USING GENERIC RESIDUAL CONTAMINANT LEVELS. If all of the following criteria are met, responsible parties may use one of the methods in sub. (3) and, where applicable, the standards in sub. (4) to determine residual contaminant levels based on groundwater protection for a site or facility:

(a) An investigation has been conducted and completed in accordance with applicable administrative rules, as specified in s. NR 720.05 (1);

(b) The contaminants of concern are listed in Table 1, except that at sites or facilities with petroleum contamination where gasoline range organics (GRO) or diesel range organics (DRO), or both, are the only contaminants of concern present other than contaminants listed in Table 1, the standards in sub. (4) (a) may be used for non-specific GRO or DRO contamination in addition to the methods in sub. (3) which are applicable to contaminants listed in Table 1;

(c) The horizontal and vertical degree and extent of contamination is defined;

(d) The vertical distance from the base of the contaminated soil to carbonate bedrock (limestone or dolostone) or fractured bedrock is one meter (3.28 feet) or greater;

(e) The vertical thickness of the residual soil contamination is 6 meters (19.69 feet) or less; and

(f) None of the residual contaminants or combinations of residual contaminants at the site or facility are known to contribute to facilitated transport or cosolvent effects.

Note: In some cases, a contaminant or combination of contaminants may contribute to an increased potential for migration of contaminants to groundwater by facilitated transport or by acting as a solvent for other contaminants, which would make the use of the values in Table 1 inappropriate. An example of facilitated transport might be polychlorinated biphenyls (PCBs) in the presence of an oily phase. An example of cosolvency might be polycyclic aromatic hydrocarbons (PAHs) in the presence of alcohols, where the alcohol acts to increase the solubility of the PAHs.

Note: If a site or facility meets the criteria in sub. (1), responsible parties are not required to use the methods for generic residual contaminant levels in sub. (3). The procedure in s. NR 720.19 may be used to determine site-specific soil cleanup standards even when the site or facility meets the criteria in sub. (1).

(2) SITE-SPECIFIC PROCESS. If any of the criteria in sub. (1) are not met, responsible parties shall use the procedure in s. NR 720.19 to determine soil cleanup standards specific to a site or facility based on groundwater protection.

(3) METHODS FOR DETERMINING GENERIC RESIDUAL CONTAMINANT LEVELS. Responsible parties may select one of the following methods to determine residual contaminant levels based on groundwater protection for sites or facilities that meet all of the criteria in sub. (1) in addition to meeting the requirements of sub. (4), if applicable:

(a) *Method 1.* Responsible parties may use the residual contaminant levels based on protection of groundwater listed for each substance in Table 1.

(b) *Method 2. 1.* Responsible parties may determine the residual contaminant levels based on protection of groundwater using the baseline concentration for each substance listed in Table 1 multiplied by a groundwater dilution factor specific to the site or facility determined using parameter values from the site or facility determined in accordance with subd. 2. and a groundwater mixing zone depth of 5 feet (152.4 cm) in the following equation:

$$DF = 1 + \frac{K \times I \times d}{R \times l}$$

Where:

- DF = groundwater dilution factor,
- K = hydraulic conductivity (cm/day),
- I = hydraulic gradient (cm/cm)
- d = depth of groundwater mixing zone (cm)
- R = average groundwater recharge rate (cm/day), and
- l = horizontal extent of contaminated soil parallel to the hydraulic gradient (cm).

2. Parameter values specific to the site or facility shall be determined as follows:

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a. Hydraulic conductivity shall be determined as the geometric mean of values determined from appropriate aquifer tests. Appropriate aquifer tests may include slug tests and pumping tests, and shall be properly performed using accepted practices.

b. Hydraulic gradient shall be determined using water level measurements from a minimum of 3 groundwater monitoring wells whose screens intersect the same hydrogeologic unit using the procedures specified in s. NR 716.13 (8). In cases where the magnitude of the hydraulic gradient is known to vary, an average value shall be used.

Note: Section NR 716.13 (8) requires that water levels be measured and recorded to the nearest 0.01 foot prior to obtaining a groundwater sample from the well.

c. Horizontal extent of contaminated soil parallel to the hydraulic gradient shall be determined as the maximum lateral extent from the information listed in s. NR 720.05 (1) and direction of the hydraulic gradient determined in subd. 2. b. In cases where the direction of the hydraulic gradient is known to vary, the longest appropriate dimension shall be used.

d. Average groundwater recharge rate shall be determined using an appropriate method or a default value of 0.07 cm/day.

Note: The default value of 0.07 cm/day is equivalent to an average annual recharge rate of 10 inches/year (25.4 cm/year).

Note: Average groundwater recharge rate can be approximated from the infiltration rate less the evapotranspiration rate. Appropriate methods may include the review of literature sources applicable to the site or facility or the use of field measurements, analytical solutions for estimating infiltration rate combined with analytical or empirical equations for estimating of evapotranspiration, or water balance approaches, among others. It is preferable to overestimate the average groundwater recharge rate rather than underestimate it.

Note: In some cases, use of Method 2 will yield residual contaminant levels lower than those for Method 1. In such cases, the residual contaminant level for Method 1 can be used.

(4) PETROLEUM CONTAMINATION. (a) *Generic residual contaminant levels.* 1. For sites or facilities with petroleum contamination where subd. 2. is not applicable, the soil cleanup standard for gasoline range organics (GRO) or diesel range organics (DRO) is a concentration in soil that may not exceed 100 milligrams per kilogram for either GRO or DRO.

2. For sites or facilities with petroleum contamination where contaminated soils and soils below the contaminated soil for a depth of 3 meters have a hydraulic conductivity of  $1 \times 10^{-6}$  cm/s or less, the soil cleanup standard for gasoline range organics (GRO) or diesel range organics (DRO) is a concentration in soil that may not exceed 250 milligrams per kilogram for either GRO or DRO.

Note: Milligrams per kilogram (mg/kg) is equivalent to parts per million (ppm) in soil.

(b) *Site-specific determination.* For sites or facilities with petroleum contamination where the concentration of gasoline range organics or diesel range organics, or both, is greater than the concentration specified in par. (a), Table 1 may be used to determine the residual contaminant levels for the compounds listed in Table 1 and soil cleanup standards for gasoline range organics and diesel range organics may be determined using the procedure in s. NR 720.19.

Table 1  
Baseline Concentrations, Dilution Attenuation Factors and  
Residual Contaminant Levels Based on Protection of Groundwater

Substance	Baseline Concentration $\mu\text{g}/\text{kg}$	Dilution Attenuation Factor	Residual Contaminant Level $\mu\text{g}/\text{kg}$
Benzene	0.093	59	5.5
1,2Dichloroethane	0.041	120	4.9
Ethylbenzene	42	70	2900
Toluene	18	81	1500
Xylenes (total)	47	87	4100

Note: Micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ) is equivalent to parts per billion (ppb) in soil. Soil concentrations are on a dry weight basis.

Note: The residual contaminant levels for Method 1 listed in Table 1 represent concentrations of contaminants that can remain in soil at a site and not cause a viola-

tion of a ch. NR 140 preventive action limit in groundwater. These residual contaminant levels are based on the baseline concentration for a substance multiplied by the dilution attenuation factor for that substance listed in Table 1.

Note: The residual contaminant levels in Table 1 are based on protection of groundwater. These concentrations of hazardous substances in soil may not be protective of other pathways of concern.

History: Cr. Register, March, 1995, No. 471, eff. 4-1-95.

**NR 720.11 Determining residual contaminant levels based on protection of human health from direct contact with contaminated soil.** (1) LAND USE CLASSIFICATION. (a) Responsible parties shall determine an appropriate land use classification for the site or facility in compliance with pars. (b) to (d), unless otherwise directed by the department.

(b) Responsible parties shall classify the land use of a site or facility as non-industrial unless all of the following criteria are met:

1. The site or facility is currently zoned for, or otherwise officially designated for, industrial use.

Note: A site or facility may be officially designated for industrial use by the issuance of a conditional use or special exception permit that allows an industrial use of that site or facility in a non-industrial zoning district or by the designation of an area as industrial in a county development plan or a municipal master plan, among other means.

2. The site or facility is expected to be used for industrial purposes due to zoning, statutory or regulatory restrictions, comprehensive plans, adjacent land use or other relevant factors.

3. More stringent residual contaminant levels for soil are not necessary to protect public health on or off the site or facility.

Note: Situations where s. NR 720.11 (1)(b) 3. would apply include site or facilities which could otherwise be classified as industrial, but where proximity to a nonindustrial land use, such as residential housing located across the street, makes a nonindustrial classification more appropriate.

(c) The land use of a site or facility may be classified as industrial if all of the criteria in par. (b) are met and if a deed restriction which meets the requirements of s. NR 726.05 (8) is recorded within 30 days after remedial action is initiated at the site or facility.

(d) The industrial column in Table 2 may be applied to restricted access areas unless more stringent residual contaminant levels are necessary to protect public health on or off the site.

Note: A deed restriction must be recorded if soil cleanup levels based on industrial exposure are used.

(2) CRITERIA AND PROCESS FOR USING GENERIC RESIDUAL CONTAMINANT LEVELS. If all of the following criteria are met for a site or facility, responsible parties may use the residual contaminant levels based on protection from direct contact listed for each substance in Table 2 which are appropriate for the site or facility in accordance with the land use classification determined in sub. (1), unless sub. (3) or (5), or both, applies:

(a) An investigation has been conducted in accordance with applicable administrative rules, as specified in s. NR 720.05 (1);

(b) The contaminants of concern present at the site or facility are listed in Table 2; and

Note: For example, at a site where soils are contaminated with diesel fuel, polynuclear aromatic hydrocarbon (PAH) compounds are present and may be considered contaminants of concern. With the exception of naphthalene, PAH compounds are generally only of concern for direct contact due to their relatively low migration potential.

(c) The horizontal and vertical degree and extent of contamination is defined.

Note: If a site or facility meets the criteria in s. NR 720.11 (2) responsible parties are not required to use the procedure for generic residual contaminant levels in sub. (2). The procedure in s. NR 720.19 may be used to determine site-specific soil cleanup standards even when the site or facility meets the criteria in sub. (2).

(3) CUMULATIVE RISK. (a) The cumulative excess cancer risk may not exceed  $1 \times 10^{-5}$  and the hazard index for non-carcinogens may not exceed one for the contaminants of concern at a site or facility.

(b) Risks for carcinogens and for non-carcinogens are presumed to be additive within each category. The residual contaminant levels in Table 2 shall be prorated downward to keep the cumulative risk below the levels specified in par. (a).

Note: The residual contaminant levels for non-industrial land use in Table 2 are based on an excess cancer risk of  $1/10$  for carcinogens or a hazard quotient of 0.2 for

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noncarcinogens. These levels are intended to be analogous with the preventive action limits in ch. NR 140.

(4) **SITE-SPECIFIC PROCESS.** Except as provided in sub. (5), if one or more of the criteria in sub. (2) are not met, responsible parties shall use the procedure in s. NR 720.19 to determine soil cleanup standards specific to a site or facility based on protection from direct contact.

(5) **EXCEPTIONS.** (a) For sites contaminated with petroleum products discharged from petroleum storage tanks:

1. If residual concentrations of benzene and 1,2-dichloroethane are below the soil contaminant concentrations in Table 2 in s. NR 746.06 (2) and residual concentrations of ethylbenzene, toluene, xylene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene and naphthalene are below the soil screening levels in Table 1 in s. NR 746.06 (2), responsible parties are not required to satisfy the requirements in s. NR 720.19 and are not required to determine a site-specific direct contact residual contaminant level or site-specific soil cleanup standard for these substances for the purpose of complying with the provisions in s. NR 720.07 (1)(a) and (b).

2. If the site does not meet the requirements of subd. 1 but meets the risk screening criteria in s. NR 746.06 (2) (b) and (c), the responsible party shall obtain prior approval from the agency with administrative authority for the site before taking any action to address a direct contact threat other than the use of a performance standard under s. NR 720.19 (2).

(b) If the background concentration for a substance in soil at a site or facility is higher than the residual contaminant level for that substance listed in Table 2 or determined using the procedure in s. NR 720.19 (3), the background concentration in soil may be used as the residual contaminant level for that substance. The background concentration for a substance in soil shall be determined using a department-approved and appropriate method.

Note: Naturally occurring background concentrations of arsenic in soil, for example, may be higher than the residual contaminant level for arsenic listed in Table 2. In such instances, the naturally occurring background concentration should be used as the soil cleanup level.

**Table 2**  
**Residual Contaminant Levels Based On**  
**Human Health Risk From Direct Contact Related To Land Use**  
**(milligrams per kilogram)**

Substance	Non-		Basis
	Industrial	Industrial	
Arsenic	0.039	1.6	cancer
Cadmium	8	510	noncancer
Chromium, hexavalent	14	200	cancer
Chromium, trivalent	16,000	NA	noncancer
Lead	50	500	noncancer

NA= Not applicable

Note: Milligrams per kilogram (mg/kg) is equivalent to parts per million (ppm) in soil. Soil concentrations are on a dry weight basis.

Note: The residual contaminant levels in Table 2 are based on protection of human health from direct contact through ingestion of soil or inhalation of particulate matter. These concentrations of hazardous substances in soil may not be protective of other pathways of concern. The definition of direct contact will be expanded in future revisions to include human exposures by inhalation of vapors and dermal absorption. In addition, these levels may be higher than those which would be characteristic of hazardous waste when tested using the toxicity characteristic leaching procedure (TCLP), U.S. EPA Method 1311.

History: Cr. Register, March, 1995, No. 471, eff. 4-1-95; am. (4) and (5), Register, January, 2001, No. 541, eff. 2-1-01.

**NR 720.19 Procedure for determining soil cleanup standards specific to a site or facility.** (1) **GENERAL.** (a) Responsible parties shall propose a soil cleanup standard specific to a site or facility in accordance with the requirements of this section when required in ss. NR 720.09 to 720.11 or if it is determined that it is not practicable to achieve the residual contaminant level for a soil

contaminant specified in ss. NR 720.09 to 720.11 using on-site remedial action or, if the responsible party chooses to utilize off-site remedial actions, using off-site remedial action or a combination of on-site and off-site remedial actions at a site or facility.

(b) Responsible parties shall establish a soil cleanup standard for a specific soil contaminant or physical location at a site or facility using one of the methods in sub. (2) or (3).

(2) **PERFORMANCE STANDARD.** If selected, a performance standard shall be established for a remedial action so that the remedial action is operated and maintained, in compliance with chs. NR 722 and 724 when those chapters are applicable to the site or facility, until the lowest concentration that is practicable is achieved or a permanent engineering control is maintained, or both, so that the residual contaminants left in the soil do not pose a threat to public health, safety and welfare or the environment.

Note: Examples of performance standards include the allowable rate of infiltration by soil contaminants into the groundwater after a membrane liner has been installed, or the rate or percentage of removal efficiency offered by an in-situ treatment system at a specific site or facility. At a site or facility where an engineering control is being considered for selection, in accordance with the requirements of ch. NR 722, an engineering control may be selected even though the soil contaminants exceed a residual contaminant level.

(3) **RESIDUAL CONTAMINANT LEVELS SPECIFIC TO A SITE OR FACILITY.** If selected, residual contaminant levels specific to a site or facility shall be established that are protective of public health, safety and welfare and the environment and restore the environment to the lowest concentration practicable, in accordance with the requirements of sub. (4) to (6). Even in cases where the procedure in sub. (3) is selected by the responsible party, the procedure in sub. (2) may be used when the residual contaminant levels established under sub. (3) are not practicable to achieve.

(4) **PROTECTION OF GROUNDWATER.** (a) Residual contaminant levels for soil based on protection of groundwater shall be developed using the preventive action limits (PALs) established in ch. NR 140 or using procedures consistent with the methodology in ss. 160.13 and 160.15, Stats., and the criteria in s. NR 722.09 (2) (b) 2. when there is no preventive action limit as the target concentrations in groundwater.

Note: In developing a residual contaminant level, any relevant information shall be considered, including public welfare concerns for groundwater, such as taste and odor.

(b) Responsible parties shall use one or more of the methods listed in this paragraph based on scientifically valid procedures that are subject to department review and approval and site-specific geological, physical and chemical conditions to establish residual contaminant levels.

1. A contaminant transport and fate model.

2. Leaching tests appropriate for the site or facility in both application and extent.

3. Any other appropriate method approved by the department for that specific site or facility, or other appropriate method suggested in department guidance.

(5) **PROTECTION OF HUMAN HEALTH FROM DIRECT CONTACT.** (a) **General.** Residual contaminant levels for soil based on protection of human health from direct contact shall be developed:

1. For individual compounds using the excess cancer risk of  $1 \times 10^{-6}$  and the hazard quotient for non-carcinogens of one; and

2. So that the cumulative excess cancer risk will not exceed  $1 \times 10^{-5}$  and the hazard index for non-carcinogens will not exceed one for the site or facility.

3. Risks for carcinogens and for non-carcinogens are presumed to be additive within each category, unless there is specific information that demonstrates that an alternative approach is more appropriate.

4. If toxicological indices for both carcinogenic and non-carcinogenic end points exist for a substance, both shall be evaluated and the value that generates the lowest residual contaminant level shall be used for the site or facility.

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(b) *Methods and procedures.* Responsible parties shall determine a residual contaminant level to protect public health from direct contact with soil contamination using scientifically valid procedures and toxicological values approved by the department and the default exposure assumptions identified in par. (c) or alternative assumptions specifically approved by the department in writing.

*Note:* The department will generally consider toxicological values in the following order: recommendations of the department of health and social services; indices contained in U.S. EPA's Integrated Risk Information System (IRIS); indices contained in U.S. EPA's Health Effects Assessment Summary Tables (HEAST); recommendations of U. S. EPA's Environmental Criteria and Assessment Office; indices withdrawn from IRIS; indices withdrawn from HEAST; and other pertinent toxicological information.

(c) *Default exposure assumptions.* 1. Non-carcinogens. When the contaminant is not a carcinogen, the following default exposure assumptions shall be used:

a. When the land use of a site or facility is classified as non-industrial, in accordance with s. NR 720.11 (1), incidental ingestion of soil shall be assumed to occur at the rate of 200 mg of soil per day for a 15 kg child for 350 days each year and inhalation of particulate matter shall be assumed to occur at the inhalation rate of 20 m<sup>3</sup> of air per day with a concentration of 1.4 µg/m<sup>3</sup> of contaminated soil particles less than 10 µm in diameter for 350 days each year, for 6 years.

b. When the land use of a site or facility is classified as industrial, in accordance with s. NR 720.11 (1), incidental ingestion of soil shall be assumed to occur at the rate of 100 mg of soil per day for a 70 kg adult worker for 250 days each year and inhalation of particulate matter shall be assumed to occur at the inhalation rate of 24 m<sup>3</sup> of air per day with a concentration of 1.4 µg/m<sup>3</sup> of contaminated soil particles less than 10 m in diameter for 250 days each year, for 25 years.

2. Carcinogens. When the contaminant is a carcinogen, the following default exposure assumptions shall be used:

a. When the land use of a site or facility is classified as non-industrial, in accordance with s. NR 720.11 (1), incidental ingestion of soil shall be assumed to occur at the rate of 200 mg of soil per day for 350 days each year for 6 years for a 15 kg child and the rate of 100 mg per day for 350 days each year for 24 years for a 70 kg adult and inhalation of particulate matter shall be assumed to occur at the inhalation rate of 20 m<sup>3</sup> of air per day with a concentration of 1.4 µg/m<sup>3</sup> of contaminated soil particles less than 10 µm in diameter for 350 days each year for 30 years, during a 70 year lifetime.

b. When the land use of a site or facility is classified as industrial, in accordance with s. NR 720.11 (1), incidental ingestion of soil shall be assumed to occur at the rate of 100 mg of soil per day for 250 days each year for a 70 kg adult worker and inhalation of particulate matter shall be assumed to occur at the inhalation rate of 24 m<sup>3</sup> of air per day with a concentration of 1.4 µg/m<sup>3</sup> of contaminated soil particles less than 10 µm in diameter for 250 days each year, for 25 years during a 70 year lifetime.

*Note:* Department approval of alternative exposure assumptions for a site or facility will be based on consultation with the department of health and social services.

(6) **OTHER PATHWAYS OF CONCERN.** Responsible parties shall consider human food chain, surface water quality and terrestrial ecosystem pathways of exposure, when those pathways of exposure are of concern at a site or facility.

*Note:* In some cases, the potential for contaminant migration or exposure to contamination through other pathways may be of concern at a site or facility. These situations could include contaminated soil in close proximity to a surface water where the potential for runoff from the site or facility to cause an impact on surface water quality exists or contaminated soil where potential for bioaccumulation through the food chain resulting in adverse impacts to human health or terrestrial ecosystems exists. Section NR 720.19 (6) requires responsible parties to establish appropriate residual contaminant levels protective of these pathways when necessary.

(7) **SUBMITTALS.** (a) Unless otherwise directed by the department, submittals under this section shall be included in the site investigation report or the draft remedial action options report required under s. NR 700.11 (2) (b).

(b) Submittals to the department under this section shall include all of the following:

1. Complete background information and supporting documentation for the procedure to be used;
2. Documentation that the application of the procedure is valid for the site or facility under consideration;
3. Necessary data and documentation needed to fully evaluate the submittal; and
4. Legible copies of source documents or pertinent portions of source documents.

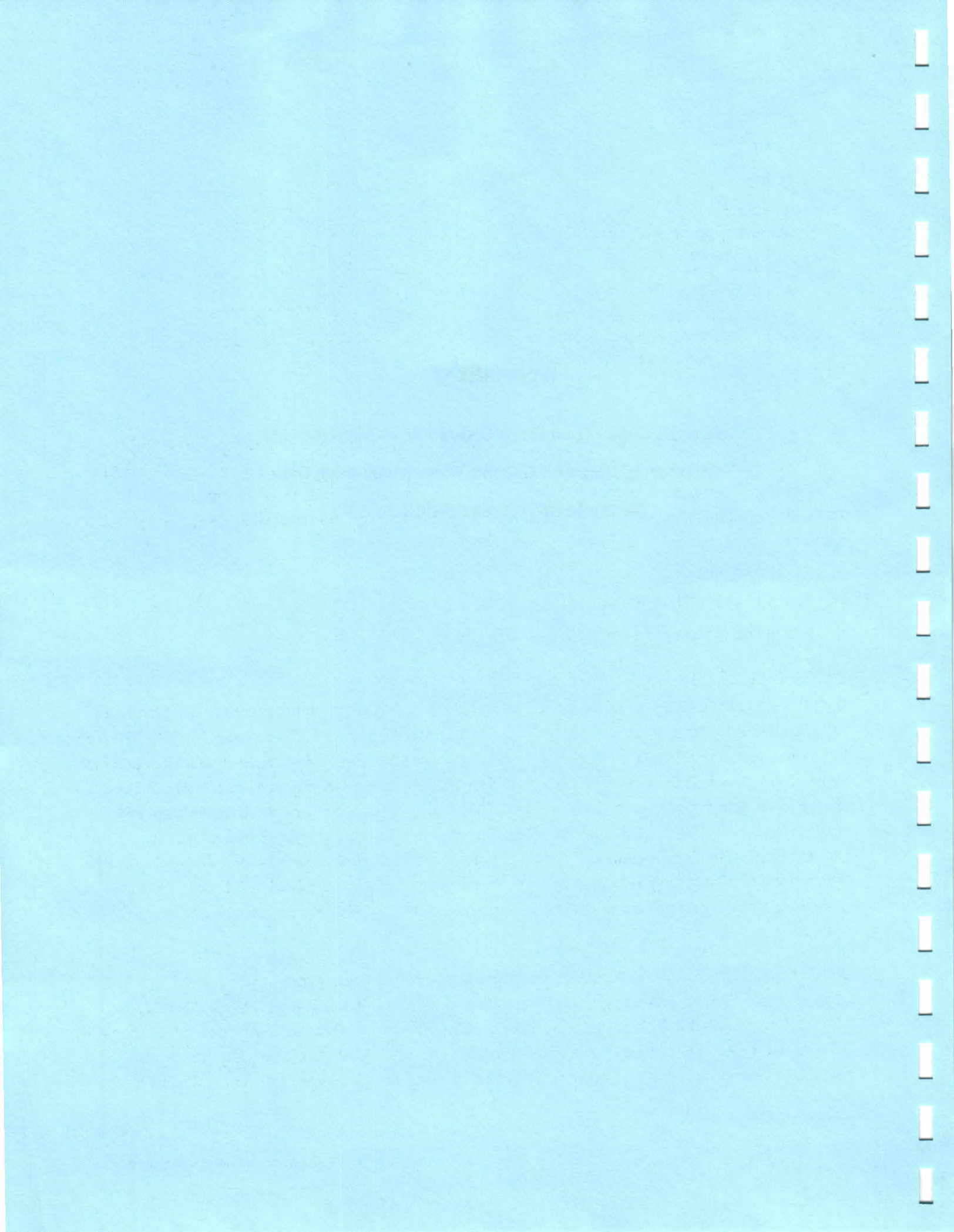
*Note:* The use of references to source documents alone in a submittal is generally not adequate for efficient department review. For example, background documentation for a given contaminant transport and fate model or articles in obscure publications may not be readily available or accessible to department staff. Considerable time can be spent in obtaining this documentation before a submittal can be reviewed. In order to facilitate department review of submittals, legible copies of entire source documents or the pertinent portions of source documents sufficient to evaluate the method or procedure used should be included with the submittal. The department will not purchase documents in order to review a particular submittal.

*History:* Cr. Register, March, 1995, No. 471, eff. 4-1-95; correction in (4) (a) made under s. 13.93 (2m) (b) 7., Stats., Register, February, 1997, No. 494.



## Appendix J

Selected Copies from the WDNR's File of Methane Gas  
Monitoring Data and Ground Water Monitoring Data  
for the Inactive Truax Field Landfill

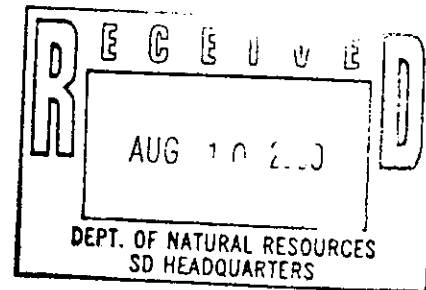




August 9, 2000

Ms. Barb Derflinger, P.G.  
Hydrogeologist  
Wisconsin Department of Natural Resources  
101 South Webster Street, SW/3  
Madison, WI 53707

**Subject: Monitoring Device Maintenance  
Dane County Truax Landfill  
Permit No. 3306**



Dear Ms. Derflinger:

On behalf of Dane County Regional Airport, RMT, Inc. (RMT), is presenting this proposal for the repair, abandonment, and replacement of several monitoring devices at the Truax Landfill, Madison, Wisconsin. This proposal is submitted in order to address Condition 8 in the Department's Conditional Plan Approval for Environmental Monitoring, dated November 18, 1999. The maintenance of the monitoring devices includes the following:

- Monitoring well replacement
- Gas probe repairs, abandonments, and replacements
- Surveying of new and repaired monitoring devices

### Monitoring Wells

The documentation of the abandonment of monitoring well MW-2 was submitted to the Wisconsin Department of Natural Resources (WDNR) by BT<sup>2</sup>, Inc., in a letter dated December 23, 1999. The well had been located within what eventually became a water retention basin. The proposed location for the replacement well, to be named MW-15, is shown on Figure 1. The replacement well will be designed and constructed according to ch. NR 141, and will include a 2-inch-I.D. Schedule 40 PVC well with a 10-foot, 10-slot PVC screen and an appropriate sand pack and boring seal, per ch. NR 141 requirements. The depth of the well will be determined at the time of installation. Well MW-15 will be screened similarly to well MW-2 as a water table observation well. Well MW-2 had a total depth of 57 feet below the ground surface and an average static water level of about 48 feet below ground surface.

BT<sup>2</sup> also noted in their December 23, 1999, letter that the protective casings were replaced and the grades of six existing monitoring wells were adjusted (wells MW-3, MW-3A, MW-11, MW-12A, MW-12B, and MW-12C) in December, so they need new reference elevation measurements. New well MW-15 will be surveyed for horizontal and vertical control, and the vertical control for the six adjusted wells will be surveyed after all device repairs and replacements as described in this letter



Ms. Barb Derflinger, P.G.  
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August 9, 2000  
Page 2

have been completed. The well construction documentation for well MW-15 will also be provided to the Department.

### Gas Probes

Based on field inspections and gas probe monitoring data, it has been noted that some of the gas probes require repair and/or replacement, and that some require relocation. Gas probes GP-11 and GP-19E (South) are damaged at the ground surface and need to be repaired. Gas probe GP-8, located northwest of the landfill near monitoring well nest MW-13, appears to be destroyed and will be replaced with GP-8R. Gas probe GP-15 was also destroyed during construction and will be replaced with GP-15R. Gas probes GP-15 and GP-16 appear to be located adjacent to, or within, the footprint of the landfill, which should explain the historical detections of methane along the landfill's southern side. RMT recommends abandoning these probes and replacing them with two monitoring points offset approximately 50 feet south of the limits of the landfill. The two replacement monitoring points would consist of existing gas probe GP-17 and proposed gas probe GP-16R (see Figure 1). A new gas probe GP-15R would be located due west of the southwestern corner of the landfill in the grass terrace adjacent to the road. The purpose of GP-15R will be to monitor for off-site gas migration relative to a new building proposed to be located due west of the probe (see Figure 1). RMT recommends replacing GP-16 with a new gas probe (called GP-16R) located 50 feet further south of the landfill. After monitoring these new gas probes for six months, the need for a gas migration assessment plan will be evaluated (see Condition 14 of the Department's November 18, 1999, conditional plan approval) and, if necessary, the plan will be submitted to the WDNR for review.

BT<sup>2</sup> noted in their December 23, 1999, letter that the protective casings were replaced and the grades of eight existing gas probes were adjusted (gas probes GP-1D, GP-2S, GP-2D, GP-4, GP-5, GP-10, GP-18, and GP-19W) in December, so they require new reference elevation measurements. The proposed replacement gas probes (GP-15, GP-8R, GP-15R, and GP-16R), along with the eight adjusted gas probes, will be surveyed after all device repairs and replacements as described in this letter have been completed. The probe construction documentation for the four new gas probes will be provided to the Department.

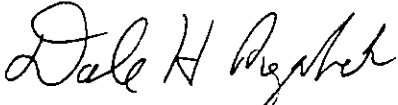
The information for the monitoring device abandonments, repairs, surveying, and replacements will be summarized in an updated Well Information Form (WIF) according to Wis. Adm. Code ch. NR 507.14(5)(1).

Ms. Barb Derflinger, P.G.  
Wisconsin Department of Natural Resources  
August 9, 2000  
Page 3

The tasks described in this letter will be completed within approximately three weeks following contractor notification. Please call us if you have any questions.

Sincerely,

RMT, Inc.



Dale H. Rezabek, P.G., C.P.G.  
Project Hydrogeologist



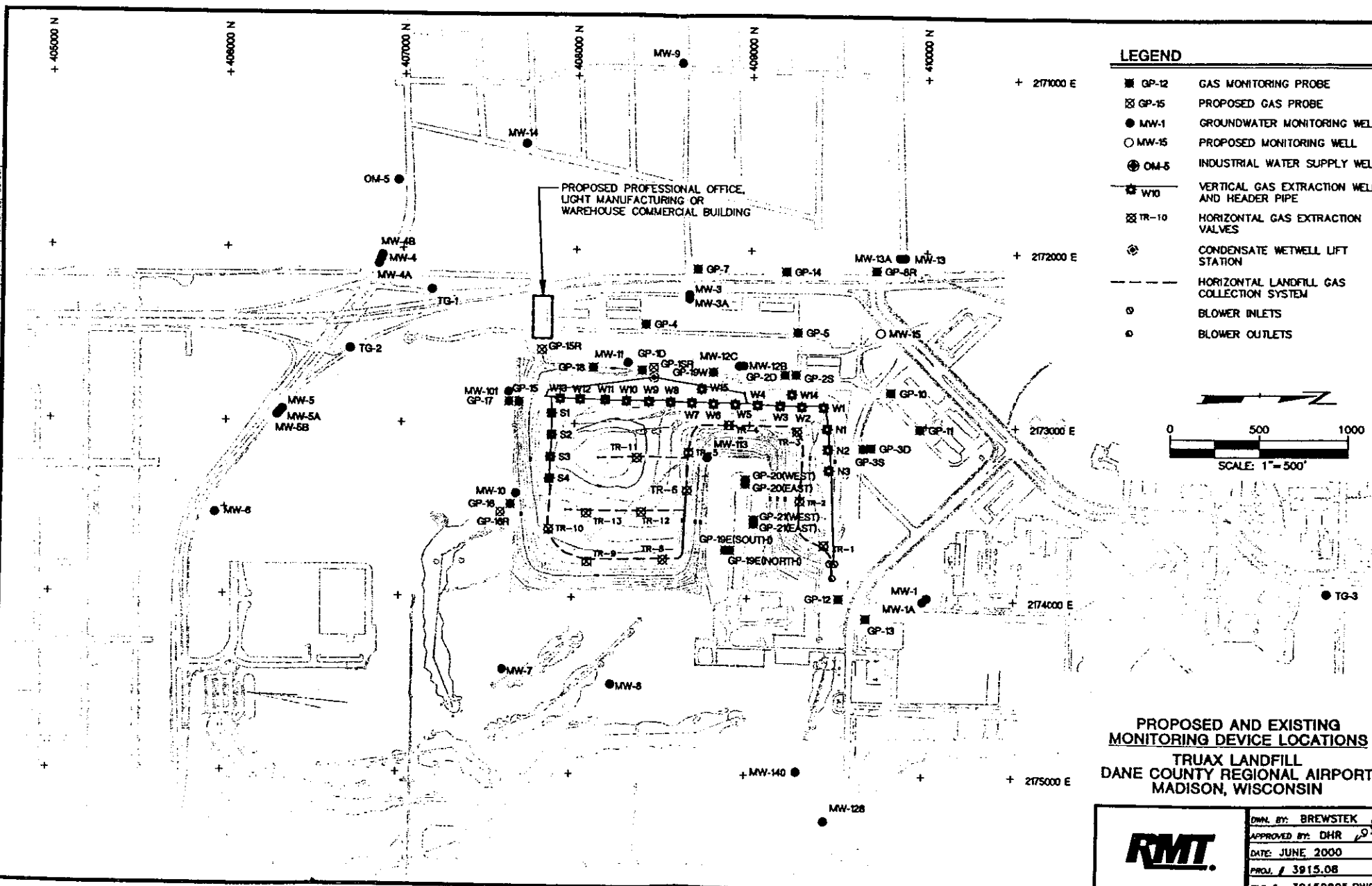
Curtis D. Madsen, P.E.  
Project Manager

Attachments: Figure 1, Proposed and Existing Monitoring Device Locations

cc: Mark Harder, WDNR SCR  
Mike Kirchner, Dane County Regional Airport

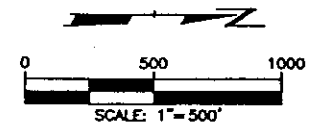
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**LEGEND**

■ GP-12	GAS MONITORING PROBE
⊠ GP-15	PROPOSED GAS PROBE
● MW-1	GROUNDWATER MONITORING WELL
○ MW-15	PROPOSED MONITORING WELL
⊕ OM-5	INDUSTRIAL WATER SUPPLY WELL
⊙ W10	VERTICAL GAS EXTRACTION WELL AND HEADER PIPE
⊠ TR-10	HORIZONTAL GAS EXTRACTION VALVES
⊕	CONDENSATE WETWELL LIFT STATION
---	HORIZONTAL LANDFILL GAS COLLECTION SYSTEM
⊙	BLOWER INLETS
⊙	BLOWER OUTLETS



**PROPOSED AND EXISTING MONITORING DEVICE LOCATIONS**  
**TRUAX LANDFILL**  
**DANE COUNTY REGIONAL AIRPORT**  
**MADISON, WISCONSIN**

<b>RMT</b>	DRAWN BY: BREWSTEK
	APPROVED BY: DHR
	DATE: JUNE 2000
	PROJ. / 3915.08
	FILE / 39150805.DWG

FIGURE 1



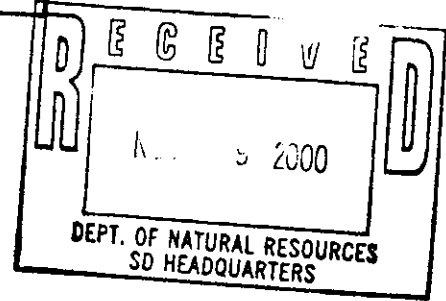
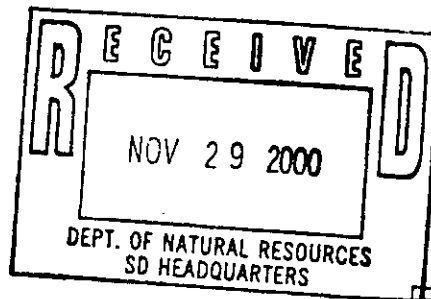
Integrated  
Environmental  
Solutions

744 Heartland Trail 53717-1934  
P.O. Box 8923 53708-8923  
Madison, WI  
Telephone: 608-831-4444  
Fax: 608-831-3334

November 22, 2000

Ms. Barb Derflinger, P.G.  
Hydrogeologist  
Wisconsin Department of Natural Resources  
101 South Webster Street SW/3  
Madison, WI 53707

**Subject: Environmental Monitoring  
Second Quarter 2000 Results  
Closed Dane County Truax Landfill**



Dear Ms. Derflinger:

Enclosed is a summary of the laboratory results for the second quarter groundwater sampling event for 2000, and the gas monitoring results for the second quarter (measurements recorded biweekly in April, May, and June 2000). The sampling for the second quarter was conducted by RMT, Inc. (RMT), on June 21 and 22, 2000. The third quarter sampling took place in September. A copy of this letter and a computer diskette containing the second quarter laboratory analytical results and gas monitoring results have been submitted to the Environmental Monitoring Data Section of the Bureau of Waste Management at the Wisconsin Department of Natural Resources (WDNR) Central Office in Madison. Groundwater samples were collected and gas probes were sampled according to the environmental monitoring plan in the Conditional Plan Approval letter dated November 18, 1999.

We have discovered that gas probe data from gas probes in the GP-01 through GP-21 series, collected by RMT during March, April, and May 2000, were inadvertently left out of our previous submittal on June 5, 2000. These additional data are included in this report. Gas monitoring data collected during this sampling event exhibit fewer detections and/or lower concentration detections of landfill gas, which indicate that the adjustments to the gas extraction system have resulted in increased efficiency.

Groundwater continues to flow to the northwest, and downward hydraulic gradients continue to be observed at well nests MW-3, MW-4, and MW-5. Table 1 presents a summary of the water quality indicator parameters that exceeded the current NR 140 Preventive Action Limits (PAL) and Enforcement Standards (ES). The indicator parameter results for samples collected and analyzed for the second quarter 2000 are generally similar to historic data for the site. The trends in the data indicate that there may be some impacts on groundwater quality in downgradient monitoring wells (monitoring wells MW-3, MW-3A, MW-11, MW-12B, and MW-12C), but that there are other potential sources in the area also contributing to the impacts, since some impacts are in sidegradient monitoring wells from the landfill (such as monitoring wells MW-1A, MW-4, MW-4A, MW-4B, MW-5, MW-5A, MW-5B).

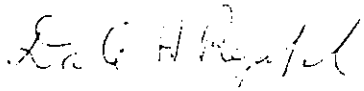
Ms. Barb Derflinger, P.G.  
Wisconsin Department of Natural Resources  
November 22, 2000  
Page 2

In summary, water quality data collected by RMT during this period are interpreted to indicate that although the landfill has had an impact on groundwater quality near the landfill, there are other sources in the vicinity which make it difficult to separate the impacts and pinpoint which impacts are attributed specifically to the landfill.

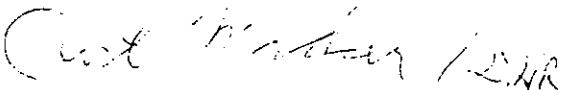
Please call us if you have any questions.

Sincerely,

RMT, Inc.



Dale H. Rezabek, P.G., C.P.G.  
Hydrogeologist



Curtis D. Madsen, P.E.  
Project Manager

Attachments: Table 1, Summary of NR 140 Exceedences - June 2000  
Gas Probe Data (March, April, May, June)  
June Monitoring Well Data

cc: Kathy Thompson, Environmental Monitoring Data Section, WDNR (letter w/ data diskette, data certification, and data tables)  
Mark Harder, WDNR - SCR (letter w/ data tables only)  
Mike Kirchner, DCRA (letter w/ data tables only)



### GROUNDWATER MONITORING DATA CERTIFICATION

Note: Two data certification pages and two copies of any exceedance notification and explanation must be prepared for **each** license number included on the diskette. One copy of each must be mailed to the WDNR Central Office with the diskette; the second copies must be mailed to the WDNR Regional Office for the region in which the facility is located.

Check here to indicate that a copy of this page (and a copy of the exceedance notification letter, if any) was mailed to the DNR Regional Office.

The enclosed diskette contains data for the following facility or facilities:

<u>License No.</u>	<u>Facility ID No.</u>	<u>Facility Name</u>	<u>Sample Results for Month(s) of:</u>
03306	113183620	Dane County Truax Landfill	March 2000 <sup>1</sup> April 2000 <sup>2</sup> May 2000 <sup>2</sup> June 2000 <sup>3</sup>

<sup>1</sup> Gas probe data only, not included with previous submittals

<sup>2</sup> Gas probe and gas extraction sample data

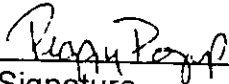
<sup>3</sup> Monitoring well, gas probe, and gas extraction sample data

Check one of the following:

An exceedance notification and explanation *is attached*.

An exceedance notification *is not attached* because there are no exceedances to report.

To the best of my knowledge, the information reported and the statements made on this diskette and enclosures are true and correct. *Furthermore, per ss. NR 140.24(1)(a) and 507.30, Wisconsin Adm. Code, I have attached notification of enforcement standard, preventative action limit, or alternative concentration limit exceedances, if any, which includes a list of the wells at which the exceedances occurred and a preliminary analysis of the cause and significance of the concentration.*

  
\_\_\_\_\_  
Signature

September 6, 2000  
Date

Database Specialist  
Title

TABLE 1

DANE COUNTY TRUAX LANDFILL

PARAMETERS THAT EXCEED CURRENT REGULATORY STANDARDS

JUNE 2000

BEGINNING SEARCH DATE: 01-JUN-2000

ENDING SEARCH DATE: 30-JUN-2000

CHEMICAL PARAMETER	UNITS	NR140		SAMPLE IDENTIFIER	SAMPLE DATE	RESULT	DATA		WITHIN DMZ?
		PAL	ES				FLAGS	EXCEEDANCE	
ARSENIC, DISSOLVED	UG/L	5	50	MW-004	21-JUN-2000	6.1	Q	PAL	
				MW-004A	21-JUN-2000	41		PAL	
				MW-004B	21-JUN-2000	6.3	Q	PAL	
				MW-005A	22-JUN-2000	39		PAL	
				MW-005B	21-JUN-2000	5.8	Q	PAL	
				MW-005B DUP	21-JUN-2000	5.3	Q	PAL	
				TG-01	21-JUN-2000	7.3	Q	PAL	
				TG-02	21-JUN-2000	6.7	Q	PAL	
CADMIUM, DISSOLVED	UG/L	.5	5	MW-003	22-JUN-2000	0.80	Q	PAL	
				MW-010	22-JUN-2000	2.3		PAL	Y
				OSCAR #5	22-JUN-2000	0.73	Q	PAL	
CHLORIDE	MG/L	125	250	MW-004	21-JUN-2000	420		ES	
				MW-004B	21-JUN-2000	260		ES	
				MW-005B	21-JUN-2000	300		ES	
				MW-005B DUP	21-JUN-2000	290		ES	
				MW-011	22-JUN-2000	920		PAL	Y
				MW-012B	22-JUN-2000	130		PAL	Y
IRON, DISSOLVED	UG/L	150	300	MW-004A	21-JUN-2000	490		ES	
				MW-004B	21-JUN-2000	310		ES	
				MW-005A	22-JUN-2000	300		ES	
				MW-005B	21-JUN-2000	3100		ES	
				MW-005B DUP	21-JUN-2000	3200		ES	
				MW-010	22-JUN-2000	310		PAL	Y
				OSCAR #5	22-JUN-2000	360		ES	
				TG-01	21-JUN-2000	1400		ES	
				TG-02	21-JUN-2000	750		ES	

TABLE 1

DANE COUNTY TRUAX LANDFILL

PARAMETERS THAT EXCEED CURRENT REGULATORY STANDARDS

JUNE 2000

BEGINNING SEARCH DATE: 01-JUN-2000

ENDING SEARCH DATE: 30-JUN-2000

CHEMICAL PARAMETER	UNITS	NR140 PAL	NR140 ES	SAMPLE IDENTIFIER	SAMPLE DATE	RESULT	DATA FLAGS	EXCEEDANCE	WITHIN DMZ?
LEAD, DISSOLVED	UG/L	1.5	15	TG-02	21-JUN-2000	3.5	Q	PAL	
MANGANESE, DISSOLVED	UG/L	25	50	MW-001A	21-JUN-2000	280		ES	
				MW-004B	21-JUN-2000	250		ES	
				MW-005	21-JUN-2000	630		ES	
				MW-005B	21-JUN-2000	110		ES	
				MW-005B DUP	21-JUN-2000	120		ES	
				MW-010	22-JUN-2000	470		PAL	Y
				MW-011	22-JUN-2000	280		PAL	Y
				MW-012B	22-JUN-2000	100		PAL	Y
				OSCAR #5	22-JUN-2000	55		ES	
				TG-01	21-JUN-2000	470		ES	
				TG-02	21-JUN-2000	84		ES	
NITROGEN, NITRATE + NITRITE	MG/L	2	10	MW-003	22-JUN-2000	7.5		PAL	
				MW-003 DUP	22-JUN-2000	7.3		PAL	
				MW-003A	22-JUN-2000	2.6		PAL	
				MW-004	21-JUN-2000	6.8		PAL	
				MW-005	21-JUN-2000	71		ES	
				MW-012B	22-JUN-2000	5.5		PAL	Y
				MW-012C	22-JUN-2000	2.0		PAL	Y
				TG-02	21-JUN-2000	2.0		PAL	



DANE COUNTY TRUAX LANDFILL  
MONITORING WELL DATA  
JUNE 2000

PARAMETER	UNITS	FIELD BLANK-1	MW-001	MW-001A	MW-003	MW-003 DUP	MW-003A
		21-JUN-2000 902183-013	21-JUN-2000 902183-001	21-JUN-2000 902183-002	22-JUN-2000 902213-002	22-JUN-2000 902213-004	22-JUN-2000 902213-003
COLOR, FIELD			GREY	CLEAR	TAR		CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM		653	860	1490		
DEPTH TO WATER	FEET		9.45	24.32	51.25		849
ODOR, FIELD			NONE	NONE	NONE		51.01
PH, FIELD	SU		7.25	7.36	6.94		NONE
TEMPERATURE	DEG C		13.1	12.9	13.8		7.35
TURBIDITY, FIELD			SLIGHT	NONE	VERY		13.8
WATER ELEVATION	FEET		848.98	834.01			NONE
ALKALINITY AS CaCO3	MG/L	14 A	290 A	320	530	520	350
CHLORIDE	MG/L	< 0.15	19	67	120	120	30
COD	MG/L	4.9 Q	2.9 Q	< 2.8	3.4 Q	4.5 Q	3.0 Q
HARDNESS AS CaCO3	MG/L	< 0.081	340	440	670	660	460
NITROGEN, NITRATE + NITRITE	MG/L	< 0.037	0.48	< 0.037	7.5	7.3	2.6
NITROGEN, TOTAL KJELDAHL	MG/L			0.49 Q			
PHOSPHORUS, SOLUBLE	MG/L			< 0.31			
SOLIDS, TOTAL DISSOLVED	MG/L	< 14	410	550	930	1100	680
SULFATE	MG/L	< 0.13	12	35	52	52	58
ARSENIC, DISSOLVED	UG/L	< 3.7	3.8 Q	4.5 Q	< 3.7	< 3.7	< 3.7
BARIUM, DISSOLVED	UG/L	< 0.92	38	230	140	140	7.3
CADMIUM, DISSOLVED	UG/L	< 0.36	< 0.36	< 0.36	0.80 Q	< 0.36	< 0.36
IRON, DISSOLVED	UG/L	< 16	< 16	35 Q	24 Q	19 Q	< 16
LEAD, DISSOLVED	UG/L	< 2.2	< 2.2	< 2.2	< 2.2	< 2.2	< 2.2
MANGANESE, DISSOLVED	UG/L	< 0.26	0.43 Q	280	12	11	< 0.26

DANE COUNTY TRUAX LANDFILL  
MONITORING WELL DATA  
JUNE 2000

PARAMETER	UNITS	MW-004	MW-004A	MW-004B	MW-005	MW-005A	MW-005B
		21-JUN-2000 902183-003	21-JUN-2000 902183-004	21-JUN-2000 902183-005	21-JUN-2000 902183-006	22-JUN-2000 902183-007	21-JUN-2000 902183-008
COLOR, FIELD		CLEAR	CLEAR	CLEAR	GREY	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	2050	481	1740	1170	365	1730
DEPTH TO WATER	FEET	14.09	13.54	50.87	7.02	7.59	53.85
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	6.89	7.31	6.94	6.92	7.67	7.11
TEMPERATURE	DEG C	12.9	14.9	13.4	12.2	22.7	15.3
TURBIDITY, FIELD		NONE	NONE	NONE	SLIGHT	NONE	NONE
WATER ELEVATION	FEET	846.80	847.01	809.04	849.29	847.94	801.82
ALKALINITY AS CaCO3	MG/L	450	230	470	210	160	400
CHLORIDE	MG/L	420	6.9	260	15	2.5	300
COD	MG/L	3.1	3.6	2.8	38	4.6	22
HARDNESS AS CaCO3	MG/L	720	210	670	510	130	600
NITROGEN, NITRATE + NITRITE	MG/L	6.8	< 0.037	< 0.037	71	< 0.037	0.32
NITROGEN, TOTAL KJELDAHL	MG/L						
PHOSPHORUS, SOLUBLE	MG/L						
SOLIDS, TOTAL DISSOLVED	MG/L	1300	300	1100	1000	230	1100
SULFATE	MG/L	46	6.4	99	68	0.90	53
ARSENIC, DISSOLVED	UG/L	6.1	41	6.3	4.3	39	5.8
BARIUM, DISSOLVED	UG/L	150	43	95	82	28	110
CADMIUM, DISSOLVED	UG/L	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
IRON, DISSOLVED	UG/L	< 16	490	310	< 16	300	3100
LEAD, DISSOLVED	UG/L	< 2.2	< 2.2	< 2.2	< 2.2	< 2.2	< 2.2
MANGANESE, DISSOLVED	UG/L	0.85	14	250	630	11	110

DANE COUNTY TRUAX LANDFILL  
 MONITORING WELL DATA  
 JUNE 2000

PARAMETER	UNITS	MW-005B DUP	MW-010	MW-011	MW-012B	MW-012C	MW-014
		21-JUN-2000 902183-012	22-JUN-2000 902213-008	22-JUN-2000 902213-007	22-JUN-2000 902213-005	22-JUN-2000 902213-006	21-JUN-2000 902183-009
COLOR, FIELD			CLEAR	GREY	GREY	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM		2020	4750	1530	815	1142
DEPTH TO WATER	FEET		9.29	33.38	50.50	50.18	21.13
ODOR, FIELD			NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU		6.96	7.06	6.90	7.35	7.23
TEMPERATURE	DEG C		14.2	13.2	13.4	14.9	13.5
TURBIDITY, FIELD			SLIGHT	SLIGHT	MODERATE	NONE	SLIGHT
WATER ELEVATION	FEET		850.28				
ALKALINITY AS CaCO3	MG/L	400	1000	1200	520	260	843.66
CHLORIDE	MG/L	290	48	920	130	76	360
COD	MG/L	17	28	40	< 2.8	< 2.8	100
HARDNESS AS CaCO3	MG/L	610	840	1400	630	370	2.8
NITROGEN, NITRATE + NITRITE	MG/L	0.30	0.55	0.20	5.5	2.0	530
NITROGEN, TOTAL KJELDAHL	MG/L		44	1.0	0.45	< 0.23	1.5
PHOSPHORUS, SOLUBLE	MG/L		< 0.31	< 0.31	Q	< 0.31	
SOLIDS, TOTAL DISSOLVED	MG/L	1100	1200	2800	1000	560	820
SULFATE	MG/L	52	110	71	35	20	72
ARSENIC, DISSOLVED	UG/L	5.3	Q	< 3.7	< 3.7	< 3.7	4.9
BARIUM, DISSOLVED	UG/L	120	130	320	85	5.9	78
CADMIUM, DISSOLVED	UG/L	< 0.36	2.3	< 0.36	< 0.36	< 0.36	< 0.36
IRON, DISSOLVED	UG/L	3200	310	58	26	< 16	130
LEAD, DISSOLVED	UG/L	< 2.2	< 2.2	< 2.2	Q	< 2.2	< 2.2
MANGANESE, DISSOLVED	UG/L	120	470	280	100	< 0.26	7.8

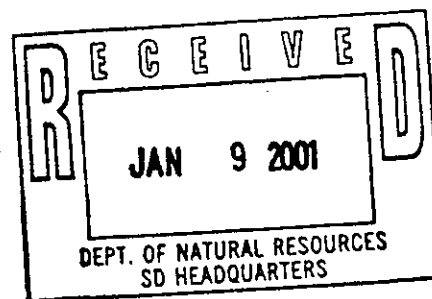
DANE COUNTY TRUAX LANDFILL  
MONITORING WELL DATA  
JUNE 2000

PARAMETER	UNITS	OSCAR #5	TG-01	TG-02
		22-JUN-2000 902213-001	21-JUN-2000 902183-010	21-JUN-2000 902183-011
COLOR, FIELD		CLEAR	TAN	TAN
CONDUCTANCE, SPECIFIC	UMHOS/CM	1053	1305	946
DEPTH TO WATER	FEET		19.47	13.33
ODOR, FIELD		NONE	NONE	NONE
PH, FIELD	SU	6.91	6.89	7.07
TEMPERATURE	DEG C	12.7	13.5	12.5
TURBIDITY, FIELD		NONE	VERY	VERY
WATER ELEVATION	FEET		846.21	847.76
ALKALINITY AS CaCO3	MG/L	340	510	410
CHLORIDE	MG/L	92	41	5.5
COD	MG/L	2.9	11	2.8
HARDNESS AS CaCO3	MG/L	510	620	580
NITROGEN, NITRATE + NITRITE	MG/L	0.25	< 0.037	2.0
NITROGEN, TOTAL KJELDAHL	MG/L			
PHOSPHORUS, SOLUBLE	MG/L			
SOLIDS, TOTAL DISSOLVED	MG/L	680	880	650
SULFATE	MG/L	50	74	47
ARSENIC, DISSOLVED	UG/L	< 3.7	7.3	6.7
BARIUM, DISSOLVED	UG/L	42	190	100
CADMIUM, DISSOLVED	UG/L	0.73	< 0.36	< 0.36
IRON, DISSOLVED	UG/L	360	1400	750
LEAD, DISSOLVED	UG/L	< 2.2	< 2.2	3.5
MANGANESE, DISSOLVED	UG/L	55	470	84



December 21, 2000

Ms. Barb Derflinger, P.G.  
Hydrogeologist  
Wisconsin Department of Natural Resources  
101 South Webster Street SW/3  
Madison, WI 53707



**Subject: Environmental Monitoring  
Third Quarter Results  
Closed Dane County Truax Landfill**

Dear Ms. Derflinger:

Enclosed is a summary of the laboratory results for the third quarter groundwater sampling event for 2000, and the gas monitoring results for the third quarter (measurements recorded biweekly). The groundwater sampling for the third quarter was conducted by RMT, Inc. (RMT), on September 28 and 29, 2000. The third quarter round included the annual analysis of volatile organic compounds (VOCs). A copy of this letter and a computer diskette containing the third quarter laboratory analytical results and the gas monitoring results have been submitted to the Environmental Monitoring Data Section of the Bureau of Waste Management at the Wisconsin Department of Natural Resources (WDNR) Central Office in Madison. Groundwater samples were collected and gas probes were sampled (except during September) according to the environmental monitoring plan in the Conditional Plan Approval letter dated November 18, 1999.

Groundwater continues to flow historically to the northwest, and historically downward hydraulic gradients continue to be observed at well nests MW-1, MW-4, MW-5, and MW-13. Table 1 presents a summary of the water quality indicator parameters, metals, and VOCs that exceeded the current NR 140 Preventive Action Limits (PAL) and Enforcement Standards (ES). Summary tables for all the groundwater quality data are also attached. The indicator parameter results for samples collected and analyzed for the third quarter 2000 are generally similar to historical data for the site. The trends in the inorganic and metals data indicate that there may be some impacts on groundwater quality in downgradient monitoring wells (monitoring wells MW-3, MW-3A, MW-11, MW-12B, and MW-12C), but that there are other potential sources in the area that may also be contributing to the impacts, since some impacts are in sidegradient monitoring wells from the landfill (such as monitoring wells TG-1, TG-2, MW-1A, MW-4, MW-4A, MW-4B, MW-5, MW-5A, MW-5B) and upgradient monitoring wells (MW-6, MW-7, and MW-8).

Specific volatile organic compounds, including cis-1,2-dichloroethene; tetrachloroethene; trichloroethene; and vinyl chloride, were detected at concentrations similar to those of historical rounds in sidegradient and downgradient wells. Chloroform was detected in monitoring well

Ms. Barb Derflinger, P.G.  
Wisconsin Department of Natural Resources  
December 21, 2000  
Page 2

MW-13A between the Limit of Detection (LOD) and the Limit of Quantitation (LOQ). Since the VOC detections were at both sidegradient and downgradient wells, there appear to be multiple sources of VOCs in the vicinity of the landfill that contribute to groundwater impacts.

In summary, water quality data collected by RMT during the first three quarters of 2000, when interpreted historically, continue to indicate that, although the landfill has had an impact on groundwater quality near the landfill, there are other sources in the vicinity that make it difficult to separate the impacts and pinpoint which impacts are attributed specifically to the landfill.

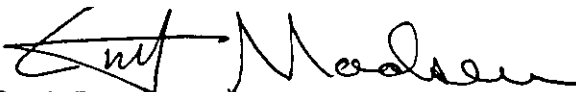
Please call us if you have any questions.

Sincerely,

RMT, Inc.



Dale H. Rezabek, P.G., C.P.G.  
Hydrogeologist



Curtis D. Madsen, P.E.  
Project Manager

Attachments: Table 1, Summary of NR 140 Exceedences – September 2000  
Gas Probe Data (July, August, September)  
Summary of September Groundwater Monitoring Well Data and Gas Probe Data

cc: Kathy Thompson - Environmental Monitoring Data Section, WDNR (letter w/ data diskette, data certification, and data tables)  
Mark Harder, WDNR – SCR (letter w/ data tables only)  
Mike Kirchner - DCRA (letter w/ data tables only)

TABLE 1

DANE COUNTY TRUAX LANDFILL

PARAMETERS THAT EXCEED CURRENT REGULATORY STANDARDS  
SEPTEMBER 2000

BEGINNING SEARCH DATE: 01-SEP-2000

ENDING SEARCH DATE: 30-SEP-2000

CHEMICAL PARAMETER	UNITS	NR140 PAL	NR140 ES	SAMPLE IDENTIFIER	SAMPLE DATE	RESULT	DATA FLAGS	EXCEEDANCE	WITHIN DMZ?
ARSENIC, DISSOLVED	UG/L	5	50	MW-001	28-SEP-2000	6.2	Q	PAL	
				MW-001A	28-SEP-2000	5.0	Q	PAL	
				MW-003	29-SEP-2000	5.9	Q	PAL	
				MW-004	28-SEP-2000	5.7	Q	PAL	
				MW-004A	28-SEP-2000	40		PAL	
				MW-004B	28-SEP-2000	9.4	Q	PAL	
				MW-005A	28-SEP-2000	24		PAL	
				MW-006	28-SEP-2000	10	Q	PAL	
				MW-007	28-SEP-2000	7.1	Q	PAL	
				MW-008	28-SEP-2000	11	Q	PAL	
				MW-009	28-SEP-2000	5.8	Q	PAL	
				MW-010	28-SEP-2000	51		PAL	Y
				MW-011	29-SEP-2000	13		PAL	Y
				MW-012B	28-SEP-2000	7.6	Q	PAL	Y
TG-01	28-SEP-2000	9.3	Q	PAL					
CADMIUM, DISSOLVED	UG/L	.5	5	MW-001A	28-SEP-2000	0.54	Q	PAL	
				MW-005A	28-SEP-2000	0.51	Q	PAL	
				MW-007	28-SEP-2000	0.97	Q	PAL	
				MW-010	28-SEP-2000	0.91	Q	PAL	Y
CHLORIDE	MG/L	125	250	MW-004	28-SEP-2000	300		ES	
				MW-004B	28-SEP-2000	150		PAL	
				MW-009	28-SEP-2000	530		ES	
				MW-010	28-SEP-2000	310		PAL	Y
				MW-011	29-SEP-2000	1000		PAL	Y
CHLOROFORM	UG/L	.6	6	MW-013A	29-SEP-2000	0.66	Q	PAL	
IRON, DISSOLVED	UG/L	150	300	MW-001A	28-SEP-2000	210		PAL	

TABLE 1

DANE COUNTY TRUAX LANDFILL

PARAMETERS THAT EXCEED CURRENT REGULATORY STANDARDS  
SEPTEMBER 2000

BEGINNING SEARCH DATE: 01-SEP-2000  
ENDING SEARCH DATE: 30-SEP-2000

CHEMICAL PARAMETER	UNITS	NR140 PAL	NR140 ES	SAMPLE IDENTIFIER	SAMPLE DATE	RESULT	DATA FLAGS	EXCEEDANCE	WITHIN DMZ?
IRON, DISSOLVED	UG/L	150	300	MW-004A	28-SEP-2000	390		ES	
				MW-004B	28-SEP-2000	1900		ES	
				MW-006	28-SEP-2000	960		ES	
				MW-008	28-SEP-2000	3000		ES	
				MW-010	28-SEP-2000	8400		PAL	Y
				OSCAR #5	28-SEP-2000	340		ES	
				TG-01	28-SEP-2000	1600		ES	
				TG-02	28-SEP-2000	180		PAL	
LEAD, DISSOLVED	UG/L	1.5	15	MW-001A	28-SEP-2000	7.7		PAL	
				MW-003	29-SEP-2000	9.1		PAL	
				MW-003A	29-SEP-2000	3.7	Q	PAL	
				MW-004A	28-SEP-2000	8.4		PAL	
				MW-004B	28-SEP-2000	3.5	Q	PAL	
				MW-005A	28-SEP-2000	6.4	Q	PAL	
				MW-005B	28-SEP-2000	9.8		PAL	
				MW-008	28-SEP-2000	5.7	Q	PAL	
				MW-010	28-SEP-2000	4.0	Q	PAL	Y
				MW-011	29-SEP-2000	8.6		PAL	Y
				MW-012B	28-SEP-2000	2.4	Q	PAL	Y
				MW-012C	29-SEP-2000	7.4		PAL	Y
				MW-013	29-SEP-2000	3.8	Q	PAL	
MW-013A	29-SEP-2000	7.2		PAL					
MANGANESE, DISSOLVED	UG/L	25	50	MW-001A	28-SEP-2000	1500		ES	
				MW-004B	28-SEP-2000	200		ES	
				MW-005	28-SEP-2000	670		ES	
				MW-006	28-SEP-2000	780		ES	
				MW-007	28-SEP-2000	390		ES	
				MW-008	28-SEP-2000	860		ES	



TABLE 1

DANE COUNTY TRUAX LANDFILL  
 PARAMETERS THAT EXCEED CURRENT REGULATORY STANDARDS  
 SEPTEMBER 2000

BEGINNING SEARCH DATE: 01-SEP-2000  
 ENDING SEARCH DATE: 30-SEP-2000

CHEMICAL PARAMETER	UNITS	NR140 PAL	NR140 ES	SAMPLE IDENTIFIER	SAMPLE DATE	RESULT	DATA FLAGS	EXCEEDANCE	WITHIN DM2?				
MANGANESE, DISSOLVED	UG/L	25	50	MW-010	28-SEP-2000	800							
				MW-011	29-SEP-2000	330		PAL	Y				
				OSCAR #5	28-SEP-2000	56		PAL	Y				
				TG-01	28-SEP-2000	450		ES					
NITROGEN, NITRATE + NITRITE	MG/L	2	10	MW-003	29-SEP-2000	15		ES					
				MW-003A	29-SEP-2000	2.3		PAL					
				MW-004	28-SEP-2000	6.6		PAL					
				MW-005	28-SEP-2000	73		ES					
				MW-005B	28-SEP-2000	31		ES					
				MW-007	28-SEP-2000	55		ES					
				MW-009	28-SEP-2000	8.0		ES					
				MW-012B	28-SEP-2000	6.1		PAL					
				MW-013	29-SEP-2000	3.4		PAL	Y				
				MW-013A	29-SEP-2000	3.2		PAL					
				MW-014	28-SEP-2000	2.3		PAL					
				SULFATE	MG/L	125	250	MW-006	28-SEP-2000	150		PAL	
								MW-007	28-SEP-2000	580		ES	
								MW-008	28-SEP-2000	840		ES	
TETRACHLOROETHENE	UG/L	.5	5	MW-012B	28-SEP-2000	1.8		PAL	Y				
				OSCAR #5	28-SEP-2000	3.4		PAL					
TRICHLOROETHENE	UG/L	.5	5	MW-003A	29-SEP-2000	0.77	Q	PAL					
				MW-012B	28-SEP-2000	1.6		PAL	Y				
				MW-014	28-SEP-2000	0.63	Q	PAL					
				OSCAR #5	28-SEP-2000	4.4		PAL					
VINYL CHLORIDE	UG/L	.02	.2	MW-011	29-SEP-2000	0.42	Q	PAL	Y				

DANE COUNTY TRUAX LANDFILL  
FIELD AND INORGANIC PARAMETERS  
THIRD QUARTER 2000

PARAMETER	UNITS	MW-004B	MW-005	MW-005A	MW-005B	MW-006	MW-007
		28-SEP-2000 903587-007	28-SEP-2000 903587-008	28-SEP-2000 903587-009	28-SEP-2000 903587-010	28-SEP-2000 903587-011	28-SEP-2000 903587-012
COLOR, FIELD		CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	1201	994	551	1126	1185	2330
DEPTH TO WATER	FEET	50.52	10.00	9.67	53.49	7.46	6.73
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	7.13	5.85	7.24	7.06	6.98	6.98
TEMPERATURE	DEG C	12.6	15.1	12.8	12.3	17.0	13.5
TURBIDITY, FIELD		NONE	SLIGHT	NONE	NONE	NONE	NONE
WATER ELEVATION	FEET	809.39	846.31	845.86	802.18	846.14	845.95
ALKALINITY AS CaCO3	MG/L	310	250	210	290	390	480
CHLORIDE	MG/L	150	11	26	32	46	31
COD	MG/L	35	54	26	48	40	110
HARDNESS AS CaCO3	MG/L	460	520	200	420	460	1300
NITROGEN, NITRATE + NITRITE	MG/L	0.29	73	1.4	31	0.065	55
NITROGEN, TOTAL KJELDAHL	MG/L					Q	
PHOSPHORUS, SOLUBLE	MG/L						
SOLIDS, TOTAL DISSOLVED	MG/L	700	850	320	720	760	1800
SULFATE	MG/L	70	73	18	86	150	580
ARSENIC, DISSOLVED	UG/L	9.4	Q	< 3.7	24	4.9	10
BARIUM, DISSOLVED	UG/L	63	64	37	60	99	73
CADMIUM, DISSOLVED	UG/L	< 0.36	< 0.36	0.51	Q	< 0.36	< 0.36
IRON, DISSOLVED	UG/L	1900	< 16	20	Q	17	960
LEAD, DISSOLVED	UG/L	3.5	Q	< 2.2	6.4	Q	9.8
MANGANESE, DISSOLVED	UG/L	200	670	23	4.8	< 2.2	< 2.2
						780	390

DANE COUNTY TRUAX LANDFILL  
FIELD AND INORGANIC PARAMETERS  
THIRD QUARTER 2000

PARAMETER	UNITS	MW-008	MW-009	MW-010	MW-011	MW-012B	MW-012C
		28-SEP-2000 903587-013	28-SEP-2000 903587-014	28-SEP-2000 903587-015	29-SEP-2000 903587-016	28-SEP-2000 903587-017	29-SEP-2000 903587-018
COLOR, FIELD		CLEAR	GREY	CLEAR	GREY	CLEAR	CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	2290	2510	3180	4860	1498	951
DEPTH TO WATER	FEET	6.11	50.57	10.13	33.37	48.57	48.45
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	6.96	6.85	6.93	6.91	6.86	7.12
TEMPERATURE	DEG C	13.4	13.1	14.8	13.1	13.8	11.9
TURBIDITY, FIELD		NONE	SLIGHT	NONE			
WATER ELEVATION	FEET	845.99	838.27	849.44		NONE	NONE
ALKALINITY AS CaCO3	MG/L	360	400	1300	1100	560	160
CHLORIDE	MG/L	48	530	310	1000	120	35
COD	MG/L	120	16	72	< 2.8	62	51
HARDNESS AS CaCO3	MG/L	1300	1000	970	1400	600	170
NITROGEN, NITRATE + NITRITE	MG/L	< 0.037	8.0	0.045 Q	0.19	6.1	0.75
NITROGEN, TOTAL KJELDAHL	MG/L			69	< 0.23	0.89	1.2
PHOSPHORUS, SOLUBLE	MG/L			0.43 Q	< 0.31	< 0.31	< 0.31
SOLIDS, TOTAL DISSOLVED	MG/L	1900	1500	1700	2800	900	260
SULFATE	MG/L	840	54	83	79	38	12
ARSENIC, DISSOLVED	UG/L	11 Q	5.8 Q	51	13	7.6 Q	3.7 Q
BARIUM, DISSOLVED	UG/L	130	82	150	300	83	8.2
CADMIUM, DISSOLVED	UG/L	< 0.36	< 0.36	0.91 Q	< 0.36	< 0.36	< 0.36
IRON, DISSOLVED	UG/L	3000	< 16	8400	47 Q	< 16	28 Q
LEAD, DISSOLVED	UG/L	5.7 Q	< 2.2	4.0 Q	8.6 Q	2.4 Q	7.4 Q
MANGANESE, DISSOLVED	UG/L	860	0.34 Q	800	330	17	14

DANE COUNTY TRUAX LANDFILL  
FIELD AND INORGANIC PARAMETERS  
THIRD QUARTER 2000

PARAMETER	UNITS	MW-013	MW-013A	MW-014	OSCAR #5	TG-01	TG-02
		29-SEP-2000 903587-019	29-SEP-2000 903587-020	28-SEP-2000 903587-021	28-SEP-2000 903587-024	28-SEP-2000 903587-022	28-SEP-2000 903587-023
COLOR, FIELD		GREY	CLEAR	CLEAR	CLEAR	TAN	TAN
CONDUCTANCE, SPECIFIC	UMHOS/CM	997	828	980	1046	1316	854
DEPTH TO WATER	FEET	56.35	56.61	21.04		20.12	15.15
ODOR, FIELD		NONE	NONE	NONE	NONE	NONE	NONE
PH, FIELD	SU	7.34	7.22	6.76	7.12	6.90	7.01
TEMPERATURE	DEG C	12.7	12.4	12.6	11.7	13.5	15.1
TURBIDITY, FIELD		MOD	NONE	NONE	NONE	VERY	VERY
WATER ELEVATION	FEET	837.26	837.06	843.75		845.56	845.94
ALKALINITY AS CaCO3	MG/L	430	400	390	390	560	470
CHLORIDE	MG/L	60	25	56	89	42	3.7
COD	MG/L	14	24	16	16	18	16
HARDNESS AS CaCO3	MG/L	490	430	440	470	620	460
NITROGEN, NITRATE + NITRITE	MG/L	3.4	3.2	2.3	0.24	< 0.037	0.90
NITROGEN, TOTAL KJELDAHL	MG/L						
PHOSPHORUS, SOLUBLE	MG/L						
SOLIDS, TOTAL DISSOLVED	MG/L	570	500	580	610	780	500
SULFATE	MG/L	37	34	65	52	70	34
ARSENIC, DISSOLVED	UG/L	4.2	Q < 3.7	3.8	Q 3.8	9.3	Q 3.9
BARIUM, DISSOLVED	UG/L	50	18	61	41	190	90
CADMIUM, DISSOLVED	UG/L	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
IRON, DISSOLVED	UG/L	< 16	< 16	< 16	340	1600	180
LEAD, DISSOLVED	UG/L	3.8	Q 7.2	< 2.2	< 2.2	< 2.2	< 2.2
MANGANESE, DISSOLVED	UG/L	0.48	Q 0.34	1.3	56	450	15

DANE COUNTY TRUAX LANDFILL  
 MONITORING WELL VOCs  
 SEPTEMBER 2000

PARAMETER	UNITS	MW-004B	MW-005	MW-005A	MW-005B	MW-006	MW-007
		28-SEP-2000 903587-007	28-SEP-2000 903587-008	28-SEP-2000 903587-009	28-SEP-2000 903587-010	28-SEP-2000 903587-011	28-SEP-2000 903587-012
1,1,1,2-TETRACHLOROETHANE	UG/L	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49
1,1,1-TRICHLOROETHANE	UG/L	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53
1,1,2,2-TETRACHLOROETHANE	UG/L	< 0.68	< 0.68	< 0.68	< 0.68	< 0.68	< 0.68
1,1,2-TRICHLOROETHANE	UG/L	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47
1,1-DICHLOROETHANE	UG/L	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61
1,1-DICHLOROETHENE	UG/L	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47
1,1-DICHLOROPROPENE	UG/L	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59
1,2,3-TRICHLOROBENZENE	UG/L	< 0.57	< 0.57	< 0.57	< 0.57	< 0.57	< 0.57
1,2,3-TRICHLOROPROPANE	UG/L	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
1,2,4-TRICHLOROBENZENE	UG/L	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
1,2,4-TRIMETHYLBENZENE	UG/L	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47
1,2-DIBROMO-3-CHLOROPROPANE	UG/L	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
1,2-DIBROMOETHANE	UG/L	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49
1,2-DICHLOROBENZENE	UG/L	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
1,2-DICHLOROETHANE	UG/L	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54
1,2-DICHLOROPROPANE	UG/L	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
1,3,5-TRIMETHYLBENZENE	UG/L	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45
1,3-DICHLOROBENZENE	UG/L	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64
1,3-DICHLOROPROPANE	UG/L	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42
1,4-DICHLOROBENZENE	UG/L	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43
2,2-DICHLOROPROPANE	UG/L	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41
2-CHLOROTOLUENE	UG/L	< 0.65	< 0.65	< 0.65	< 0.65	< 0.65	< 0.65
4-CHLOROTOLUENE	UG/L	< 0.56	< 0.56	< 0.56	< 0.56	< 0.56	< 0.56
BENZENE	UG/L	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44
BROMOBENZENE	UG/L	< 0.46	< 0.46	< 0.46	< 0.46	< 0.46	< 0.46
BROMOCHLOROMETHANE	UG/L	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21
BROMODICHLOROMETHANE	UG/L	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41
BROMOFORM	UG/L	< 0.58	< 0.58	< 0.58	< 0.58	< 0.58	< 0.58
BROMOMETHANE	UG/L	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94
CARBON TETRACHLORIDE	UG/L	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
CHLOROBENZENE	UG/L	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43
CHLORODIBROMOMETHANE	UG/L	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43



DANE COUNTY TRUAX LANDFILL  
MONITORING WELL VOCs  
SEPTEMBER 2000

PARAMETER	UNITS	MW-008	MW-009	MW-010	MW-011	MW-012B	MW-012C
		28-SEP-2000 903587-013	28-SEP-2000 903587-014	28-SEP-2000 903587-015	29-SEP-2000 903587-016	28-SEP-2000 903587-017	29-SEP-2000 903587-018
1,1,1,2-TETRACHLOROETHANE	UG/L	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49
1,1,1-TRICHLOROETHANE	UG/L	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53
1,1,2,2-TETRACHLOROETHANE	UG/L	< 0.68	< 0.68	< 0.68	< 0.68	< 0.68	< 0.68
1,1,2-TRICHLOROETHANE	UG/L	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47
1,1-DICHLOROETHANE	UG/L	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61
1,1-DICHLOROETHENE	UG/L	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47
1,1-DICHLOROPROPENE	UG/L	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59
1,2,3-TRICHLOROBENZENE	UG/L	< 0.57	< 0.57	< 0.57	< 0.57	< 0.57	< 0.57
1,2,3-TRICHLOROPROPANE	UG/L	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
1,2,4-TRICHLOROBENZENE	UG/L	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
1,2,4-TRIMETHYLBENZENE	UG/L	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47
1,2-DIBROMO-3-CHLOROPROPANE	UG/L	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
1,2-DIBROMOETHANE	UG/L	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49
1,2-DICHLOROBENZENE	UG/L	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
1,2-DICHLOROETHANE	UG/L	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54
1,2-DICHLOROPROPANE	UG/L	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
1,3,5-TRIMETHYLBENZENE	UG/L	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45
1,3-DICHLOROBENZENE	UG/L	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64
1,3-DICHLOROPROPANE	UG/L	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42
1,4-DICHLOROBENZENE	UG/L	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43
2,2-DICHLOROPROPANE	UG/L	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41
2-CHLOROTOLUENE	UG/L	< 0.65	< 0.65	< 0.65	< 0.65	< 0.65	< 0.65
4-CHLOROTOLUENE	UG/L	< 0.56	< 0.56	< 0.56	< 0.56	< 0.56	< 0.56
BENZENE	UG/L	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44
BROMOBENZENE	UG/L	< 0.46	< 0.46	< 0.46	< 0.46	< 0.46	< 0.46
BROMOCHLOROMETHANE	UG/L	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21
BROMODICHLOROMETHANE	UG/L	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41
BROMOFORM	UG/L	< 0.58	< 0.58	< 0.58	< 0.58	< 0.58	< 0.58
BROMOMETHANE	UG/L	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94
CARBON TETRACHLORIDE	UG/L	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
CHLOROBENZENE	UG/L	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43
CHLORODIBROMOMETHANE	UG/L	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43

DANE COUNTY TRUAX LANDFILL  
MONITORING WELL VOCs  
SEPTEMBER 2000

PARAMETER	UNITS	MW-008	MW-009	MW-010	MW-011	MW-012B	MW-012C
		28-SEP-2000 903587-013	28-SEP-2000 903587-014	28-SEP-2000 903587-015	29-SEP-2000 903587-016	28-SEP-2000 903587-017	29-SEP-2000 903587-018
CHLOROETHANE	UG/L	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63
CHLOROFORM	UG/L	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41
CHLOROMETHANE	UG/L	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44
CIS-1,2-DICHLOROETHENE	UG/L	< 0.46	< 0.46	< 0.46	< 0.46	2.4	< 0.46
CIS-1,3-DICHLOROPROPENE	UG/L	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54
DIBROMOMETHANE	UG/L	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60
DICHLORODIFLUOROMETHANE	UG/L	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61
ETHYLBENZENE	UG/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
FLUOROTRICHLOROMETHANE	UG/L	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47
HEXACHLOROBUTADIENE	UG/L	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49
ISOPROPYLBENZENE	UG/L	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39
METHYLENE CHLORIDE	UG/L	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
N-BUTYLBENZENE	UG/L	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39
N-PROPYLBENZENE	UG/L	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54
NAPHTHALENE	UG/L	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59
P-ISOPROPYLTOLUENE	UG/L	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51
SEC-BUTYLBENZENE	UG/L	< 0.58	< 0.58	< 0.58	< 0.58	< 0.58	< 0.58
STYRENE	UG/L	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
TERT-BUTYLBENZENE	UG/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TETRACHLOROETHENE	UG/L	< 0.41	< 0.41	< 0.41	< 0.41	1.8	< 0.41
TOLUENE	UG/L	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
TRANS-1,2-DICHLOROETHENE	UG/L	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64
TRANS-1,3-DICHLOROPROPENE	UG/L	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26
TRIMETHYLBENZENES, TOTAL	UG/L	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47
TRICHLOROETHENE	UG/L	< 0.49	< 0.49	< 0.49	< 0.49	1.6	< 0.49
VINYL CHLORIDE	UG/L	< 0.17	< 0.17	< 0.17	0.42	< 0.17	< 0.17
XYLENE, M + P	UG/L	< 0.77	< 0.77	< 0.77	< 0.77	< 0.77	< 0.77
XYLENE, O	UG/L	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54
XYLENE, TOTAL	UG/L	< 0.77	< 0.77	< 0.77	< 0.77	< 0.77	< 0.77



DANE COUNTY TRUAX LANDFILL  
MONITORING WELL VOCs  
SEPTEMBER 2000

PARAMETER	UNITS	MW-013	MW-013A	MW-014	OSCAR #5	TG-01	TG-02
		29-SEP-2000 903587-019	29-SEP-2000 903587-020	28-SEP-2000 903587-021	28-SEP-2000 903587-024	28-SEP-2000 903587-022	28-SEP-2000 903587-023
1,1,1,2-TETRACHLOROETHANE	UG/L	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49
1,1,1-TRICHLOROETHANE	UG/L	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53
1,1,2,2-TETRACHLOROETHANE	UG/L	< 0.68	< 0.68	< 0.68	< 0.68	< 0.68	< 0.68
1,1,2-TRICHLOROETHANE	UG/L	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47
1,1-DICHLOROETHANE	UG/L	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61
1,1-DICHLOROETHENE	UG/L	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47
1,1-DICHLOROPROPENE	UG/L	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59
1,2,3-TRICHLOROBENZENE	UG/L	< 0.57	< 0.57	< 0.57	< 0.57	< 0.57	< 0.57
1,2,3-TRICHLOROPROPANE	UG/L	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
1,2,4-TRICHLOROBENZENE	UG/L	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
1,2,4-TRIMETHYLBENZENE	UG/L	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47
1,2-DIBROMO-3-CHLOROPROPANE	UG/L	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
1,2-DIBROMOETHANE	UG/L	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49
1,2-DICHLOROBENZENE	UG/L	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
1,2-DICHLOROETHANE	UG/L	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54
1,2-DICHLOROPROPANE	UG/L	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
1,3,5-TRIMETHYLBENZENE	UG/L	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45
1,3-DICHLOROBENZENE	UG/L	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64
1,3-DICHLOROPROPANE	UG/L	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42
1,4-DICHLOROBENZENE	UG/L	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43
2,2-DICHLOROPROPANE	UG/L	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41
2-CHLOROTOLUENE	UG/L	< 0.65	< 0.65	< 0.65	< 0.65	< 0.65	< 0.65
4-CHLOROTOLUENE	UG/L	< 0.56	< 0.56	< 0.56	< 0.56	< 0.56	< 0.56
BENZENE	UG/L	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44
BROMOBENZENE	UG/L	< 0.46	< 0.46	< 0.46	< 0.46	< 0.46	< 0.46
BROMOCHLOROMETHANE	UG/L	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21
BROMODICHLOROMETHANE	UG/L	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41
BROMOFORM	UG/L	< 0.58	< 0.58	< 0.58	< 0.58	< 0.58	< 0.58
BROMOMETHANE	UG/L	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94
CARBON TETRACHLORIDE	UG/L	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
CHLOROBENZENE	UG/L	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43
CHLORODIBROMOMETHANE	UG/L	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43

DANE COUNTY TRUAX LANDFILL  
 MONITORING WELL VOCs  
 SEPTEMBER 2000

PARAMETER	UNITS	MW-013	MW-013A	MW-014	OSCAR #5	TG-01	TG-02
		29-SEP-2000 903587-019	29-SEP-2000 903587-020	28-SEP-2000 903587-021	28-SEP-2000 903587-024	28-SEP-2000 903587-022	28-SEP-2000 903587-023
CHLOROETHANE	UG/L	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63	< 0.63
CHLOROFORM	UG/L	< 0.41	0.66	Q < 0.41	< 0.41	< 0.41	< 0.41
CHLOROMETHANE	UG/L	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44
CIS-1,2-DICHLOROETHENE	UG/L	< 0.46	< 0.46	4.5	0.73	Q < 0.46	< 0.46
CIS-1,3-DICHLOROPROPENE	UG/L	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54
DIBROMOMETHANE	UG/L	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60	< 0.60
DICHLORODIFLUOROMETHANE	UG/L	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61	< 0.61
ETHYLBENZENE	UG/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
FLUOROTRICHLOROMETHANE	UG/L	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47
HEXACHLOROBUTADIENE	UG/L	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49
ISOPROPYLBENZENE	UG/L	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39
METHYLENE CHLORIDE	UG/L	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
N-BUTYLBENZENE	UG/L	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39
N-PROPYLBENZENE	UG/L	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54
NAPHTHALENE	UG/L	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59	< 0.59
P-ISOPROPYLTOLUENE	UG/L	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51	< 0.51
SEC-BUTYLBENZENE	UG/L	< 0.58	< 0.58	< 0.58	< 0.58	< 0.58	< 0.58
STYRENE	UG/L	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
TERT-BUTYLBENZENE	UG/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TETRACHLOROETHENE	UG/L	< 0.41	< 0.41	< 0.41	3.4	< 0.41	< 0.41
TOLUENE	UG/L	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
TRANS-1,2-DICHLOROETHENE	UG/L	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64
TRANS-1,3-DICHLOROPROPENE	UG/L	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26
TRIMETHYLBENZENES, TOTAL	UG/L	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47	< 0.47
TRICHLOROETHENE	UG/L	< 0.49	< 0.49	0.63	Q 4.4	< 0.49	< 0.49
VINYL CHLORIDE	UG/L	< 0.17	< 0.17	0.33	Q < 0.17	< 0.17	< 0.17
XYLENE, M + P	UG/L	< 0.77	< 0.77	< 0.77	< 0.77	< 0.77	< 0.77
XYLENE, O	UG/L	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54	< 0.54
XYLENE, TOTAL	UG/L	< 0.77	< 0.77	< 0.77	< 0.77	< 0.77	< 0.77

DANE COUNTY TRUAX LANDFILL

GAS PROBE DATA

AUGUST 2000

PARAMETER	UNITS	GP-13	GP-14	GP-14	GP-15	GP-15	GP-16
		25-AUG-2000 000825-X12	11-AUG-2000 000811-X13	25-AUG-2000 000825-X13	11-AUG-2000 000811-X14	25-AUG-2000 000825-X14	11-AUG-2000 000811-X15
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	17.4	16.9	16.8	20.0	20.2	19.5
TEMPERATURE, AIR	DEG F	75	65	75	65	75	65
PRESSURE, BAROMETRIC	MM HG	763.27	767.08	763.27	767.08	763.27	767.08
BAROMETRIC PRESSURE TREND		-1		-1		-1	
GROUND CONDITIONS		AVERAGE	DAMP	AVERAGE	DAMP	AVERAGE	DAMP
VACUUM	IN/WATER	0.0	0.0	0.0	0.1	0.0	0.0

DANE COUNTY TRUAX LANDFILL  
GAS PROBE DATA  
AUGUST 2000

PARAMETER	UNITS	GP-16	GP-17	GP-17	GP-18	GP-18	GP-19E NORTH
		25-AUG-2000 000825-X15	11-AUG-2000 000811-X16	25-AUG-2000 000825-X16	11-AUG-2000 000811-X17	25-AUG-2000 000825-X17	11-AUG-2000 000811-X19
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	14.7	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	16.9	20.2	8.5	15.7	14.8	16.3
TEMPERATURE, AIR	DEG F	75	65	75	65	75	65
PRESSURE, BAROMETRIC	MM HG	763.27	767.08	763.27	767.08	763.27	767.08
BAROMETRIC PRESSURE TREND		-1		-1		-1	
GROUND CONDITIONS		AVERAGE	DAMP	AVERAGE	DAMP	AVERAGE	DAMP
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0

DANE COUNTY TRUAX LANDFILL

GAS PROBE DATA

JULY 2000

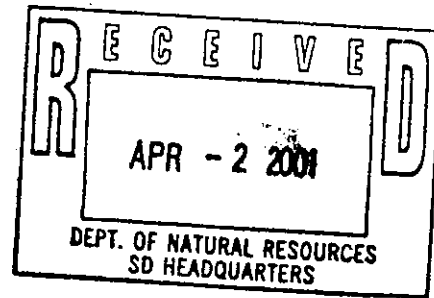
PARAMETER	UNITS	GP-13	GP-13	GP-14	GP-14	GP-15	GP-15
		03-JUL-2000	28-JUL-2000	03-JUL-2000	28-JUL-2000	03-JUL-2000	28-JUL-2000
		000703-X12	000728-X12	000703-X13	000728-X13	000703-X14	000728-X14
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	16.0	17.2	17.3	17.0	19.5	20.1
TEMPERATURE, AIR	DEG F	65	70	65	70	65	70
PRESSURE, BAROMETRIC	MM HG	762.25	759.97	762.25	759.97	762.25	759.97
BAROMETRIC PRESSURE TREND							
GROUND CONDITIONS		WET	MOIST	WET	MOIST	WET	MOIST
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0



March 29, 2001

Ms. Barb Derflinger, P.G.  
Hydrogeologist  
Wisconsin Department of Natural Resources  
101 South Webster Street SW/3  
Madison, WI 53707

Subject: Environmental Monitoring  
Fourth Quarter 2000 Results  
Closed Dane County Truax Landfill



Dear Ms. Derflinger:

Enclosed is a summary of the laboratory results for the fourth quarter groundwater sampling event for 2000, and the gas probe and extraction monitoring results for the fourth quarter (measurements recorded biweekly in September, October, November, and December 2000). In addition, gas extraction monitoring results for August 2000 are included because they were inadvertently left out of the third quarter report. The groundwater sampling for the fourth quarter was conducted by RMT, Inc. (RMT), on December 18 through 19, 2000. A copy of this letter and a computer diskette containing the fourth quarter laboratory analytical results and the gas monitoring results have been submitted to the Environmental Monitoring Data Section of the Bureau of Waste Management at the Wisconsin Department of Natural Resources (WDNR) Central Office in Madison. Groundwater samples were collected and gas probes were sampled according to the environmental monitoring plan in the Conditional Plan Approval letter dated November 18, 1999.

Four of the wells in the monitoring well network could not be sampled. Monitoring wells MW-3A, MW-10, and MW-101 (water level only) could not be located because of the deep snow cover. Well OM-5, one of the Oscar Mayer production wells, could not be sampled because it was not operational at the time of the monitoring round. Oscar Mayer reported that it would not be in service for approximately 6 weeks.

Groundwater continues to flow to the northwest, and downward hydraulic gradients continue to be observed at wells nests MW-1/1A, MW-4/4A/4B, MW-5/5A/5B, and MW-13/13A (calculations are attached). Table 1 presents a summary of the water quality indicator parameters, and the metals that exceeded the current NR 140 Preventive Action Limits (PAL) and Enforcement Standards (ES). Summary tables for all the groundwater quality data are also attached. The indicator parameter results for samples collected and analyzed for the fourth quarter 2000 are generally similar to historical data for the site. The trends in the inorganic and metals data indicate that there may be some impacts on groundwater quality in downgradient monitoring wells (monitoring wells MW-3, MW-11, MW-12B, and MW-12C), but that there are other potential sources in the area also

Ms. Barb Derflinger, P.G.  
Wisconsin Department of Natural Resources  
March 29, 2001  
Page 2

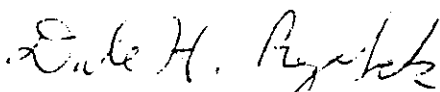
contributing to the impacts, since some impacts are in sidegradient monitoring wells from the landfill (such as monitoring wells TG-1, MW-1A, MW-4, MW-4A, MW-4B, MW-5, MW-5A, MW-5B).

In summary, water quality data collected by RMT during the fourth quarter of 2000 are interpreted to indicate that, although the landfill has had an impact on groundwater quality near the landfill, there are other sources in the vicinity which make it difficult to separate the impacts and pinpoint which impacts are attributed specifically to the landfill.

Please call us if you have any questions.

Sincerely,

RMT, Inc.



Dale H. Rezabek, P.G., C.P.G.  
Hydrogeologist



Curtis D. Madsen, P.E.  
Project Manager

Attachments: Table 1, Summary of NR 140 Exceedences - December 2000  
Summary of Vertical Hydraulic Gradient Calculations, 4<sup>th</sup> Quarter 2000  
Gas Monitoring Data (August, September, October, November, December 2000)  
Summary of December 2000 Groundwater Monitoring Well Data and 4<sup>th</sup> Quarter Gas  
Probe Monitoring Data

cc: Kathy Thompson - Environmental Monitoring Data Section, WDNR (letter w/ data diskette, data certification, and data tables)  
Mark Harder, WDNR - SCR (letter w/ data tables only)  
Mike Kirchner - DCRA (letter w/ data tables only)

## DANE COUNTY TRUAX LANDFILL

## GAS PROBE DATA

JULY 2000

PARAMETER	UNITS	GP-16	GP-16	GP-17	GP-17	GP-18	GP-18
		03-JUL-2000	28-JUL-2000	03-JUL-2000	28-JUL-2000	03-JUL-2000	28-JUL-2000
		000703-X15	000728-X15	000703-X16	000728-X16	000703-X17	000728-X17
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0-0.2	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	3.9-14.2	18.3	19.8	20.0	12.2	15.2
TEMPERATURE, AIR	DEG F	65	70	65	70	65	70
PRESSURE, BAROMETRIC	MM HG	762.25	759.97	762.25	759.97	762.25	759.97
BAROMETRIC PRESSURE TREND							
GROUND CONDITIONS		WET	MOIST	WET	MOIST	WET	MOIST
VACUUM	IN/WATER	0.0	0.0	0.1	0.0	0.0	0.0



TABLE 1

DANE COUNTY TRUAX LANDFILL  
 PARAMETERS THAT EXCEED CURRENT REGULATORY STANDARDS  
 DECEMBER 2000

BEGINNING SEARCH DATE: 01-DEC-2000  
 ENDING SEARCH DATE: 30-DEC-2000

CHEMICAL PARAMETER	UNITS	NR140 PAL	NR140 ES	SAMPLE IDENTIFIER	SAMPLE DATE	RESULT	DATA FLAGS	EXCEEDANCE	WITHIN DMZ?
ARSENIC, DISSOLVED	UG/L	5	50	MW-001A	19-DEC-2000	5.2	Q	PAL	
				MW-003	18-DEC-2000	7.5	Q	PAL	
				MW-004A	19-DEC-2000	38		PAL	
				MW-004B	19-DEC-2000	7.5	Q	PAL	
				MW-005A	19-DEC-2000	37		PAL	
				MW-011	18-DEC-2000	13		PAL	Y
				MW-012B	19-DEC-2000	7.1	Q	PAL	Y
				TG-01	18-DEC-2000	5.5	Q	PAL	
CADMIUM, DISSOLVED	UG/L	.5	5	MW-001A	19-DEC-2000	0.52	Q	PAL	
CHLORIDE	MG/L	125	250	MW-004	19-DEC-2000	360		ES	
				MW-004B	19-DEC-2000	320		ES	
				MW-005B	19-DEC-2000	210		PAL	
				MW-011	18-DEC-2000	1100		PAL	Y
				MW-012B	19-DEC-2000	130		PAL	Y
IRON, DISSOLVED	UG/L	150	300	MW-004A	19-DEC-2000	480		ES	
				MW-004B	19-DEC-2000	1400		ES	
				MW-005A	19-DEC-2000	340		ES	
				MW-005B	19-DEC-2000	2900		ES	
				TG-01	18-DEC-2000	2100		ES	
MANGANESE, DISSOLVED	UG/L	25	50	MW-001A	19-DEC-2000	290		ES	
				MW-004B	19-DEC-2000	320		ES	
				MW-005	19-DEC-2000	970		ES	
				MW-005B	19-DEC-2000	100		ES	
				MW-011	18-DEC-2000	320		PAL	Y
				MW-012B	19-DEC-2000	95		PAL	Y
TG-01	18-DEC-2000	470		ES					

TABLE 1

DANE COUNTY TRUAX LANDFILL

PARAMETERS THAT EXCEED CURRENT REGULATORY STANDARDS

DECEMBER 2000

BEGINNING SEARCH DATE: 01-DEC-2000

ENDING SEARCH DATE: 30-DEC-2000

CHEMICAL PARAMETER	UNITS	NR140 PAL	NR140 ES	SAMPLE IDENTIFIER	SAMPLE DATE	RESULT	DATA FLAGS	EXCEEDANCE	WITHIN DMZ?
NITROGEN, NITRATE + NITRITE	MG/L	2	10	MW-003	18-DEC-2000	16		ES	
				MW-004	19-DEC-2000	6.2		PAL	
				MW-005	19-DEC-2000	96		ES	
				MW-012B	19-DEC-2000	6.4		PAL	Y
				MW-012C	19-DEC-2000	2.1		PAL	Y
				MW-014	18-DEC-2000	2.1		PAL	

**SUMMARY OF VERTICAL HYDRAULIC GRADIENT CALCULATIONS  
4TH QUARTER 2000 ENVIRONMENTAL MONITORING REPORT  
DANE COUNTY TRUAX LANDFILL  
MADISON, WISCONSIN**

**Gradients within the lower sand zones and sandstone.  
Water levels measured on December 18, 2000**

Well	Well Type	Groundwater Elevation (h) (ft-MSL)	Reference Point (L) (ft-MSL)	Delta h (ft)	Delta L (ft)	Vertical Gradient (i) (ft/ft)
MW-1 MW-1A	water table piezometer	845.42 834.62	845.42 659.00	10.80	186.42	0.06
MW-4 MW-4A	water table piezometer	844.79 844.55	844.79 669.30	0.24	175.49	0.001
MW-4 MW-4B	water table piezometer	844.79 809.48	844.79 584.50	35.31	260.29	0.14
MW-5 MW-5A	water table piezometer	845.65 845.18	845.65 682.55	0.47	163.10	0.003
MW-5 MW-5B	water table piezometer	845.65 802.77	845.65 449.30	42.88	396.35	0.11
MW-13 MW-13A	water table piezometer	837.76 837.56	837.76 746.96	0.20	90.80	0.002

**Notes:**

Vertical Gradient (i) = Delta h / Delta L; Positive values indicate downward groundwater flow.  
Reference Point (L) for head measurements (h) is the water table for water table wells and the midpoint of the screened interval for piezometers including the sand filter pack.

Delta h = the distance between head measurements

Delta L = the distance between reference points

Prepared by: DHR 3/28/01  
Checked by: COB 3/29/01

DANE COUNTY TRUAX LANDFILL  
 MONITORING WELL DATA  
 DECEMBER 2000

PARAMETER	UNITS	MW-005	MW-005A	MW-005B	MW-006	MW-009	MW-011
		19-DEC-2000 904735-007	19-DEC-2000 904735-008	19-DEC-2000 904735-009	18-DEC-2000 904735-X01	18-DEC-2000 904735-X02	18-DEC-2000 904735-010
COLOR, FIELD		CLEAR	CLEAR	CLEAR			CLEAR
CONDUCTANCE, SPECIFIC	UMHOS/CM	1293	420	1488			4990
DEPTH TO WATER	FEET	10.66	10.35	52.90	8.20	50.01	33.79
ODOR, FIELD		NONE	NONE	NONE			NONE
PH, FIELD	SU	6.56	7.30	6.86			7.02
TEMPERATURE	DEG C	7.9	8.3	7.9			9.6
TURBIDITY, FIELD		NONE	NONE	NONE			NONE
WATER ELEVATION	FEET	845.65	845.18	802.77	845.40	838.83	
ALKALINITY AS CaCO3	MG/L	200	200	410			1100
CHLORIDE	MG/L	12	8.7	210			1100
COD	MG/L	48	14	17			46
HARDNESS AS CaCO3	MG/L	600	150	550			1500
NITROGEN, NITRATE + NITRITE	MG/L	96	< 0.015	0.029	Q		0.67
NITROGEN, TOTAL KJELDAHL	MG/L						0.97
PHOSPHORUS, SOLUBLE	MG/L						0.21
SOLIDS, TOTAL DISSOLVED	MG/L	870	250	800			2800
SULFATE	MG/L	83	8.1	52			87
ARSENIC, DISSOLVED	UG/L	< 3.7	37	4.2	Q		13
BARIUM, DISSOLVED	UG/L	67	33	94			270
CADMIUM, DISSOLVED	UG/L	< 0.36	< 0.36	< 0.36			< 0.36
IRON, DISSOLVED	UG/L	< 39	340	2900			< 39
LEAD, DISSOLVED	UG/L	< 2.2	< 2.2	< 2.2			< 2.2
MANGANESE, DISSOLVED	UG/L	970	22	100			320

DANE COUNTY TRUAX LANDFILL  
 MONITORING WELL DATA  
 DECEMBER 2000

PARAMETER	UNITS	TG-02	TG-03
		18-DEC-2000	18-DEC-2000
		904735-015	904735-X05
COLOR, FIELD		TAN	
CONDUCTANCE, SPECIFIC	UMHOS/CM	783	
DEPTH TO WATER	FEET	15.87	22.40
ODOR, FIELD		NONE	
PH, FIELD	SU	7.11	
TEMPERATURE	DEG C	7.8	
TURBIDITY, FIELD		VERY	
WATER ELEVATION	FEET	845.22	847.59
ALKALINITY AS CaCO3	MG/L	440	
CHLORIDE	MG/L	5.3	
COD	MG/L	< 2.6	
HARDNESS AS CaCO3	MG/L	450	
NITROGEN, NITRATE + NITRITE	MG/L	1.2	
NITROGEN, TOTAL KJELDAHL	MG/L		
PHOSPHORUS, SOLUBLE	MG/L		
SOLIDS, TOTAL DISSOLVED	MG/L	490	
SULFATE	MG/L	38	
ARSENIC, DISSOLVED	UG/L	< 3.7	
BARIUM, DISSOLVED	UG/L	88	
CADMIUM, DISSOLVED	UG/L	< 0.36	
IRON, DISSOLVED	UG/L	< 39	
LEAD, DISSOLVED	UG/L	< 2.2	
MANGANESE, DISSOLVED	UG/L	1.3	

DANE COUNTY TRUAX LANDFILL  
 LANDFILL GAS  
 AUGUST 2000

PARAMETER	UNITS	GP-12	GP-13	GP-13	GP-14	GP-14	GP-15
		25-AUG-2000	11-AUG-2000	25-AUG-2000	11-AUG-2000	25-AUG-2000	11-AUG-2000
		000825-X11	000811-X12	000825-X12	000811-X13	000825-X13	000811-X14
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	15.5	17.7	17.4	16.9	16.8	20.0
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	75	65	75	65	75	65
PRESSURE, BAROMETRIC	MM HG	763.27	767.08	763.27	767.08	763.27	767.08
BAROMETRIC PRESSURE TREND		-1		-1		-1	
GROUND CONDITIONS		AVERAGE	DAMP	AVERAGE	DAMP	AVERAGE	DAMP
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.1

DANE COUNTY TRUAX LANDFILL  
 LANDFILL GAS  
 AUGUST 2000

PARAMETER	UNITS	GP-15	GP-16	GP-16	GP-17	GP-17	GP-18
		25-AUG-2000 000825-X14	11-AUG-2000 000811-X15	25-AUG-2000 000825-X15	11-AUG-2000 000811-X16	25-AUG-2000 000825-X16	11-AUG-2000 000811-X17
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	14.7	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	20.2	19.5	16.9	20.2	8.5	15.7
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	75	65	75	65	75	65
PRESSURE, BAROMETRIC	MM HG	763.27	767.08	763.27	767.08	763.27	767.08
BAROMETRIC PRESSURE TREND		-1		-1		-1	
GROUND CONDITIONS		AVERAGE	DAMP	AVERAGE	DAMP	AVERAGE	DAMP
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0

DANE COUNTY TRUAX LANDFILL  
 LANDFILL GAS  
 NOVEMBER 2000

PARAMETER	UNITS	GP-07	GP-10	GP-11	GP-12	GP-13	GP-16
		20-NOV-2000 001120-X05	20-NOV-2000 001120-X06	20-NOV-2000 001120-X07	20-NOV-2000 001120-X08	20-NOV-2000 001120-X09	20-NOV-2000 001120-X10
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	15.7	19.6	18.8	16.5	19.1	19.7
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	25	25	25	25	25	25
GROUND CONDITIONS		PRT SNOW	PRT SNOW	PRT SNOW	PRT SNOW	PRT SNOW	PRT SNOW
VACUUM	IN/WATER	0.00	0.00	0.00	0.01	0.00	0.00



DANE COUNTY TRUAX LANDFILL  
 LANDFILL GAS  
 NOVEMBER 2000

PARAMETER	UNITS	GP-17	GP-19E NORTH	GP-19E SOUTH	GP-20 EAST	GP-20 WEST	GP-21 EAST
		20-NOV-2000 001120-X11	20-NOV-2000 001120-X12	20-NOV-2000 001120-X13	20-NOV-2000 001120-X14	20-NOV-2000 001120-X15	20-NOV-2000 001120-X16
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	19.8	19.9	17.9	20.0	20.0	20.0
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	25	25	25	25	25	25
GROUND CONDITIONS		PRT SNOW	PRT SNOW	PRT SNOW	PRT SNOW	PRT SNOW	PRT SNOW
VACUUM	IN/WATER	0.00	0.00	0.00	0.00	0.00	0.00

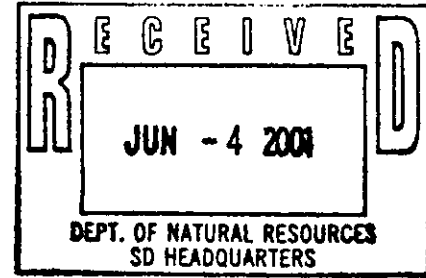


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Madison, WI  
Telephone: 608-831-4444  
Fax: 608-831-3334

June 1, 2001

Mr. Mark Harder, P.E.  
South Central Region Office  
Wisconsin Department of Natural Resources  
3911 Fish Hatchery Road  
Fitchburg, WI 53711



Ms. Barb Derflinger, P.G.  
Hydrogeologist  
Wisconsin Department of Natural Resources  
101 South Webster Street SW/3  
Madison, WI 53707

**Subject: First Quarter 2001 Environmental Monitoring Results and Maintenance Log for  
Blower/Flare System  
Closed Dane County Truax Landfill; License # 03306**

Dear Mr. Harder and Ms. Derflinger:

On behalf of Dane County Regional Airport (DCRA), RMT is submitting a summary of the groundwater and gas monitoring results at the Truax Landfill for the first quarter 2001, in accordance with the Department's November 18, 1999, Conditional Plan Approval letter. We are also submitting the first quarter 2001 maintenance logs for the blower/flare system in accordance with Conditions 1 and 2 of the Department's April 29, 1999, Final Cover and Landfill Gas Extraction System Construction Approval letter. Groundwater sampling is now being conducted on a semiannual basis, gas well monitoring is being conducted on a monthly basis, and gas probe monitoring is being conducted on a semimonthly basis (2 times per month). A copy of this letter and a computer diskette containing the groundwater laboratory analytical results and the gas monitoring results have been submitted to the Environmental Monitoring Data Section of the Bureau of Waste Management at the Wisconsin Department of Natural Resources (WDNR) Central Office in Madison.

#### Maintenance Log for Blower/Flare System

Attachment 1 to this letter contains Table 1, entitled "Truax Landfill Gas Extraction System Blower/Flare Operation and Run Time Log." This table indicates the date and time of restart or maintenance, the blower that was operating, the blower run time (hours), any maintenance completed, the flow rate, the tank levels for nitrogen and propane, and any pertinent comments.

Attachment 2 contains copies of the Truax Landfill Gas Extraction System Blower/Flare Maintenance Records (maintenance records). A maintenance record was compiled for each occurrence when the blower/flare was not operational for over 2 hours in any day in accordance with Condition 1 of the Department's April 29, 1999, approval letter. During the fourth quarter (October 1 to December 31) of

Ms. Barb Derflinger and Mr. Mark Harder  
Wisconsin Department of Natural Resources  
June 1, 2001  
Page 2

2000, seven such occurrences were identified. A maintenance record documenting each occurrence is provided in Attachment 2.

The nonoperational status of the blower/flare system can be attributed to a variety of causes. One typical cause is the depletion of the propane tank, which fuels the flare system's pilot flame, or of the nitrogen tank, which controls both the vertical and the horizontal extraction system's actuator valves. Additionally, nonoperation can be a result of the UV sensor no longer being able to detect a flame emanating from the flare. Detection problems can occur when debris falls onto the sensor or when strong winds blow the flame out of the sensor's range. Temporary loss of electrical power to the main control panel can also trip circuit breakers. In the first quarter of 2001 (January 1 to March 31), the cold weather could have affected the mechanical components of the blower system. Valves, piping connects, gaskets, and hoses tend to require higher maintenance when exposed to cold and freezing conditions.

#### Gas Monitoring

Attachment 3 contains copies of the semimonthly gas monitoring results of the gas probes for the first quarter of 2001 (January, February, and March 2001). The gas monitoring consists of percent methane, oxygen, and carbon dioxide. Atmospheric data and pressure in inches of water in the probe are also recorded. On April 4, 2001, the gas monitoring equipment appeared to be overly sensitive to methane readings. The equipment indicated methane readings in all gas probes. Methane readings on April 4, 2001, in gas probes that have not historically indicated the presence of methane ranged from 0.1% to 0.2%. Provided that these readings are qualified due to equipment sensitivity, methane was detected one or more times at six gas probe locations: GP-10 (twice); GP-35 (four times); GP-12 (twice); GP-13 (twice); GP-20E (once); and GP-30 (once). Methane detections in these gas probes during the first quarter were attributed to the frequency of system nonoperational status, frozen cover conditions, and/or the availability of sufficient vacuum at the extraction point(s) near the respective gas probe. Vacuum head available within the system was sequentially increased during the first quarter and resulted in decreased or lack of methane detections at the five gas probes in question. Continued increases in vacuum head availability within the gas extraction system will continue to be made during the second quarter, with results being presented in the "Second Quarter Environmental Monitoring Results Report."

#### Groundwater Monitoring

Table 1 in Attachment 4 presents a summary of the water quality indicator parameters, and the metals that exceeded the current NR 40 Preventive Action Limits (PALs) and Enforcement Standards (ESs). Summary tables for all the groundwater quality data are also included in Attachment 5. The indicator parameter results for samples collected and analyzed for the first quarter 2001 are generally similar to historical data for the site. The trends in the inorganic and metals data indicate that there may be some impacts on groundwater quality in downgradient monitoring wells (monitoring wells MW-3,

Ms. Barb Derflinger and Mr. Mark Harder  
Wisconsin Department of Natural Resources  
June 1, 2001  
Page 3

MW-3A, MW-11, MW-12B, MW-12C, and MW-15), but other sources in the area are also potentially contributing to the impacts, since some impacts are in sidegradient monitoring wells from the landfill (such as monitoring wells such as TG-1, MW-1, MW-1A, MW-4, MW-4A, MW-4B, MW-5, MW-5A, MW-5B, and MW-14).

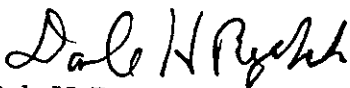
Two of the wells in the monitoring well network could not be sampled. Monitoring well MW-10 had a blockage, possibly an animal that froze to death inside the well at a depth of about 9 feet below the top of the casing. Attempts to clear the well were unsuccessful, so the well will be repaired prior to the next sampling round in September 2001. Well OM-5, one of the Oscar Mayer production wells, could not be sampled because it was not operational at the time of the monitoring round. RMT will contact Oscar Mayer about the operational status of well OM-5 prior to the next sampling round in September 2001. The direction of groundwater flow at the site is to the northwest, and downward hydraulic gradients were observed at well nests MW-1/1A, MW-5/5A/5B, and MW-13/13A; slightly upward gradients were observed at well nests MW-3/3A and MW-4/4A/4B.

In summary, water quality data collected by RMT during the first semiannual round of 2001 are interpreted to indicate that, although the landfill has had an impact on groundwater quality near the landfill, other possible sources in the vicinity make it difficult to separate the impacts and pinpoint which impacts are attributed specifically to the landfill.

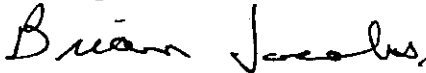
Please call us if you have any questions.

Sincerely,

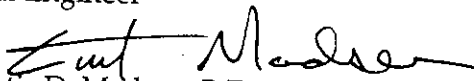
RMT, Inc.



Dale H. Rezabek, P.G., C.P.G.  
Hydrogeologist



Brian S. Jacobs  
Staff Engineer



Curtis D. Madsen, P.E.  
Project Manager

Attachments

cc: Kathy Thompson - Environmental Monitoring Data Section, WDNR (letter w/ data tables, data diskette, and data certification)  
Mike Kirchner - DCRA (letter w/ data tables only)

DANE COUNTY TRUAX LANDFILL  
 LANDFILL GAS MONITORING  
 JANUARY 2001

PARAMETER	UNITS	GP-10	GP-11	GP-12	GP-13	GP-15	GP-16
		18-JAN-2001	18-JAN-2001	18-JAN-2001	18-JAN-2001	18-JAN-2001	26-JAN-2001
		010118-X07	010118-X08	010118-X09	010118-X10	010118-X11	010126-X04
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.1	0.2	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	15.8	18.3	17.5	18.9	3.6	20.2
CARBON DIOXIDE, PERCENT BY VOL	%						
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	28	28	28	28	28	27
PRESSURE, BAROMETRIC	MM HG	29.89	29.89	29.89	29.89	29.89	29.65
BAROMETRIC PRESSURE TREND		0	0	0	0	0	0
GROUND CONDITIONS		SNOWY	SNOWY	SNOWY	SNOWY	SNOWY	SNOWY
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0

DANE COUNTY TRUAX LANDFILL  
 LANDFILL GAS MONITORING  
 FEBRUARY 2001

PARAMETER	UNITS	GP-13	GP-13	GP-15	GP-15	GP-16	GP-16
		20-FEB-2001 010220-X11	28-FEB-2001 010228-X11	20-FEB-2001 010220-X12	28-FEB-2001 010228-X12	20-FEB-2001 010220-X13	28-FEB-2001 010228-X13
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	19.4	19.4	11.0	3.4	20.2	19.9
CARBON DIOXIDE, PERCENT BY VOL	%	1.4	1.2	7.1	13.5	0.1	0.1
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	23	10	23	10	23	10
PRESSURE, BAROMETRIC	MM HG	30.04	30.36	30.04	30.36	30.04	30.36
BAROMETRIC PRESSURE TREND		+1	-1	+1	-1	+1	-1
GROUND CONDITIONS		SNOWY	SNOWY	SNOWY	SNOWY	SNOWY	SNOWY
VACUUM	IN/WATER	0.0	0.0	0.0	0.65	0.0	0.0

DANE COUNTY TRUAX LANDFILL  
 LANDFILL GAS MONITORING  
 FEBRUARY 2001

PARAMETER	UNITS	GP-17	GP-17	GP-21 EAST	GP-21 WEST	HES INLET	HES INLET
		20-FEB-2001 010220-X14	28-FEB-2001 010228-X14	20-FEB-2001 010220-X15	20-FEB-2001 010220-X16	20-FEB-2001 010220-X03	21-FEB-2001 010221-X03
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER					0.12	14.5
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.0	41.2	38.4
OXYGEN, PERCENT BY VOLUME	%	9.4	5.8	20.9	20.7	0.4	2.4
CARBON DIOXIDE, PERCENT BY VOL	%	9.5	10.5	0.1	0.2	34.6	31.9
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	23	10	23	23	23	18
PRESSURE, BAROMETRIC	MM HG	30.04	30.36	30.04	30.04	30.04	30.48
BAROMETRIC PRESSURE TREND		+1	-1	+1	+1	+1	0
GROUND CONDITIONS		SNOWY	SNOWY	SNOWY	SNOWY	SNOWY	FROZEN
VACUUM	IN/WATER	0.0	0.0	0.0	0.0		

DANE COUNTY TRUAX LANDFILL  
 LANDFILL GAS MONITORING  
 MARCH 2001

PARAMETER	UNITS	GP-14	GP-16	GP-16	GP-17	GP-17	GP-18
		04-APR-2001	16-MAR-2001	04-APR-2001	16-MAR-2001	04-APR-2001	16-MAR-2001
		010404-X18	010316-X20	010404-X20	010316-X21	010404-X21	010316-X22
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.2	0.0	0.2	0.0	0.2	0.0
OXYGEN, PERCENT BY VOLUME	%	19.1	20.5	20.9	20.5	20.2	10.4
CARBON DIOXIDE, PERCENT BY VOL	%	1.8	0.0	0.0	0.0	0.0	3.4
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	45	28	45	28	45	28
PRESSURE, BAROMETRIC	MM HG	30.33	29.95	30.33	29.95	30.33	29.95
BAROMETRIC PRESSURE TREND		0	+1	0	+1	0	+1
GROUND CONDITIONS		MOIST	SNOWY	MOIST	SNOWY	MOIST	SNOWY
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0



TABLE 1

DANE COUNTY TRUAX LANDFILL

PARAMETERS THAT EXCEED CURRENT REGULATORY STANDARDS

Q1 2001

BEGINNING SEARCH DATE: 01-JAN-2001

ENDING SEARCH DATE: 31-MAR-2001

CHEMICAL PARAMETER	UNITS	NR140 PAL	NR140 ES	SAMPLE IDENTIFIER	SAMPLE DATE	RESULT	DATA FLAGS	EXCEEDANCE	WITHIN DM2?
ARSENIC, DISSOLVED	UG/L	5	50	MW-004A	12-MAR-2001	36		PAL	
				MW-005A	13-MAR-2001	37		PAL	
CHLORIDE	MG/L	125	250	MW-003	12-MAR-2001	350		ES	
				MW-004	12-MAR-2001	340		ES	
				MW-004B	12-MAR-2001	310		ES	
				MW-005B	13-MAR-2001	170		PAL	
				MW-005B DUP	13-MAR-2001	170		PAL	
				MW-011	13-MAR-2001	1000		PAL	Y
				MW-012B	13-MAR-2001	130		PAL	Y
				MW-012C	13-MAR-2001	140		PAL	Y
				MW-012C DUP	13-MAR-2001	140		PAL	Y
				MW-015	12-MAR-2001	210		PAL	
IRON, DISSOLVED	UG/L	150	300	MW-004A	12-MAR-2001	490		ES	
				MW-004B	12-MAR-2001	1700		ES	
				MW-005A	13-MAR-2001	300		ES	
				MW-005B	13-MAR-2001	2800		ES	
				MW-005B DUP	13-MAR-2001	2700		ES	
				TG-01	13-MAR-2001	900		ES	
LEAD, DISSOLVED	UG/L	1.5	15	MW-001	12-MAR-2001	2.9	Q	PAL	
				MW-003	12-MAR-2001	5.2	Q	PAL	
				MW-011	13-MAR-2001	7.3		PAL	Y
				MW-015	12-MAR-2001	6.0	Q	PAL	
MANGANESE, DISSOLVED	UG/L	25	50	MW-001A	12-MAR-2001	280		ES	
				MW-004B	12-MAR-2001	280		ES	
				MW-005	13-MAR-2001	500		ES	
				MW-005B	13-MAR-2001	95		ES	

TABLE 1

DANE COUNTY TRUAX LANDFILL

PARAMETERS THAT EXCEED CURRENT REGULATORY STANDARDS  
Q1 2001

BEGINNING SEARCH DATE: 01-JAN-2001  
ENDING SEARCH DATE: 31-MAR-2001

CHEMICAL PARAMETER	UNITS	NR140 PAL	NR140 ES	SAMPLE IDENTIFIER	SAMPLE DATE	RESULT	DATA FLAGS	EXCEEDANCE	WITHIN DMZ?
MANGANESE, DISSOLVED	UG/L	25	50	MW-005B DUP	13-MAR-2001	94		ES	
				MW-011	13-MAR-2001	180		PAL	Y
				MW-012B	13-MAR-2001	130		PAL	Y
				TG-01	13-MAR-2001	430		ES	
NITROGEN, NITRATE + NITRITE	MG/L	2	10	MW-003	12-MAR-2001	8.5		PAL	
				MW-003A	12-MAR-2001	2.1		PAL	
				MW-004	12-MAR-2001	6.4		PAL	
				MW-005	13-MAR-2001	59		ES	
				MW-012B	13-MAR-2001	6.3		PAL	Y
				MW-012C DUP	13-MAR-2001	2.0		PAL	Y
				MW-014	12-MAR-2001	2.5		PAL	

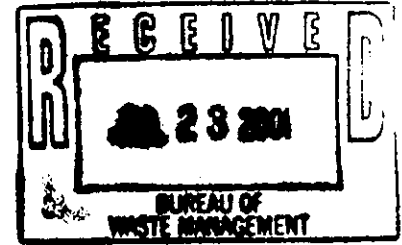


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July 19, 2001

Mr. Mark Harder, P.E.  
South Central Region Office  
Wisconsin Department of Natural Resources  
3911 Fish Hatchery Road  
Fitchburg, WI 53711



Office copy

Ms. Barb Derflinger, P.G.  
Wisconsin Department of Natural Resources  
101 South Webster Street SW/3  
Madison, WI 53707

**Subject: Second Quarter 2001 Environmental Monitoring Results and Maintenance Log for  
Blower/Flare System  
Closed Dane County Truax Landfill; License # 03306**

Dear Mr. Harder and Ms. Derflinger:

On behalf of Dane County Regional Airport (DCRA), RMT is submitting a summary of the gas monitoring results at the Truax Landfill for the second quarter 2001, in accordance with the Department's November 18, 1999, Conditional Plan Approval letter. We are also submitting the second quarter 2001 maintenance logs for the blower/flare system in accordance with Conditions 1 and 2 of the Department's April 29, 1999, Final Cover and Landfill Gas Extraction System Construction Approval letter. Gas well monitoring is being conducted on a monthly basis, and gas probe monitoring is being conducted on a semimonthly basis (2 times per month). A copy of this letter and a computer diskette containing the gas monitoring results have been submitted to the Environmental Monitoring Data Section of the Bureau of Waste Management at the Wisconsin Department of Natural Resources (WDNR) Central Office in Madison. Groundwater sampling is now being conducted on a semiannual basis (quarters 1 and 3), and as a result, was not conducted for the second quarter.

#### **Maintenance Log for Blower/Flare System**

Attachment 1 to this letter contains Table 1, entitled "Truax Landfill Gas Extraction System Blower/Flare Operation and Run Time Log." This table indicates the date and time of restart or maintenance, the blower that was operating, the blower run time (hours), any maintenance completed, the flow rate, the tank levels for nitrogen and propane, and any pertinent comments.

Attachment 2 contains copies of the Truax Landfill Gas Extraction System Blower/Flare Maintenance Records (maintenance records). A maintenance record was compiled for each occurrence when the blower/flare was not operational for over 2 hours in any day in accordance with Condition 1 of the Department's April 29, 1999, approval letter. During the second quarter (April 1 to June 30) of 2001,

Ms. Barb Derflinger and Mr. Mark Harder  
Wisconsin Department of Natural Resources  
July 19, 2001  
Page 2

20 such occurrences were identified. A maintenance record documenting each occurrence is provided in Attachment 2.

The nonoperational status of the blower/flare system can be attributed to a variety of causes. One typical cause is the depletion of the nitrogen in the tank, which controls both the vertical and the horizontal extraction system's actuator valves. Additionally, nonoperation can be a result of the UV sensor no longer being able to detect a flame emanating from the flare. Detection problems can occur when debris falls onto the sensor or when strong winds blow the flame out of the sensor's range. Temporary loss of electrical power to the main control panel can also trip circuit breakers. During the automatic restart sequence, certain circumstances trigger fault conditions in the system's control unit. These circumstances are most likely associated with pilot gas ignition failure. This fault condition can be and has been, addressed when restarting the blower/flare system manually; however, on occasion, the issue persists during automatic restart conditions. An evaluation is being conducted to assess the best remedy for this condition.

#### Gas Monitoring

Attachment 3 contains copies of the semimonthly and monthly gas monitoring results of the gas probes and wells, respectively, for the second quarter of 2001. The gas monitoring consists of percent methane, oxygen, and carbon dioxide. Atmospheric data and pressure in inches of water in the probe are also recorded. Methane was detected one or more times at six gas probe locations: GP-1D (five times); GP-5 (once); GP-15 (once); GP-16R (once); GP-18 (once); and GP-30 (four times). Methane detections in these gas probes during the first quarter were attributed to the frequency of system nonoperational status and/or the availability of sufficient vacuum at the extraction point(s) near the respective gas probe. Vacuum head available within the system was adjusted during the second quarter to minimize methane detections at the six gas probes in question. Continued adjustments in vacuum head availability within the gas extraction system will continue to be made during the third quarter, with results being presented in the "Third Quarter Environmental Monitoring Results Report." Gas probe GP-15 was not monitored in the month of April due to our understanding that GP-30 had replaced it. After clarification from the WDNR, GP-15 monitoring began in May of 2001. Gas well monitoring results were used to adjust the wellfield to enhance gas recovery. Gas well TR-4 was not monitored in the month of April due to not being able to locate the well.

Ms. Barb Derflinger and Mr. Mark Harder  
Wisconsin Department of Natural Resources  
July 19, 2001  
Page 3

If you have any questions or comments after you review the information provided, please call me, at  
(608) 831-4444.

Sincerely,

RMT, Inc.



Brian S. Jacobs  
Staff Engineer



Curtis D. Madsen, P.E.  
Project Manager

Attachments

cc: Kathy Thompson - Environmental Monitoring Data Section, WDNR (letter w/ data tables,  
data diskette, and data certification)  
Mike Kirchner - DCRA (letter w/ data tables only)  
Dale Rezabek - RMT, Inc.

DANE COUNTY TRUAX LANDFILL  
 MONTHLY GAS MONITORING  
 APRIL 2001

PARAMETER	UNITS	GP-14	GP-14	GP-16	GP-16	GP-17	GP-17
		20-APR-2001 010420-X18	25-APR-2001 010425-X15	20-APR-2001 010420-X19	25-APR-2001 010425-X16	20-APR-2001 010420-X20	25-APR-2001 010425-X17
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	19.5	19.3	20.9	21.2	15.0	15.6
CARBON DIOXIDE, PERCENT BY VOL	%	2.1	2.1	0.2	0.2	4.0	2.8
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	55	45	55	45	55	45
PRESSURE, BAROMETRIC	MM HG	29.73	30.19	29.73	30.19	29.73	30.19
BAROMETRIC PRESSURE TREND		-1	+1	-1	+1	-1	+1
GROUND CONDITIONS		MOIST	MOIST	MOIST	MOIST	MOIST	MOIST
WELL OTHER							
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0

DANE COUNTY TRUAX LANDFILL  
 MONTHLY GAS MONITORING  
 APRIL 2001

PARAMETER	UNITS	GP-18	GP-18	GP-19E NORTH	GP-19E NORTH	GP-19E SOUTH	GP-19E SOUTH
		20-APR-2001 010420-X21	25-APR-2001 010425-X18	20-APR-2001 010420-X23	25-APR-2001 010425-X20	20-APR-2001 010420-X24	25-APR-2001 010425-X21
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	13.2	16.0	21.6	21.5	21.5	19.3
CARBON DIOXIDE, PERCENT BY VOL	%	2.8	2.3	0.6	0.0	0.0	0.3
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	55	45	55	45	55	45
PRESSURE, BAROMETRIC	MM HG	29.73	30.19	29.73	30.19	29.73	30.19
BAROMETRIC PRESSURE TREND		-1	+1	-1	+1	-1	+1
GROUND CONDITIONS		MOIST	MOIST	MOIST	MOIST	MOIST	MOIST
WELL OTHER							
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0

DANE COUNTY TRUAX LANDFILL  
MONTHLY GAS MONITORING  
MAY 2001

PARAMETER	UNITS	GP-13	GP-14	GP-14	GP-15	GP-15	GP-16
		30-MAY-2001 010530-X17	18-MAY-2001 010518-X18	30-MAY-2001 010530-X18	18-MAY-2001 010518-X19	30-MAY-2001 010530-X19	18-MAY-2001 010518-X20
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.1	0.0	0.1
OXYGEN, PERCENT BY VOLUME	%	18.5	19.4	18.8	22.1	21.6	22.1
CARBON DIOXIDE, PERCENT BY VOL	%	1.6	2.4	2.6	0.1	0.1	0.1
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	64	70	64	70	64	70
PRESSURE, BAROMETRIC	MM HG	30.20	29.89	30.20	29.89	30.20	29.89
BAROMETRIC PRESSURE TREND		-1	+1	-1	+1	-1	+1
GROUND CONDITIONS		DRY	DRY	DRY	DRY	DRY	DRY
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0



DANE COUNTY TRUAX LANDFILL  
MONTHLY GAS MONITORING  
MAY 2001

PARAMETER	UNITS	GP-16	GP-17	GP-17	GP-18	GP-18	GP-19E NORTH
		30-MAY-2001 010530-X20	18-MAY-2001 010518-X21	30-MAY-2001 010530-X21	18-MAY-2001 010518-X22	30-MAY-2001 010530-X22	18-MAY-2001 010518-X24
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.1	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	20.7	22.2	21.7	15.6	16.2	21.3
CARBON DIOXIDE, PERCENT BY VOL	%	0.7	0.0	0.0	2.7	2.3	0.0
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	64	70	54	70	64	70
PRESSURE, BAROMETRIC	MM HG	30.20	29.89	30.20	29.89	30.20	29.89
BAROMETRIC PRESSURE TREND		-1	+1	-1	+1	-1	+1
GROUND CONDITIONS		DRY	DRY	DRY	DRY	DRY	DRY
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0

DANE COUNTY TRUAX LANDFILL  
 MONTHLY GAS MONITORING  
 JUNE 2001

PARAMETER	UNITS	GP-14	GP-14	GP-15	GP-15	GP-16	GP-16
		07-JUN-2001	22-JUN-2001	07-JUN-2001	22-JUN-2001	07-JUN-2001	22-JUN-2001
		010607-X18	010622-X18	010607-X19	010622-X19	010607-X20	010622-X20
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	18.9	17.6	21.4	21.1	18.2	20.3
CARBON DIOXIDE, PERCENT BY VOL	%	2.6	3.1	0.0	0.1	2.0	0.7
FLOW RATE, GAS	CFM						
TEMPERATURE, AIR	DEG F	65	70	65	70	65	70
PRESSURE, BAROMETRIC	MM HG	30.06	30.01	30.06	30.01	30.06	30.01
BAROMETRIC PRESSURE TREND		+1	-1	+1	-1	+1	-1
GROUND CONDITIONS		MOIST	DRY	MOIST	DRY	MOIST	DRY
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0

DANE COUNTY TRUAX LANDFILL  
MONTHLY GAS MONITORING  
JUNE 2001

PARAMETER	UNITS	GP-17	GP-17	GP-18	GP-18	GP-19E NORTH	GP-19E NORTH
		07-JUN-2001	22-JUN-2001	07-JUN-2001	22-JUN-2001	07-JUN-2001	22-JUN-2001
		010607-X21	010622-X21	010607-X22	010622-X22	010607-X24	010622-X24
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	21.7	21.2	15.0	14.3	21.3	20.9
CARBON DIOXIDE, PERCENT BY VOL	%	0.0	0.2	2.5	3.3	0.0	0.0
FLOW RATE, GAS	CFM						
TEMPERATURE, AIR	DEG F	65	70	65	70	65	70
PRESSURE, BAROMETRIC	MM HG	30.06	30.01	30.06	30.01	30.06	30.01
BAROMETRIC PRESSURE TREND		+1	-1	+1	-1	+1	-1
GROUND CONDITIONS		MOIST	DRY	MOIST	DRY	MOIST	DRY
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0

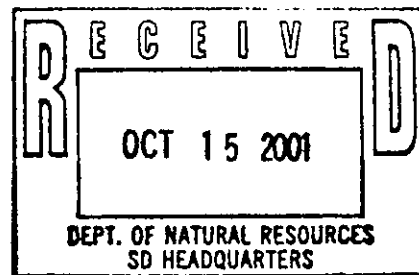


Integrated  
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October 12, 2001

Mr. Mark Harder, P.E.  
South Central Region Office  
Wisconsin Department of Natural Resources  
3911 Fish Hatchery Road  
Fitchburg, WI 53711



Ms. Barb Derflinger, P.G.  
Wisconsin Department of Natural Resources  
101 South Webster Street SW/3  
Madison, WI 53707

**Subject: Third Quarter 2001 Environmental Monitoring Results and Maintenance Log for  
Blower/Flare System  
Closed Dane County Truax Landfill; License # 03306**

Dear Mr. Harder and Ms. Derflinger:

On behalf of Dane County Regional Airport (DCRA), RMT is submitting a summary of the gas monitoring results at the Truax Landfill for the third quarter 2001, in accordance with the Department's November 18, 1999, Conditional Plan Approval letter. We are also submitting the third quarter 2001 maintenance logs for the blower/flare system in accordance with Conditions 1 and 2 of the Department's April 29, 1999, Final Cover and Landfill Gas Extraction System Construction Approval letter. Gas well monitoring is being conducted on a monthly basis, and gas probe monitoring is being conducted on a semimonthly basis (2 times per month). A copy of this letter and a computer diskette containing the gas monitoring results have been submitted to the Environmental Monitoring Data Section of the Bureau of Waste Management at the Wisconsin Department of Natural Resources (WDNR) Central Office in Madison. Groundwater sampling was conducted in the third quarter; however, the analytical results were not available at the time of this submission. These data will be submitted when they become available.

#### **Maintenance Log for Blower/Flare System**

Attachment 1 to this letter contains Table 1, entitled "Truax Landfill Gas Extraction System Blower/Flare Operation and Run Time Log." This table indicates the date and time of restart or maintenance, the blower that was operating, the blower run time (hours), any maintenance completed, the flow rate, the tank levels for nitrogen and propane, and any pertinent comments.

Attachment 2 contains copies of the Truax Landfill Gas Extraction System Blower/Flare Maintenance Records (maintenance records). A maintenance record was compiled for each occurrence when the blower/flare was not operational for over 2 hours in any day in accordance with Condition 1 of the Department's April 29, 1999, approval letter. During the third quarter (July 1 to September 30)

of 2001, six such occurrences were identified. A maintenance record documenting each occurrence is provided in Attachment 2.

The nonoperational status of the blower/flare system can be attributed to a variety of causes. One typical cause is the depletion of the nitrogen in the tank, which controls both the vertical and the horizontal extraction system's actuator valves. Additionally, nonoperation can be a result of the UV sensor no longer being able to detect a flame emanating from the flare. Detection problems can occur when debris falls onto the sensor or when strong winds blow the flame out of the sensor's range. Temporary loss of electrical power to the main control panel can also trip circuit breakers. During the automatic restart sequence, certain circumstances trigger fault conditions in the system's control unit. These circumstances are most likely associated with pilot gas ignition failure. During September, the igniter assembly components (which included the spark generator) were replaced in an attempt to improve the reliability of the pilot gas ignition system. The technical representative from the flare manufacturer indicated that the extensive "downtime" of the flare was primarily due to a weak spark being generated. The technical representative indicated that a spark generator failure in the industry is very rare, and that he had not seen a failure in over 15 years of flare service. Since completing these repairs, the system's control unit has not experienced a fault condition related to pilot gas ignition failure. Thus, we anticipate a high percentage of flare "run time" from this date forward.

### Gas Monitoring

Attachment 3 contains copies of the semimonthly and monthly gas monitoring results of the gas probes and wells, respectively, for the third quarter of 2001. The gas monitoring consists of percent methane, oxygen, and carbon dioxide. Atmospheric data, pressure in inches of water, and differential pressure in the probe and wells, are also recorded. On July 12, 2001, the portable gas monitoring device appeared to be overly sensitive to methane readings. The device indicated methane readings in 19 of the 27 gas probes. Methane readings on July 12, 2001, in gas probes that have not historically indicated the presence of methane, ranged from 0.1% to 0.2%. Provided that these readings are qualified due to the sensitivity of the monitoring device, methane was detected one or more times at four gas probe locations: GP-1D (four times), GP-1SR (five times), GP-17 (once), and GP-30 (five times). Methane detections in these gas probes during the third quarter were attributed to the frequency of the flare system's nonoperational status and/or the availability of sufficient vacuum at the extraction point(s) near the respective gas probe along the western side, as a result of the accumulation of increased liquids in the condensate well, due to a blown fuse in the pump control panel. Vacuum head available within the system was adjusted during the third quarter to minimize methane detections at the six gas probes in question. Continued adjustments in vacuum head availability within the gas extraction system will be made as necessary during the fourth quarter, with results being presented in the "Fourth Quarter Environmental Monitoring Results Report." Gas

Ms. Barb Derflinger and Mr. Mark Harder  
Wisconsin Department of Natural Resources  
October 12, 2001  
Page 3

probes GP-7, GP-8R, and GP-16R were monitored on September 28, 2001, due to equipment malfunction. Gas well monitoring results were used to adjust the wellfield to maximize gas recovery.

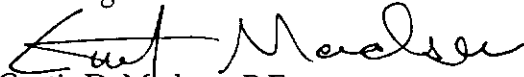
If you have any questions or comments after you review the information provided, please call me, at (608) 831-4444.

Sincerely,

RMT, Inc.



Brian S. Jacobs  
Staff Engineer



Curtis D. Madsen, P.E.  
Project Manager

Attachments

cc: Kathy Thompson - Environmental Monitoring Data Section, WDNR  
(letter w/ data tables, data diskette, and data certification)  
Mike Kirchner - DCRA (letter w/ data tables only)  
Dale Rezabek - RMT, Inc.

DANE COUNTY TRUAX LANDFILL  
MONTHLY GAS MONITORING  
JULY 2001

PARAMETER	UNITS	GP-13	GP-14	GP-14	GP-15	GP-15	GP-16
		25-JUL-2001	12-JUL-2001	25-JUL-2001	12-JUL-2001	25-JUL-2001	12-JUL-2001
		010725-X17	010712-X18	010725-X18	010712-X19	010725-X19	010712-X20
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.2	0.0	0.2	0.0	0.2
OXYGEN, PERCENT BY VOLUME	%	18.8	19.0	20.4	21.9	21.6	22.0
CARBON DIOXIDE, PERCENT BY VOL	%	2.6	3.0	1.9	0.2	0.1	0.2
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	68	80	68	80	68	80
PRESSURE, BAROMETRIC	MM HG	762.51	763.27	762.51	763.27	762.51	763.27
BAROMETRIC PRESSURE TREND		+1	+1	+1	+1	+1	+1
GROUND CONDITIONS		MOIST	DRY	MOIST	DRY	MOIST	DRY
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0

DANE COUNTY TRUAX LANDFILL  
 MONTHLY GAS MONITORING  
 JULY 2001

PARAMETER	UNITS	GP-16	GP-17	GP-17	GP-18	GP-18	GP-19E NORTH
		25-JUL-2001	12-JUL-2001	25-JUL-2001	12-JUL-2001	25-JUL 2001	12-JUL-2001
		010725-X20	010712-X21	010725-X21	010712-X22	010725-X22	010712-X24
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.1	0.0	0.2	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	21.6	19.8	21.7	15.9	14.4	21.5
CARBON DIOXIDE, PERCENT BY VOL	%	0.0	1.4	0.0	2.8	3.6	0.0
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	68	80	68	80	68	80
PRESSURE, BAROMETRIC	MM HG	762.51	763.27	762.51	763.27	762.51	763.27
BAROMETRIC PRESSURE TREND		+1	+1	+1	+1	+1	+1
GROUND CONDITIONS		MOIST	DRY	MOIST	DRY	MOIST	DRY
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0



DANE COUNTY TRUAX LANDFILL  
MONTHLY GAS MONITORING  
AUGUST 2001

PARAMETER	UNITS	GP-13	GP-14	GP-14	GP-15	GP-15	GP-16
		30-AUG-2001	22-AUG-2001	30-AUG-2001	22-AUG-2001	30-AUG-2001	22-AUG-2001
		010830-X17	010822-X18	010830-X18	010822-X19	010830-X19	010822-X20
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	20.3	18.1	17.5	20.6	21.3	20.8
CARBON DIOXIDE, PERCENT BY VOL	%	0.6	3.1	3.7	0.2	0.2	0.0
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	75	70	75	70	75	70
PRESSURE, BAROMETRIC	MM HG	757	759.46	757	759.46	757	759.46
BAROMETRIC PRESSURE TREND		-1	+1	-1	+1	-1	+1
GROUND CONDITIONS		AVERAGE	MOIST	AVERAGE	MOIST	AVERAGE	MOIST
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0

DANE COUNTY TRUAX LANDFILL  
 MONTHLY GAS MONITORING  
 AUGUST 2001

PARAMETER	UNITS	GP-16	GP-17	GP-17	GP-18	GP-18	GP-19E NORTH
		30-AUG-2001	22-AUG-2001	30-AUG-2001	22-AUG-2001	30-AUG-2001	22-AUG-2001
		010830-X20	010822-X21	010830-X21	010822-X22	010830-X22	010822-X24
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.1	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	21.0	19.9	21.5	15.5	15.9	20.8
CARBON DIOXIDE, PERCENT BY VOL	%	0.6	0.8	0.2	2.7	2.7	0.1
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	75	70	75	70	75	70
PRESSURE, BAROMETRIC	MM HG	757	759.46	757	759.46	757	759.46
BAROMETRIC PRESSURE TREND		-1	+1	-1	+1	-1	+1
GROUND CONDITIONS		AVERAGE	MOIST	AVERAGE	MOIST	AVERAGE	MOIST
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0

DANE COUNTY TRUAX LANDFILL  
MONTHLY GAS MONITORING  
SEPTEMBER 2001

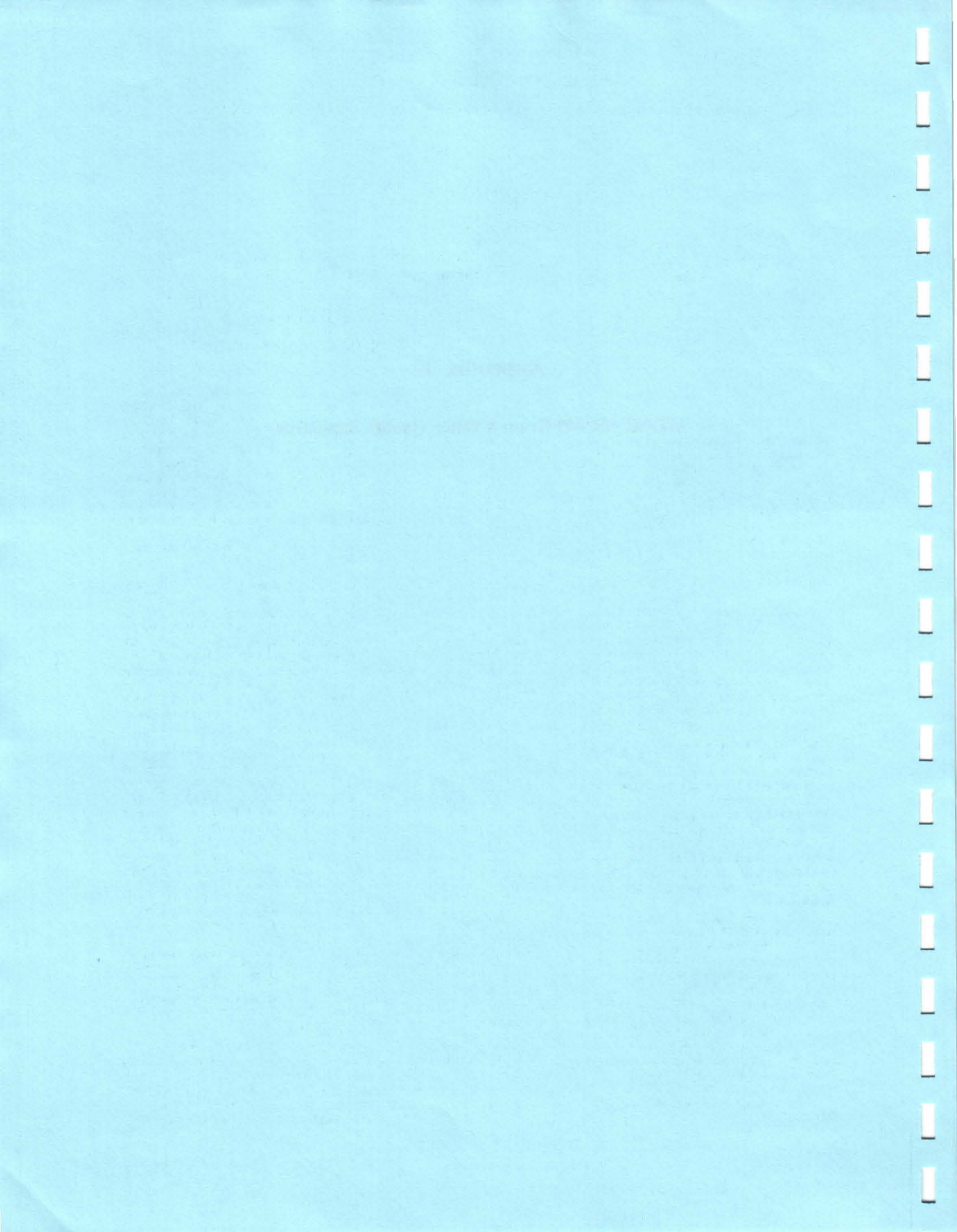
PARAMETER	UNITS	GP-13	GP-14	GP-14	GP-15	GP-15	GP-16
		28-SEP-2001	26-SEP-2001	28-SEP-2001	26-SEP-2001	28-SEP-2001	26-SEP-2001
		010928-X17	010926-X18	010928-X18	010926-X19	010928-X19	010926-X20
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%	0.0	0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%	17.7	16.5	16.7	20.4	20.6	20.4
CARBON DIOXIDE, PERCENT BY VOL	%	2.4	3.6	3.6	0.2	0.2	0.4
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F	50	56	50	56	50	56
PRESSURE, BAROMETRIC	MM HG	768.9	762.3	768.9	762.3	768.9	762.3
BAROMETRIC PRESSURE TREND		+1	-1	+1	-1	+1	-1
GROUND CONDITIONS	AVE	AVE	AVE	AVE	AVE	AVE	AVE
VACUUM	IN/WATER	0.0	0.0	0.0	0.0	0.0	0.0
WELL NOT SAMPLED							

DANE COUNTY TRUAX LANDFILL  
 MONTHLY GAS MONITORING  
 SEPTEMBER 2001

PARAMETER	UNITS	GP-16	GP-17	GP-17	GP-18	GP 18	GP-19E NORTH
		28 SEP-2001	26-SEP-2001	28-SEP-2001	26-SEP-2001	28-SEP-2001	26-SEP-2001
		010928-X20	010926-X21	010928-X21	010926-X22	010928-X22	010926-X24
PRESSURE AFTER ORIFICE PLATE	IN/WATER						
WELL SIDE PRESSURE	IN/WATER						
METHANE, PERCENT BY VOLUME	%		0.0	0.0	0.0	0.0	0.0
OXYGEN, PERCENT BY VOLUME	%		17.9	20.6	13.0	19.0	20.6
CARBON DIOXIDE, PERCENT BY VOL	%		1.6	0.1	3.6	1.1	0.0
TEMPERATURE, GAS	DEG F						
FLOW RATE, GAS	CFM						
VALVE OPENING	% OPEN						
TEMPERATURE, AIR	DEG F		56	50	56	50	56
PRESSURE, BAROMETRIC	MM HG		762.3	768.9	762.3	768.9	762.3
BAROMETRIC PRESSURE TREND			-1	+1	-1	+1	-1
GROUND CONDITIONS			AVE	AVE	AVE	AVE	AVE
VACUUM	IN/WATER		0.0	0.0	0.0	0.0	0.0
WELL NOT SAMPLED		00000					

**Appendix K**

**WDNR NR 140 Ground Water Quality Standards**



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## Chapter NR 140

### GROUNDWATER QUALITY

#### Subchapter I — General

- NR 140.01 Purpose.
- NR 140.02 Regulatory framework.
- NR 140.03 Applicability.
- NR 140.05 Definitions.

#### Subchapter II — Groundwater Quality Standards

- NR 140.10 Public health related groundwater standards.
- NR 140.12 Public welfare related groundwater standards.
- NR 140.14 Statistical procedures.

- NR 140.16 Monitoring and laboratory data requirements.

#### Subchapter III — Evaluation and Response Procedures

- NR 140.20 Indicator parameter groundwater standards.
- NR 140.22 Point of standards application for design and compliance.
- NR 140.24 Responses when a preventive action limit is attained or exceeded.
- NR 140.26 Responses when an enforcement standard is attained or exceeded.
- NR 140.27 Responses when an enforcement standard is attained or exceeded at a location other than a point of standards application.
- NR 140.28 Exemptions.

#### Subchapter I — General

**NR 140.01 Purpose.** The purpose of this chapter is to establish groundwater quality standards for substances detected in or having a reasonable probability of entering the groundwater resources of the state; to specify scientifically valid procedures for determining if a numerical standard has been attained or exceeded; to specify procedures for establishing points of standards application, and for evaluating groundwater monitoring data; to establish ranges of responses the department may require if a groundwater standard is attained or exceeded; and to provide for exemptions for facilities, practices and activities regulated by the department.

*History:* Cr. Register, September, 1985, No. 357, eff. 10-1-85.

**NR 140.02 Regulatory framework.** (1) This chapter supplements the regulatory authority elsewhere in the statutes and administrative rules. The department will continue to exercise the powers and duties in those regulatory programs, consistent with the enforcement standards and preventive action limits for substances in groundwater under this chapter. This chapter provides guidelines and procedures for the exercise of regulatory authority which is established elsewhere in the statutes and administrative rules, and does not create independent regulatory authority.

(2) The department may adopt regulations which establish specific design and management criteria for regulated facilities or activities, if the regulations will ensure that the regulated facilities and activities will not cause the concentration of a substance in groundwater affected by the facilities or activities to exceed the enforcement standards and preventive action limits under this chapter at a point of standards application. The department may adopt more stringent regulations under authority elsewhere in the statutes based on the best currently available technology for regulated activities and practices which ensure a greater degree of groundwater protection or when necessary to comply with state or federal laws.

(3) Preventive action limits serve to inform the department of potential groundwater contamination problems, establish the level of groundwater contamination at which the department is required to commence efforts to control the contamination and provide a basis for design and management practice criteria in administrative rules. Preventive action limits are applicable both to controlling new releases of contamination as well as to restoring groundwater quality contaminated by past releases of contaminants. Although a preventive action limit is not intended to always require remedial action, activities affecting groundwater must be regulated to minimize the level of substances to the extent technically and economically feasible, and to maintain compliance with the preventive action limits unless compliance with the preventive action limits is not technically and economically feasible.

(4) The department may take any actions within the context of regulatory programs established in statutes or rules outside of this chapter, if those actions are necessary to protect public health and welfare or prevent a significant damaging effect on groundwater or surface water quality for present or future consumptive or non-consumptive uses, whether or not an enforcement standard and preventive action limit for a substance have been adopted under this chapter. Nothing in this chapter authorizes an impact on groundwater quality which would cause surface water quality standards contained in chs. NR 102 to 105 to be attained or exceeded.

*History:* Cr. Register, January, 1992, No. 433, eff. 2-1-92; reprinted to restore dropped copy, Register, March, 1992, No. 435.

**NR 140.03 Applicability.** This subchapter and subch. II apply to all facilities, practices and activities which may affect groundwater quality and which are regulated under chs. 85, 93, 94, 101, 145, 281, 283, 287, 289, 291 and 292, Stats., by the department of agriculture, trade and consumer protection, the department of commerce, the department of transportation, or the department of natural resources, as well as to facilities, practices and activities which may affect groundwater quality which are regulated by other regulatory agencies. Health-related enforcement standards adopted in s. NR 140.10 also apply to bottled drinking water manufactured, bottled, sold or distributed in this state as required by s. 97.34 (2) (b), Stats., and to determining eligibility for the well compensation program under s. 281.75, Stats. Subchapter III applies to all facilities, practices and activities which may affect groundwater quality and which are regulated by the department under ch. 281, 283, 287, 289, 291, 292, 295 or 299, Stats. This chapter does not apply to any facilities, practices or activities on a prospecting site or a mining site because those facilities, practices and activities are subject to the groundwater quality requirements of chs. NR 131, 132 and 182. The department may promulgate new rules or amend rules governing facilities, practices or activities regulated under ch. 293, Stats., if the department determines that the amendment or promulgation of rules is necessary to protect public health, safety or welfare. The requirements of this chapter are in addition to the requirements of any other statutes and rules.

*Note:* The groundwater standards in this chapter do not replace the maximum contaminant levels applicable to public water systems contained in ch. NR 809. Drinking water maximum contaminant levels and health advisory levels may take into account such factors as treatment costs and feasibility for public water systems.

*History:* Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. Register, December, 1998, No. 516, eff. 1-1-99; correction made under s. 13.93 (2m) (b) 7, Stats., Register, March, 2000, No. 531.

**NR 140.05 Definitions.** (1) "Accuracy" means the closeness of a measured value to its generally accepted value or its value based upon an accepted reference standard.

(1m) "Alternative concentration limit" means the concentration of a substance in groundwater established by the department for a site to replace a preventive action limit or enforcement stan-



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dard or both, from Table 1 or 2, when an exemption is granted in accordance with s. NR 140.28.

(1s) "Approval" means written acceptance by the department of a plan, report or other document that has been submitted to the department for review.

(2) "Attain or exceed" means that the concentration of a substance is determined to be equal to or greater than the preventive action limit or enforcement standard for that substance.

(3) "Background water quality" or "background concentration" means groundwater quality at or near a facility, practice or activity which has not been affected by that facility, practice or activity.

(4) "Certified laboratory" means a laboratory which performs tests for hire in connection with a covered program and which receives certification under s. 299.11 (7), Stats., or receives reciprocal recognition under s. 299.11 (5), Stats.

(5) "Department" means the department of natural resources.

(6) "Design management zone" means a 3-dimensional boundary surrounding each regulated facility, practice or activity established under s. NR 140.22 (3).

(7) "Enforcement standard" means a numerical value expressing the concentration of a substance in groundwater which is adopted under s. 160.07, Stats., and s. NR 140.10 or s. 160.09, Stats., and s. NR 140.12.

(8) "Facility, practice or activity" means any source or potential source of a substance which is detected in or has a reasonable probability of entering the groundwater resources of the state.

(9) "Groundwater" means any of the waters of the state, as defined in s. 281.01 (18), Stats., occurring in a saturated subsurface geological formation of rock or soil.

(10) "Indicator parameter" means a substance for which a preventive action limit has been established under s. NR 140.20, which is used to indicate the potential for a preventive action limit established under s. NR 140.10 or 140.12 to be attained or exceeded and for which an enforcement standard has not been established under s. NR 140.10 or 140.12.

(10e) "Infiltration" means the underground emplacement of substances or remedial material, or both, into an excavation that is wider than deep so as to percolate or move through unsaturated material to groundwater.

(10s) "Injection" means the underground emplacement of substances or remedial material, or both, into a borehole or other excavation that is deeper than wide so as to percolate or move through unsaturated material to groundwater or to enter groundwater directly.

(11) "Land disposal system" means a facility for disposing of liquid wastes consisting of:

- (a) An absorption or seepage pond system,
- (b) A ridge and furrow system;
- (c) A spray irrigation system,
- (d) An overland flow system,
- (e) A subsurface field absorption system,
- (f) A land spreading system, or
- (g) Any other land area receiving liquid waste discharges.

(12) "Limit of detection" means the lowest concentration level that can be determined to be statistically different from a blank.

(13) "Limit of quantitation" means the level above which quantitative results may be obtained with a specified degree of confidence.

Note: The limit of quantitation is 10/3 or 3.333 times the limit of detection.

(14) "Monitoring" means all procedures used to collect data on groundwater, surface water or soils.

(14m) "Natural attenuation" means the reduction in the concentration and mass of a substance and its breakdown products in groundwater, due to naturally occurring physical, chemical, and

biological processes without human intervention or enhancement. These processes include, but are not limited to, dispersion, diffusion, sorption and retardation, and degradation processes such as biodegradation, abiotic degradation and radioactive decay.

(15) "Point of standards application" means the specific location, depth or distance from a facility, activity or practice at which the concentration of a substance in groundwater is measured for purposes of determining whether a preventive action limit or an enforcement standard has been attained or exceeded.

(16) "Precision" means the closeness of repeated measurements of the same parameter within a sample.

(17) "Preventive action limit" means a numerical value expressing the concentration of a substance in groundwater which is adopted under s. 160.15, Stats., and s. NR 140.10, 140.12 or 140.20.

(18) "Property boundary" means the boundary of the total contiguous parcel of land owned or leased by a common owner or lessor, regardless of whether public or private roads run through the parcel.

(19) "Registered laboratory" means a laboratory which is registered under s. 299.11 (8), Stats., or receives reciprocal recognition under s. 299.11 (5), Stats.

(20) "Regulatory agency" means the department of agriculture, trade and consumer protection, the department of commerce, the department of transportation, the department of natural resources and other state agencies which regulate activities, facilities or practices which are related to substances which have been detected in or have reasonable probability of entering the groundwater resources of the state.

(20h) "Remedial action" means a response which is taken to achieve compliance with groundwater quality standards established under this chapter. This term includes, but is not limited to, actions designed to prevent or minimize the further discharge or release of substances to groundwater and actions designed to renovate or restore groundwater quality.

(20k) "Remedial material" means any solid, liquid, semi-solid or gaseous material, either naturally occurring or manmade, in its original form or as a metabolite or degradation product, or naturally occurring non-pathogenic biological organisms which have not undergone human induced genetic alteration, which enhances the restoration of soil or groundwater quality, or both.

(20m) "Response" means any action taken to respond to an attainment or exceedance of a preventive action limit or enforcement standard as required by s. NR 140.24 or 140.26.

Note: A response may include a remedial action.

(21) "Substance" means any solid, liquid, semisolid, dissolved solid or gaseous material, naturally occurring or man-made chemical, parameter for measurement of water quality or biological organism which, in its original form, or as a metabolite or a degradation or waste product, may decrease the quality of groundwater.

(22) "Wastewater and sludge storage or treatment lagoon" means a natural or man-made containment structure, constructed primarily of earthen materials for the treatment or storage of wastewater or sludge, which is not a land disposal system.

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; cr. (1m), am. (7), (17) and (18), Register, October, 1988, No. 394, eff. 11-1-88; am. (6), cr. (20h) and (20m), Register, March, 1994, No. 459, eff. 4-1-94; cr. (1a), (10e), (10s), (20k), r. and rec. (12), (13), Register, August, 1995, No. 476, eff. 9-1-95; cr. (14m), Register, October, 1996, No. 490, eff. 11-1-96; am. (20), Register, December, 1998, No. 516, eff. 1-1-99; correction in (9) made under s. 13.93 (2m) (b) 7., Stats., Register, April, 2001, No. 544.

## Subchapter II — Groundwater Quality Standards

**NR 140.10 Public health related groundwater standards.** The groundwater quality standards for substances of public health concern are listed in Table 1.

Note: For all substances that have carcinogenic, mutagenic or teratogenic properties or interactive effects, the preventive action limit is 10% of the enforcement standard. The preventive action limit is 20% of the enforcement standard for all other sub-



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stances that are of public health concern. Enforcement standards and preventive action limits for additional substances will be added to Table I as recommendations are developed pursuant to ss. 160.07, 160.13 and 160.15, Stats.

Table 1  
Public Health Groundwater Quality Standards

Substance <sup>1</sup>	Enforcement Standard (micrograms per liter – except as noted)	Preventive Action Limit (micrograms per liter – except as noted)
Acetone	1000	200
Alachlor	2	0.2
Aldicarb	10	2
Antimony	6	1.2
Anthracene	3000	600
Arsenic	50	5
Asbestos	7 million fibers per liter (MFL)	0.7 MFL
Atrazine, total chlorinated residues	3 <sup>2</sup>	0.3 <sup>2</sup>
Bacteria, Total Coliform	0 <sup>3</sup>	0 <sup>3</sup>
Barium	2 milligrams/liter (mg/l)	0.4 mg/l
Bentazon	300	60
Benzene	5	0.5
Benzo(b)fluoranthene	0.2	0.02
Benzo(a)pyrene	0.2	0.02
Beryllium	4	0.4
Boron	960	190
Bromodichloromethane	0.6	0.06
Bromoform	4.4	0.44
Bromomethane	10	1
Butylate	67	6.7
Cadmium	5	0.5
Carbaryl	960	192
Carbofuran	40	8
Carbon disulfide	1000	200
Carbon tetrachloride	5	0.5
Chloramben	150	30
Chlordane	2	0.2
Chloroethane	400	80
Chloroform	6	0.6
Chloromethane	3	0.3
Chromium	100	10
Chrysene	0.2	0.02
Cobalt	40	8
Copper	1300	130
Cyanazine	1	0.1
Cyanide	200	40
Dacthal	4 mg/l	0.8 mg/l
1,2-Dibromoethane (EDB)	0.05	0.005
Dibromochloromethane	60	6
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.02
Dibutyl phthalate	100	20
Dicamba	300	60
1,2-Dichlorobenzene	600	60
1,3-Dichlorobenzene	1250	125
1,4-Dichlorobenzene	75	15
Dichlorodifluoromethane	1000	200
1,1-Dichloroethane	850	85

Table 1 (cont.)  
Public Health Groundwater Quality Standards

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Table 1 (cont.)  
Public Health Groundwater Quality Standards

Substance <sup>1</sup>	Enforcement Standard (micrograms per liter – except as noted)	Preventive Action Limit (micrograms per liter – except as noted)
1,2-Dichloroethane	5	0.5
1,1-Dichloroethylene	7	0.7
1,2-Dichloroethylene (cis)	70	7
1,2-Dichloroethylene (trans)	100	20
2,4-Dichlorophenoxyacetic Acid (2,4-D)	70	7
1,2-Dichloropropane	5	0.5
1,3-Dichloropropene (cis/trans)	0.2	0.02
Di (2-ethylhexyl) phthalate	6	0.6
Dimethoate	2	0.4
2,4-Dinitrotoluene	0.05	0.005
2,6-Dinitrotoluene	0.05	0.005
Dinoseb	7	1.4
Dioxin (2, 3, 7, 8-TCDD)	0.00003	0.000003
Endrin	2	0.4
EPTC	250	50
Ethylbenzene	700	140
Ethylene glycol	7 mg/l	0.7 mg/l
Fluoranthene	400	80
Fluorene	400	80
Fluoride	4 mg/l	0.8 mg/l
Fluorotrichloromethane	3490	698
Formaldehyde	1000	100
Heptachlor	0.4	0.04
Heptachlor epoxide	0.2	0.02
Hexachlorobenzene	1	0.1
N-Hexane	600	120
Hydrogen sulfide	30	6
Lead	15	1.5
Lindane	0.2	0.02
Mercury	2	0.2
Methanol	5000	1000
Methoxychlor	40	4
Methylene chloride	5	0.5
Methyl ethyl ketone (MEK)	460	90
Methyl isobutyl ketone (MIBK)	500	50
Methyl tert-butyl ether (MTBE)	60	12
Metolachlor	15	1.5
Metribuzin	250	50
Monochlorobenzene	100	20
Naphthalene	40	8
Nickel	100	20
Nitrate (as N)	10 mg/l	2 mg/l
Nitrate + Nitrite (as N)	10 mg/l	2 mg/l
Nitrite (as N)	1 mg/l	0.2 mg/l
N-Nitrosodiphenylamine	7	0.7
Pentachlorophenol (PCP)	1	0.1
Phenol	6 mg/l	1.2 mg/l
Picloram	500	100
Polychlorinated biphenyls (PCBs)	0.03	0.003
Prometon	90	18
Pyrene	250	50
Pyridine	10	2

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Table 1 (cont.)  
Public Health Groundwater Quality Standards

Substance <sup>1</sup>	Enforcement Standard (micrograms per liter – except as noted)	Preventive Action Limit (micrograms per liter – except as noted)
Selenium	50	10
Silver	50	10
Simazine	4	0.4
Styrene	100	10
1,1,1,2-Tetrachloroethane	70	7
1,1,2,2-Tetrachloroethane	0.2	0.02
Tetrachloroethylene	5	0.5
Tetrahydrofuran	50	10
Thallium	2	0.4
Toluene	1 mg/l	0.2 mg/l
Toxaphene	3	0.3
1,2,4-Trichlorobenzene	70	14
1,1,1-Trichloroethane	200	40
1,1,2-Trichloroethane	5	0.5
Trichloroethylene (TCE)	5	0.5
2,4,5-Trichlorophenoxy-propionic acid (2,4,5-TP)	50	5
1,2,3-Trichloropropane	60	12
Trifluralin	7.5	0.75
Trimethylbenzenes (1,2,4- and 1,3,5- combined)	480	96
Vanadium	30	6
Vinyl chloride	0.2	0.02
Xylene <sup>4</sup>	10 mg/l	1 mg/l

<sup>1</sup> Appendix 1 contains Chemical Abstract Service (CAS) registry numbers, common synonyms and trade names for most substances listed in Table 1.

<sup>2</sup> Total chlorinated atrazine residues includes parent compound and the following metabolites of health concern: 2-chloro-4-amino-6-isopropylamino-s-triazine (formerly deethylatrazine), 2-chloro-4-amino-6-ethylamino-s-triazine (formerly deisopropylatrazine) and 2-chloro-4,6-diamino-s-triazine (formerly diaminoatrazine).

<sup>3</sup> Total coliform bacteria may not be present in any 100 ml sample using either the membrane filter (MF) technique, the presence-absence (P-A) coliform test, the minimal medium ONPG-MUG (MMO-MUG) test or not present in any 10 ml portion of the 10-tube multiple tube fermentation (MTF) technique.

<sup>4</sup> Xylene includes meta-, ortho-, and para-xylene combined. The preventive action limit has been set at a concentration that is intended to address taste and odor concerns associated with this substance.

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. table 1, Register, October, 1988, No. 394, eff. 11-1-88; am. table 1, Register, September, 1990, No. 417, eff. 10-1-90; am. Register, January, 1992, No. 433, eff. 2-1-92; am. Table 1, Register, March, 1994, No. 459, eff. 4-1-94; am. Table 1, Register, August, 1995, No. 476, eff. 9-1-95; am. Table 1, Register, December, 1998, No. 516, eff. 1-1-99; am. Table 1, boron, Register, December, 1998, No. 516, eff. 12-31-99; am. Table 1, Register, March, 2000, No. 531, eff. 4-1-00.

**NR 140.12 Public welfare related groundwater standards.** The groundwater quality standards for substances of public welfare concern are listed in Table 2.

Note: For each substance of public welfare concern, the preventive action limit is 50% of the established enforcement standard.

Table 2  
Public Welfare Groundwater Quality Standards

Substance	Enforcement Standard (milligrams per liter – except as noted)	Preventive Action Limit (milligrams per liter – except as noted)
Chloride	250	125
Color	15 color units	7.5 color units
Foaming agents MBAS (Methylene-Blue Active Substances)	0.5	0.25
Iron	0.3	0.15
Manganese	0.05	0.025
Odor	3 (Threshold Odor No.)	1.5 (Threshold Odor No.)
Sulfate	250	125
Zinc	5	2.5

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. table 2, Register, October, 1990, No. 418, eff. 11-1-90; am. Table 2, Register, March, 1994, No. 459, eff. 4-1-94.

**NR 140.14 Statistical procedures.** (1) If a preventive action limit or an enforcement standard for a substance listed in

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Table 1 or 2, an alternative concentration limit issued in accordance with s. NR 140.28 or a preventive action limit for an indicator parameter established according to s. NR 140.20 (2) is attained or exceeded at a point of standards application:

(a) The owner or operator of the facility, practice or activity at which a standard is attained or exceeded shall notify the appropriate regulatory agency that a standard has been attained or exceeded; and

(b) The regulatory agency shall require a response in accordance with the rules promulgated under s. 160.21, Stats. No response shall be required if it is demonstrated to the satisfaction of the appropriate regulatory agency that a scientifically valid determination cannot be made that the preventive action limit or enforcement standard for a substance in Table 1 or 2 has been attained or exceeded based on consideration of sampling procedures or laboratory precision and accuracy, at a significance level of 0.05.

(2) The regulatory agency shall use one or more valid statistical procedures to determine if a change in the concentration of a substance has occurred. A significance level of 0.05 shall be used for all tests.

(3) In addition to sub. (2), the following applies when a preventive action limit or enforcement standard is equal to or less than the limit of quantitation:

(a) If a substance is not detected in a sample, the regulatory agency may not consider the preventive action limit or enforcement standard to have been attained or exceeded.

(b) If the preventive action limit or enforcement standard is less than the limit of detection, and the concentration of a substance is reported between the limit of detection and the limit of quantitation, the regulatory agency shall consider the preventive action limit or enforcement standard to be attained or exceeded only if:

1. The substance has been analytically confirmed to be present in the same sample using an equivalently sensitive analytical method or the same analytical method, and

2. The substance has been statistically confirmed to be present above the preventive action limit or enforcement standard, determined by an appropriate statistical test with sufficient samples at a significance level of 0.05.

(c) If the preventive action limit or enforcement standard is between the limit of detection and the limit of quantitation, the regulatory agency shall consider the preventive action limit or enforcement standard to be attained or exceeded if the concentration of a substance is reported at or above the limit of quantitation.

**History:** Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. (1) (intro.) and (b), r. and recr. (2), Register, October, 1988, No. 394, eff. 11-1-88; am. (1) (b), (2) and (3) (b), Register, September, 1990, No. 417, eff. 10-1-90; am. (1) (b), Register, March, 1994, No. 459, eff. 4-1-94; r. and recr. (3) (intro.), (a), (b), renum. (3) (c) to be 140.16 (3) and am., Register, August, 1995, No. 476, eff. 9-1-95.

**NR 140.16 Monitoring and laboratory data requirements.** (1) (a) All groundwater quality samples collected to determine compliance with ch. 160, Stats., shall comply with this section except as noted.

(b) *Groundwater sampling requirements.* All groundwater quality samples shall be collected and handled in accordance with procedures specified by the applicable regulatory agency or, where no sampling procedures are specified by that agency, in accordance with the sampling procedures referenced in par. (c). The sampling procedures specified by a regulatory agency may include requirements for field filtration.

(c) *Department groundwater sampling procedures.* 1. If sampling procedures are not specified by the applicable regulatory agency pursuant to par. (b), all groundwater quality samples shall be collected and handled in accordance with the sampling procedures contained in the following publications:

a. *Groundwater Sampling Desk Reference.* Wisconsin Department of Natural Resources, PUBL-DG-037-96, September, 1996.

b. *Groundwater Sampling Field Manual.* Wisconsin Department of Natural Resources, PUBL-DG-038-96, September, 1996.

**Note:** Copies of these publications may be purchased from:

Wisconsin Department of Administration  
Document Sales Unit  
202 South Thornton Avenue  
P.O. Box 7840  
Madison, WI 53707-7840

These publications are available for inspection at the offices of the department, the secretary of state and the revisor of statutes.

2. Where no procedure for collecting a particular groundwater quality sample is specified by the appropriate regulatory agency or in the publications referenced in subd. 1, other published scientifically valid groundwater sampling procedures may be used.

(d) *Laboratory requirements.* All groundwater quality samples, except samples collected for total coliform bacteria analysis and field analyses for pH, specific conductance and temperature, shall be analyzed in accordance with provisions of ch. NR 149 by a laboratory certified or registered under ch. NR 149. Samples for total coliform bacteria analysis shall be analyzed by the state laboratory of hygiene or at a laboratory approved or certified by the department of agriculture, trade and consumer protection.

**Note:** Refer to s. NR 149.11 for sample preservation procedures and holding times.

(e) *Data submittal.* The results of the analysis of groundwater quality samples shall be submitted to the department and any applicable regulatory agency. Except as provided in s. NR 205.07 (3) (c) for wastewater permittees, this section does not require the submission of groundwater monitoring data which is collected voluntarily and is not required to be collected to determine compliance with this chapter or another rule or statute.

(2) The laboratory shall select the analytical methodology which:

(a) Is specified in rules or approved by the regulatory agency, and

(b) Is appropriate for the concentration of the sample, and

(c) Is one of the following:

1. Has a limit of detection and limit of quantitation below the preventive action limit, or

2. Produces the lowest available limit of detection and limit of quantitation if the limit of detection and limit of quantitation are above the preventive action limit.

(3) If the owner or operator of a facility, practice or activity believes that a sample result does not represent groundwater quality in the vicinity of the facility, practice or activity, the owner or operator shall resample the appropriate well or wells to obtain a representative sample at the earliest possible time. All sample results shall be submitted to the department and the appropriate regulatory agency with an explanation of why the owner or operator believes that all or some of the results are invalid.

(4) The department may reject groundwater quality data that does not meet the requirements of the approved or designated analytical methods.

(5) The owner or operator of the facility, practice or activity shall report the limit of detection and the limit of quantitation with the sample results. If a substance is detected below the limit of quantitation, the owner or operator shall report the detected value with the appropriate qualifier to the regulatory agency.

**History:** Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. (1), Register, September, 1990, No. 417, eff. 10-1-90; am. (1), r. and recr. (2), Register, March, 1994, No. 459, eff. 4-1-94; (5) renum. from NR 140.14 (3) (c), cr. (4), Register, August, 1995, No. 476, eff. 9-1-95; r. and recr. (1), Register, December, 1998, No. 516, eff. 1-1-99.

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### Subchapter III — Evaluation and Response Procedures

**NR 140.20 Indicator parameter groundwater standards.** (1) **ESTABLISHING BACKGROUND WATER QUALITY.** Background water quality at a facility, practice or activity at which monitoring is required shall be established by sampling one or more monitoring points at locations and depths sufficient to yield groundwater samples that are representative of background water quality at or near the facility, practice or activity. Background water quality shall be determined for indicator parameters specified by the department. Background water quality for indicator parameters shall be established by averaging a minimum of 8 sample results from each well. The department may exclude any sample result which is nonrepresentative of background water quality. In making the calculations required in this section, the department may use as many representative sample points as are available.

(2) **ESTABLISHING PREVENTIVE ACTION LIMITS FOR INDICATOR PARAMETERS.** For each indicator parameter for which groundwater monitoring is required by the department, the preventive action limit shall be established based upon a change of water quality with respect to background water quality according to the methodology specified in pars. (a) to (c) and in Table 3.

(a) For field pH, the preventive action limit shall be one pH unit above or below the pH of the background water quality.

(b) For field temperature, the preventive action limit shall be 3 standard deviations or 10°F (5.6°C), whichever is greater, above or below the temperature of the background water quality.

(c) For all other indicator parameters, the preventive action limit shall be the background water quality for that parameter plus 3 standard deviations or the background water quality plus the increase of that parameter listed in Table 3, whichever is greater.

*Note:* The standard deviation for a group of samples is equal to the square root of the value of the sum of the squares of the difference between each sample in the sample group and the mean for that sample group divided by the number of samples in the sample group where the sample group has 30 or more samples and by one less than the number of samples in the sample group where the sample group has less than 30 samples.

**Table 3**  
Methodology for Establishing Preventive Action Limit for Indicator Parameters

Parameter	Minimum Increase (mg/l)
Alkalinity	100
Biochemical oxygen demand (BOD <sub>5</sub> )	25
Calcium	25
Chemical oxygen demand (COD)	25
Magnesium	25
Nitrogen series	
Ammonia nitrogen	2
Organic nitrogen	2
Total nitrogen	5
Potassium	5
Sodium	10
Field specific conductance	200 micromhos/cm
Total dissolved solids (TDS)	200
Total hardness	100
Total organic carbon (TOC)	1
Total organic halogen (TOX)	0.25

*History:* Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. table 3, Register, October, 1990, No. 418, eff. 11-1-90; am. Table 3, Register, December, 1998, No. 516, eff. 1-1-99.

**NR 140.22 Point of standards application for design and compliance.** (1) **DESIGN.** Facilities, practices or activities regulated by the department, including remedial actions, shall be

designed to minimize the level of substances in groundwater and to comply with the preventive action limits to the extent technically and economically feasible at all the following locations:

- (a) Any point of present groundwater use.
- (b) Any point beyond the boundary of the property on which the facility, practice or activity is located.
- (c) Any point within the property boundaries beyond the 3-dimensional design management zone if one is established by the department at each facility, practice or activity under sub. (3).
- (d) Every point at which groundwater is monitored to determine if a preventive action limit or enforcement standard has been attained or exceeded for sites identified under s. NR 140.22 (2) (c).

(2) **COMPLIANCE.** (a) The point of standards application to determine if a preventive action limit has been attained or exceeded is any point at which groundwater is monitored.

(b) The point of standards application to determine whether an enforcement standard has been attained or exceeded shall be the following locations:

1. Any point of present groundwater use;
2. Any point beyond the boundary of the property on which the facility, practice or activity is located;
3. Any point within the property boundaries beyond the 3 dimensional design management zone if one is established by the department at each facility, practice or activity under sub. (3).

*Note:* The boundary beyond which the enforcement standards apply is the closer of the property boundary or the design management zone boundary to the waste boundary for the facility, practice or activity.

(c) For discharges, releases, sites or facilities regulated under s. 292.11, 291.29 or 291.37, Stats., or s. NR 600.07, for which a design management zone has not been established in sub. (3), Table 4, the point of standards application shall be every point at which groundwater is monitored to determine if a preventive action limit or enforcement standard has been attained or exceeded.

(3) **DESIGN MANAGEMENT ZONE.** (a) The design management zone for facilities, practices or activities subject to regulation by the department shall be an area enclosed by vertical boundaries which extend from the land surface downward through all saturated geological formations. The design management zone shall extend horizontally beyond the waste boundary to the distance indicated in Table 4 for the specific type of facility, practice or activity. The waste boundary shall be the outermost limit at which waste from a facility, practice or activity has been stored, applied or disposed of, or permitted or approved for storage, application or disposal. For hazardous waste facilities regulated under ch. 291, Stats., the waste boundary shall include the horizontal space taken up by any liner, dike or other barrier to contain waste.

(b) In issuing or reissuing a permit, license or approval, the department may consider an expansion or reduction of the design management zone at a regulated or proposed facility, practice or activity by a horizontal distance not to exceed 50% of the distance listed in Table 4.

(c) The department shall consider the following factors in determining whether to expand or reduce the design management zone:

1. Nature, thickness and permeability of unconsolidated materials, including topography;
2. Nature and permeability of bedrock;
3. Groundwater depth, flow direction and velocity;
4. Waste volume, waste type and characteristics, including waste loading;
5. Contaminant mobility;
6. Distances to property boundary and surface waters;
7. Engineering design of the facility, practice or activity;
8. Life span of the facility, practice or activity;
9. Present and anticipated uses of land and groundwater; and

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10. Potential abatement options if an enforcement standard is exceeded.

(d) The design management zone may not be expanded or reduced unless it has been demonstrated to the satisfaction of the department that the preventive action limits and enforcement standards will be met at the adjusted design management zone. The design management zone may not be expanded unless it has been demonstrated to the satisfaction of the department that the preventive action limits and enforcement standards cannot be met at the design management zone specified in Table 4.

Table 4

Type of Facility, Practice or Activity	Horizontal Distances for the Design Management Zone
Land disposal systems regulated under ch. 283, Stats.	250 feet
Wastewater and sludge storage or treatment lagoons regulated under ch. 281 or 283, Stats.	100 feet
Solid waste disposal facilities regulated under ch. 289, Stats., which have feasibility reports approved after October 1, 1985.	150 feet
All other solid waste disposal facilities regulated under ch. 289, Stats.	300 feet
Hazardous waste disposal facilities, waste piles, landfills and surface impoundments subject to regulation under s. NR 635.16	300 feet
Hazardous waste disposal facilities, waste piles, landfills and surface impoundments subject to regulation under ss. NR 635.05 to 635.15.	0 feet

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. (1) (b), Register, October, 1988, No. 394, eff. 11-1-88; am. (4) and table 4, Register, January, 1992, No. 433, eff. 2-1-92; am. (1), cr. (1) (d), renum. (2) to (5) to be (2) (a), (b), (c) and (3) and am. (2) (b) 3., Register, March, 1994, No. 459, eff. 4-1-94.

**NR 140.24 Responses when a preventive action limit is attained or exceeded.** (1) NOTIFICATION AND ASSESSMENT. If the concentration of a substance, including indicator parameters, in groundwater attains or exceeds a preventive action limit at a point of standards application as described in s. NR 140.22 (2):

(a) The owner or operator of the facility, practice or activity shall notify the department in writing when monitoring data is submitted that a preventive action limit has been attained or exceeded in accordance with any deadlines in applicable statutes, rules, permits or plan approvals. Where no deadlines are imposed, the owner or operator shall notify the department as soon as practical after the results are received. When the results of any private well sampling attain or exceed a preventive action limit, the owner or operator of the facility, practice or activity shall notify the department within 10 days after the results are received. The notification shall provide a preliminary analysis of the cause and significance of the concentration.

Note: Section 292.11 (2) (a), Stats., requires that the department be notified immediately of hazardous substance discharges.

Note: See s. NR 140.27.

(b) Upon receipt of the notice under par. (a), the department shall evaluate the information and, if further information is required to make the assessment under par. (c), direct the owner or operator to prepare and submit a report by a specified deadline. The report shall assess the cause and significance of the increased concentration based on a consideration of the factors identified in par. (c) and shall propose a response to meet the objectives of sub. (2).

(c) The department shall assess the cause and significance of the concentration of the substance in determining the appropriate response to meet the objectives of sub. (2). In addition to all other relevant information, the department shall consider the information submitted under par. (b) and the following factors where applicable:

1. Background water quality. a. The department shall compare background water quality data and monitoring data from wells downgradient of the facility, practice or activity to determine if downgradient water quality is adversely affected. If the background water quality at a facility, practice or activity is not known or is inadequately defined, the department may require additional sampling of existing wells, or installation and sampling of additional wells, or both.

b. Except for substances which are carcinogenic, teratogenic or mutagenic in humans, before requiring a response at a site where the background concentration of a substance is determined to be equal to or greater than the preventive action limit, the department shall determine that the proposed remedial action will protect or substantially improve groundwater quality notwithstanding the background concentrations of naturally occurring substances.

2. Reliability of sampling data. As part of its review of the quality of the sampling data, the department shall evaluate the sampling procedures, precision and accuracy of the analytical test, size of the data set, and the quality control and quality assurance procedures used. If there is insufficient information to evaluate the reliability of the sampling data, the department may require additional samples or other changes in the monitoring program at the facility, practice or activity.

3. Public health, welfare and environmental effects of the substance. The department shall consider the public health, welfare and environmental effects of the substance, including but not limited to its mobility in the subsurface, environmental fate, the risks considered when the standard was adopted and whether it is carcinogenic, mutagenic, teratogenic or has interactive effects with other substances.

4. Probability that a preventive action limit or an enforcement standard may be attained or exceeded outside the design management zone. In evaluating the probability that a preventive action limit or an enforcement standard may be attained or exceeded outside the design management zone, the department shall consider, at a minimum, geologic conditions, groundwater flow rate and direction, contaminant mobility in the subsurface and environmental fate.

5. Performance of the facility, practice or activity. The department shall consider whether the facility, practice or activity is performing as designed in accordance with the design requirements in s. NR 140.22 (1). The department shall consider the type, age and size of the facility, practice or activity; the type of design, if applicable; the operational history; and other factors related to performance of the facility, practice or activity as appropriate.

6. Location of the monitoring point. The department shall consider the location of the monitoring point in relation to the facility, practice or activity and the design management zone in assessing the appropriate response.

7. Other known or suspected sources of the substance in the area. If other known or suspected sources are present in the vicinity of a facility, practice or activity of concern, the department shall evaluate the probability of contributions from other sources of the substance. The department shall consider, at a minimum, the number, size, type and age of nearby sources; the groundwater flow patterns; and the substances involved.

8. Hydrogeologic conditions. The department shall consider the geologic and groundwater conditions, including but not limited to the nature, thickness and permeability of the unconsolidated materials; the nature and permeability of bedrock; the depth to the water table; groundwater flow gradients, both vertical and

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horizontal; the position of the facility, practice or activity within the groundwater flow system; and the present and potential groundwater use in the vicinity of the facility, practice or activity at which an exceedance occurs. If there is insufficient hydrogeologic information, the department may require additional information.

9. Extent of groundwater contamination. The department shall consider the current and anticipated future extent of groundwater contamination in 3 dimensions. If water supplies are affected or threatened, the department shall evaluate the existing effects and potential risks of the substance on the potable water supplies. If the extent of contamination is not known, the department may require further documentation of the extent of contamination.

10. Alternate responses. The department shall evaluate alternate responses, including consideration of the technical and economic feasibility of alternate responses from Table 5 or 6 or both, the practicality of stopping the further release of the substance and the risks and benefits of continued operation of the facility, practice or activity and the ability of a response to meet other applicable environmental protection laws.

(2) RESPONSE OBJECTIVES. Based on its evaluation of the report required under sub. (1), and the assessment criteria of sub. (1) (c), the department shall specify the responses to be implemented by the owner or operator of the facility, practice or activity designed to the extent technically and economically feasible to prevent any new releases of the substance from traveling beyond the design management zone or other applicable points of standards application described in s. NR 140.22 and restore contaminated groundwater within a reasonable period of time, considering the criteria specified in s. NR 722.07. Both the source control and the groundwater restoration components of the response shall be designed and implemented to:

(a) Minimize the concentration of the substance in groundwater at the point of standards application where technically and economically feasible;

(b) Regain and maintain compliance with the preventive action limit. If the department determines that compliance with the preventive action limit is either not technically or economically feasible, the owner or operator shall achieve compliance with the lowest possible concentration which is technically and economically feasible; and

(c) Ensure that the enforcement standard is not attained or exceeded at the point of standards application.

(3) RANGE OF RESPONSES FOR INDICATOR PARAMETERS. Except as otherwise provided in this subsection, the range of responses which the department may take or may require if a preventive action limit for an indicator parameter identified in Table 3 has been attained or exceeded, is one or more of the responses in items 1 to 4 in Table 5. The range of responses is one or more of the responses in items 1 to 6 of Table 5 in the event the department determines that:

(a) There is a threat to public health or welfare as a result of a preventive action limit for an indicator parameter being attained or exceeded; or

(b) The results demonstrate a significant design flaw or failure of the facility to contain substances, such that the facility can be expected to emit one or more of the substances on Table 1 or 2 in excess of a preventive action limit at a point of standards application.

(4) RANGE OF RESPONSES FOR SUBSTANCES OF PUBLIC HEALTH OR WELFARE CONCERN. The range of responses which the department may take or may require the owner or operator of a facility, practice or activity to take if a preventive action limit for a substance of health or welfare concern has been attained or exceeded are listed in Table 5. More than one response may be taken or required by the department.

Table 5

*Range of Responses for Exceedances of a Preventive Action Limit for Indicator Parameters and Substances of Health or Welfare Concern*

1. No action pursuant to s. NR 140.24 (5) and consistent with s.160.23, Stats.
2. Require the installation and sampling of groundwater monitoring wells.
3. Require a change in the monitoring program, including increased monitoring.
4. Require an investigation of the extent of groundwater contamination.
5. Require a revision of the operational procedures at the facility, practice or activity.
6. Require a change in the design or construction of the facility, practice or activity.
7. Require an alternate method of waste treatment or disposal.
8. Require prohibition or closure and abandonment of a facility, practice or activity in accordance with sub. (6).
9. Require remedial action to renovate or restore groundwater quality.
10. Require remedial action to prevent or minimize the further discharge or release of the substance to groundwater.
11. Revise rules or criteria on facility design, location or management practices.
12. Require the collection and evaluation of data to determine whether natural attenuation can be effective to restore groundwater quality within a reasonable period of time, considering applicable criteria specified in ss. NR 140.24, 722.07 and 722.09 or 722.11, and require monitoring to determine whether or not natural attenuation is occurring in compliance with the response objectives in s. NR 140.24 (2).

(5) NO ACTION RESPONSE CRITERIA. For facilities, practices and activities with a design management zone specified in s. NR 140.22 (3) Table 4, the department may determine that no response is necessary and that an exemption under s. NR 140.28 is not required when either of the following conditions is met:

(a) The concentration of a substance within a design management zone is detected above the preventive action limit, the enforcement standard has not been attained or exceeded within the design management zone, and the department determines that there is no indication that the preventive action limit will be attained or exceeded at any point outside the design management zone, or

(b) The background concentration of a substance is greater than the preventive action limit, the anticipated or detected incremental increase in the concentration of a substance which results from a specific facility, practice or activity is not greater than the preventive action limit, and the anticipated or detected concentration is not greater than the enforcement standard either within or outside of the design management zone.

(6) PROHIBITION AND CLOSURE CRITERIA. The department may not impose a prohibition on a practice or activity or require closure of a facility which produces the substance unless the department:

(a) Bases its decision upon reliable test data;

(b) Determines, to a reasonable certainty, by the greater weight of the credible evidence, that no other remedial action would prevent the violation of the enforcement standard at the point of standards application;

(c) Establishes the basis for the boundary and duration of the prohibition; and

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(d) Ensures that any prohibition imposed shall be reasonably related in time and scope to maintaining compliance with the enforcement standard at the point of standards application.

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. (5) (intro.) and (6) (intro.), Register, October, 1988, No. 394, eff. 11-1-88; am. (1) (intro.), (a), (b), (c) (intro.), 5. and 10., (2) (intro.), and (5) (intro.), renum. (7) to be NR 104.02 (4), Register, January, 1992, No. 433, eff. 2-1-92; am. (1) (intro.), (c) (intro.), (3) (intro.) and Table 5, Register, March, 1994, No. 459, eff. 4-1-94; am. (1) (a), (5) (intro.), Register, August, 1995, No. 476, eff. 9-1-95; am. (2) (intro.), (4) and Table 5, Register, October, 1996, No. 490, eff. 11-1-96; am. (1) (a), Register, December, 1998, No. 516, eff. 1-1-99.

**NR 140.26 Responses when an enforcement standard is attained or exceeded. (1) NOTIFICATION AND ASSESSMENT.** If the concentration of a substance in groundwater attains or exceeds an enforcement standard at a point of standards application as described in s. NR 140.22 (2):

(a) The owner or operator of the facility, practice or activity shall notify the department in writing when monitoring data is submitted that an enforcement standard has been attained or exceeded in accordance with any deadlines in applicable statutes, rules, permits or plan approvals. Where no deadlines are imposed, the owner or operator shall notify the department as soon as practical after the results are received. When the results of any private well sampling attain or exceed an enforcement standard or preventive action limit, the owner or operator of the facility, practice or activity shall notify the department within 10 days after the results are received. The notification shall provide a preliminary analysis of the cause and significance of the concentration.

Note: Section 292.11 (2) (a), Stats., requires that the department be notified immediately of hazardous substance discharges.

Note: See s. NR 140.27.

(b) Upon receipt of the notice under par. (a), the department shall evaluate the information and, if further information is required to make the assessment under par. (c), direct the owner or operator to prepare and submit a report by a specified deadline. The report shall assess the cause and significance of the increased concentration based on a consideration of the factors identified in s. NR 140.24 (1) (c) and shall propose a response to achieve compliance with the enforcement standard at the point of standards application and to comply with sub. (4).

(c) The department shall assess the cause and significance of the concentration of the substance in determining the appropriate response measures to achieve compliance with the enforcement standard at the point of standards application and to comply with sub. (4). In addition to all other relevant information, the department shall consider the information submitted under sub. (1) and the factors listed in s. NR 140.24 (1) (c), where applicable.

**(2) REGULATORY RESPONSES.** (a) If a facility, activity or practice is regulated under subch. IV of ch. 283, Stats., ch. 289 or 291, Stats., the department shall require responses as necessary, based on the evaluation of the increased concentration as outlined in sub. (1), to prevent any new releases of the substance from traveling beyond the design management zone or other applicable point of standards application described in s. NR 140.22 and restore contaminated groundwater within a reasonable period of time, considering the criteria specified in s. NR 722.07. Both the source control and the groundwater restoration components of the response shall be designed to achieve compliance with the enforcement standard at the point of standards application and to achieve compliance with the preventive action limit at the point of standards application unless compliance with the preventive action limit is not technically and economically feasible. The range of responses which the department may take or may require the owner or operator of a facility, practice or activity to take if an enforcement standard for a substance of public health or welfare concern has been attained or exceeded at a point of standards application is listed in Table 6. More than one response listed in Table 6 may be required by the department. In addition, the department may take or may require the owner or operator of a facility,

practice or activity to take one or more responses from Table 5, except response number one.

**Table 6**

*Range of Responses for Exceedance of Enforcement Standards for Substances of Health or Welfare Concern*

1. Require a revision of the operational procedures at a facility, practice or activity.
2. Require a change in the design or construction of the facility, practice or activity.
3. Require an alternate method of waste treatment or disposal.
4. Require prohibition or closure and abandonment of a facility, practice or activity.
5. Require remedial action to renovate or restore groundwater quality.
6. Require remedial action to prevent or minimize the further release of the substance to groundwater.
7. Revise rules or criteria on facility design, location or management practices.
8. Require the collection and evaluation of data to determine whether natural attenuation can be effective to restore groundwater quality within a reasonable period of time, considering applicable criteria specified in ss. NR 140.24, 722.07 and 722.09 or 722.11, and require monitoring to determine whether or not natural attenuation is occurring in compliance with the requirements of s. NR 140.26 (2) (a).

(b) If an activity or practice is not subject to regulation under subch. IV of ch. 283, Stats., ch. 289 or 291, Stats., and if the concentration of a substance in groundwater attains or exceeds an enforcement standard at a point of standards application, the department shall take the following responses unless it can be shown to the department that, to a reasonable certainty, by the greater weight of the credible evidence, an alternative response will achieve compliance with the enforcement standard at the point of standards application:

1. Prohibit the activity or practice which uses or produces the substance; and
2. Require remedial actions with respect to the specific site in accordance with this chapter.

**(3) RESPONSES FOR NITRATE AND SUBSTANCES OF PUBLIC WELFARE CONCERN.** If nitrates or any substance of welfare concern only attains or exceeds an enforcement standard, the department is not required to impose a prohibition or close a facility if it determines that:

- (a) The enforcement standard was attained or exceeded, in whole or in part, because of high background concentrations of the substance; and
- (b) The additional concentration does not represent a public welfare concern.

**(4) COMPLIANCE WITH PREVENTIVE ACTION LIMITS.** When compliance with the enforcement standard is achieved at the point of standards application, s. NR 140.24 applies.

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. (1) (intro.), (a), (b), (2), r. (6), Register, January, 1992, No. 433, eff. 2-1-92; am. (1) (intro.) and Table 6, renum. (2) to (5) to be (2) (a), (b), (3) and (4), Register, March, 1994, No. 459, eff. 4-1-94; am. (1) (a), Register, August, 1995, No. 476, eff. 9-1-95; correction in (1) (b) and (c) made under s. 13.93 (2m) (b) 7., Stats., Register, August, 1995, No. 476; am. (2) (a) and Table 6, Register, October, 1996, No. 490, eff. 11-1-96; am. (1) (a), Register, December, 1998, No. 516, eff. 1-1-99.

**NR 140.27 Responses when an enforcement standard is attained or exceeded at a location other than a point of standards application.** If the concentration of a substance in groundwater attains or exceeds an enforcement standard



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at a location other than a point of standards application for an enforcement standard, s. NR 140.24 shall apply.

History: Cr. Register, October, 1988, No. 394, eff. 11-1-88.

**NR 140.28 Exemptions. (1) APPLICABILITY.** (a) The department may not approve a proposed facility, practice or activity at a location where a preventive action limit or enforcement standard adopted under s. NR 140.10 or 140.12 has been attained or exceeded unless an exemption has been granted under this section.

(b) For an existing facility, practice or activity, a response is required under s. NR 140.24 (2) or 140.26 (2) when a preventive action limit or an enforcement standard has been attained or exceeded at a point of standards application unless an exemption has been granted under this section or the criteria of s. NR 140.24 (5) (a) or (b) are met.

(c) For an existing facility, practice or activity that has taken or is taking a response under s. NR 140.24 (2) or 140.26 (2), a continued response is required unless a substance no longer attains or exceeds a preventive action limit or an exemption has been granted under this section.

(d) If a substance or remedial material is to be infiltrated or injected into groundwater at a concentration which attains or exceeds a preventive action limit, or at any concentration for a substance or remedial material for which a groundwater quality standard has not been established under this chapter, a temporary exemption is required under sub. (5).

**(2) CRITERIA FOR GRANTING EXEMPTIONS WHERE THE BACKGROUND CONCENTRATION IS BELOW THE PREVENTIVE ACTION LIMIT.** (a) The department may grant an exemption under this section to a facility, practice or activity which is regulated by the department in an area where the background concentration of nitrate or a substance of public welfare concern is below the preventive action limit if the facility, practice or activity is designed and implemented to achieve the lowest possible concentration for that substance which is technically and economically feasible and the existing or anticipated increase in the concentration of that substance does not present a threat to public health or welfare.

(b) The department may grant an exemption under this section to a facility, practice or activity which is regulated by the department in an area where the background concentration of a substance of public health concern, other than nitrate, is below the preventive action limit for that substance if all of the following occur:

1. The measured or anticipated increase in the concentration of the substance will be minimized to the extent technically and economically feasible.
2. Compliance with the preventive action limit is either not technically or economically feasible.
3. The enforcement standard for that substance will not be attained or exceeded at the point of standards application.
4. Any existing or projected increase in the concentration of the substance above the background concentration does not present a threat to public health or welfare.

Note: An exemption may be considered under this subsection even if monitoring data indicates no detectable background concentration of the substance.

**(3) CRITERIA FOR GRANTING EXEMPTIONS WHERE THE BACKGROUND CONCENTRATION IS ABOVE A PREVENTIVE ACTION LIMIT.** (a) The department may grant an exemption under this section to a facility, practice or activity which is regulated by the department in an area where the background concentration of nitrate or a substance of public welfare concern attains or exceeds the preventive action limit if the facility, practice or activity is designed to achieve the lowest possible concentration for that substance which is technically and economically feasible and the existing or anticipated increase in the concentration of the substance does not present a threat to public health or welfare.

(b) The department may grant an exemption under this section to a facility, practice or activity which is regulated by the department in an area where the background concentration of a substance of public health concern, other than nitrate, attains or exceeds a preventive action limit for that substance:

1. If the facility, practice or activity has not caused and will not cause the further release of that substance into the environment; or

2. If the background concentration of the substance does not exceed the enforcement standard for that substance, the facility, practice or activity has not caused and will not cause the concentration of the substance to exceed the enforcement standard for that substance at a point of standards application and the facility, practice or activity is designed to achieve the lowest possible concentration of that substance which is technically and economically feasible.

**(4) CRITERIA FOR GRANTING EXEMPTIONS WHERE THE BACKGROUND CONCENTRATION IS ABOVE AN ENFORCEMENT STANDARD.** (a) The department may grant an exemption under this section to a facility, practice or activity which is regulated by the department in an area where the background concentration of nitrate or a substance of public welfare concern attains or exceeds an enforcement standard if the facility, practice or activity is designed to achieve the lowest possible concentration for that substance which is technically and economically feasible and the existing or anticipated increase in the concentration of the substance does not present a threat to public health or welfare.

(b) The department may grant an exemption under this section to a facility, practice or activity which is regulated by the department in an area where the background concentration of a substance of public health concern, other than nitrate, attains or exceeds the enforcement standard for that substance if:

1. The facility has not caused and will not cause the further release of that substance into the environment; or

2. a. The facility is designed to achieve the lowest possible concentration of that substance which is technically and economically feasible; and

b. The existing or anticipated increase in the concentration of the substance has not caused or will not cause an increased threat to public health or welfare; and

c. The existing or anticipated incremental increase in the concentration of the substance by itself, has not exceeded or will not exceed the preventive action limit.

(c) The department shall take action under s. NR 140.26 if it determines that the increase in the concentration of the substance causes an increased threat to public health or welfare or it determines that the incremental increase in the concentration of the substance, by itself, exceeds the preventive action limit.

**(5) CRITERIA FOR GRANTING A TEMPORARY EXEMPTION WHERE INFILTRATION OR INJECTION IS UTILIZED FOR A REMEDIAL ACTION.** (a) *General.* In lieu of an exemption granted in compliance with the criteria in subs. (2) to (4), the department may grant a temporary exemption if the criteria in this subsection are complied with. This exemption applies to the owner or operator of a facility, practice or activity that is undertaking a remedial action that: includes the infiltration or injection of contaminated groundwater or remedial material, has been approved by the department, and will comply with the applicable response objectives under s. NR 140.24 or 140.26 within a reasonable period of time. The owner or operator of the facility, practice or activity may submit a temporary exemption request to the department at the same time or after the department has approved the remedial action.

(b) *Exemption request.* The owner or operator of the facility, practice or activity shall submit a request for a temporary exemption to the department. As part of the request, the applicant shall indicate how the exemption prerequisites under par. (c) and appli-

\*p-1Y Unofficial Text (See Printed Volume). Current through date and Register shown on Title Page.

cable remedial design, operational and monitoring criteria under par. (d) will be met.

**Note:** For most remedial actions, a microcosm or treatability study, or other bench scale or pilot scale study will be required by the department prior to consideration of an exemption for the full-scale remedial action under this section. If a pilot scale study is deemed necessary before an exemption for a full-scale remedial action can be granted, a separate temporary exemption issued under this section is required before the pilot scale study can begin.

(c) *Exemption prerequisites.* As part of the temporary exemption request, the owner or operator shall demonstrate to the satisfaction of the department that all of the following requirements will be met:

1. The remedial action for restoring contaminated soil or groundwater, and any infiltrated or injected contaminated water and remedial material, shall achieve the applicable response objectives required by s. NR 140.24 (2) or 140.26 (2) within a reasonable period of time.

2. The type, concentration and volume of substances or remedial material to be infiltrated or injected shall be minimized to the extent that is necessary for restoration of the contaminated soil or groundwater and be approved by the department prior to use.

3. Any infiltration or injection of contaminated water or remedial material into soil or groundwater will not significantly increase the threat to public health or welfare.

4. No uncontaminated or contaminated water, substance or remedial material will be infiltrated or injected into an area where a floating non-aqueous phase liquid is present in the contaminated soil or groundwater.

5. There will be no expansion of soil or groundwater contamination, or migration of any infiltrated or injected contaminated water or remedial material, beyond the edges of previously contaminated areas, except that infiltration or injection into previously uncontaminated areas may be allowed if the department determines that expansion into adjacent, previously uncontaminated areas is necessary for the restoration of the contaminated soil or groundwater, and the requirements of subd. 1. will be met.

6. All necessary federal, state and local licenses, permits and other approvals are obtained and all applicable environmental protection requirements will be complied with.

**Note:** The issuance of a wastewater discharge permit by the department is required prior to the infiltration or injection of substances or remedial material into unsaturated soil or groundwater. A wastewater discharge permit establishes the effluent or injection limits for substances or remedial material which may be infiltrated or injected into unsaturated soil or groundwater. A temporary exemption granted under this subsection applies to substances or remedial material which may enter groundwater or may be detected at a point of standards applications; it does not apply to substances or remedial material infiltrated or injected into unsaturated soil.

(d) *Remedial action design, operation and monitoring criteria.* In addition to providing information on how the requirements under par. (c) will be met, the application shall specify the following information where applicable.

1. The remedial action design, operation and soil and groundwater monitoring procedures to insure compliance with the requirements under par. (c) and applicable criteria under this paragraph.

2. The level of pre-treatment for contaminated groundwater prior to reinfiltration or reinjection.

3. The types and concentrations of substances or remedial material being proposed for infiltration or injection.

4. The volume and rate of infiltration or injection of contaminated groundwater or remedial material.

5. The location where the contaminated groundwater or remedial material will be infiltrated or injected.

(e) *Granting an exemption.* The department may only grant a temporary exemption under this subsection at the same time or after the department has approved the remedial action. When the department grants an exemption under this subsection, it shall follow the exemption procedures included in sub. (6) and shall require the owner or operator of the facility, practice or activity to comply with the requirements and criteria in pars. (c) and (d). The temporary exemption shall also include:

1. The expiration date of the temporary exemption. The expiration date shall be selected to achieve the applicable response objectives required by s. NR 140.24 (2) or 140.26 (2) within a reasonable period of time, not to exceed 5 years from the effective date of the exemption. The temporary exemption may be reissued following a department review of information documenting the performance of the remedial action and a successful demonstration that reissuance of the exemption is necessary to achieve the response objectives required by s. NR 140.24 (2) or 140.26 (2), necessary relating to the temporary exemption.

(f) *Responses to exemption violations.* If the department determines that the conditions or requirements specified in the temporary exemption are not being met, the department may:

1. Require that the owner or operator of the facility, practice or activity revise the remedial action design, operation or monitoring procedures in accordance with par. (d). All revisions shall comply with the requirements established under pars. (c) and (e) and may require approval from the department prior to implementation.

2. Revoke the exemption and require implementation of an alternate remedial action to restore soil or groundwater quality.

(6) **EXEMPTION PROCEDURES.** If the department grants an exemption under this section for a substance or a remedial material, it shall specify:

(a) The substance or remedial material to which the exemption applies;

(b) The terms and conditions of the exemption, which may include an alternative concentration limit, under which the department may seek a response under s. NR 140.24 or 140.26 relating to the substance or remedial material; and

(c) Any other conditions relating to the exemption.

**History:** Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. (1) (a) and (b), (3) (a), (b) (intro.) and 2., (4) (a) and (b) 1. and (5) (b), Register, October, 1988, No. 394, eff. 11-1-88; am. (1) (b), Register, January, 1992, No. 433, eff. 2-1-92; correction in (4) (b) made under s. 13.93 (2m) (b) 1., Stats., Register, January, 1992, No. 433; am. (1) (b) and (5) (b), Register, March, 1994, No. 459, eff. 4-1-94; renum. (5) to be (6), cr. (5), Register, August, 1995, No. 476, eff. 9-1-95; cr. (1) (c), (d), am. (2) (intro.), (5) (a), (6) (intro.), (a) and (b), Register, December, 1998, No. 516, eff. 1-1-99; r. and recr. (2), Register, March, 2000, No. 531, eff. 4-1-00.

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## Chapter NR 140

APPENDIX I TO TABLE 1  
PUBLIC HEALTH GROUNDWATER QUALITY STANDARDS

Substance	CAS RN <sup>1</sup>	Common synonyms/Trade name <sup>2</sup>
Acetone	67-64-1	Propanone
Alachlor	15972-60-8	Lasso
Aldicarb	116-06-3	Temik
Anthracene	120-12-7	Para-naphthalene
Asbestos	12001-29-5	
Bentazon	25057-89-0	Basagran
Benzene	71-43-2	
Benzo(b)fluoranthene	205-99-2	B(b)F,3,4-Benzofluoranthene
Benzo(a)pyrene	50-32-8	BaP, B(a)P
Boron	7440-42-8	
Bromodichloromethane	75-27-4	Dichlorobromomethane, BDCM
Bromoform	75-25-2	Tribromomethane
Bromomethane	74-83-9	Methyl bromide
Butylate	2008-41-5	
Carbaryl	63-25-2	Sevin
Carbofuran	1563-66-2	Furadan
Carbon disulfide	75-15-0	Carbon bisulfide
Carbon tetrachloride	56-23-5	Tetrachloromethane, Perchloroethane
Chloramben	133-90-4	
Chlordane	57-74-9	
Chloroethane	75-00-3	Ethyl chloride, Monochloroethane
Chloroform	67-66-3	Trichloromethane
Chloromethane	74-87-3	Methyl chloride
Chrysene	218-01-9	1,2-Benzphenanthrene
Cobalt	7440-48-4	
Cyanazine	21725-46-2	Bladex, 2-chloro-4-ethylamino-6-nitriloisopropylamino-s-triazine
Cyanide	57-12-5	
Dacthal	1861-32-1	DPCA, Chlorothal
Dibromochloromethane	124-48-1	Chlorodibromomethane, DBCM
1,2-Dibromo-3-chloropropane	96-12-8	DBCP, Dibromochloropropane
1,2-Dibromoethane	106-93-4	EDB, Ethylene dibromide, Dibromoethane
Dibutyl phthalate	84-74-2	DP, Di-n-butyl phthalate, n-Butyl phthalate
Dicamba	1918-00-9	Banvel
1,2-Dichlorobenzene	95-50-1	o-Dichlorobenzene, o-DCB
1,3-Dichlorobenzene	541-73-1	m-Dichlorobenzene, m-DCB
1,4-Dichlorobenzene	106-46-7	p-Dichlorobenzene, p-DCB
Dichlorodifluoromethane	75-71-8	Freon 12
1,1-Dichloroethane	75-34-3	Ethylidene chloride
1,2-Dichloroethane	107-06-2	1,2-DCA, Ethylene dichloride
1,1-Dichloroethylene	75-35-4	1,1-DCE, 1,1-Dichloroethene, Vinylidene chloride
1,2-Dichloroethylene (cis)	156-59-2	cis-Dichloroethylene, 1,2-Dichloroethene (cis)
1,2-Dichloroethylene (trans)	156-60-5	trans-1,2-Dichloroethylene
2,4-Dichlorophenoxyacetic acid	94-75-7	2,4-D
1,2-Dichloropropane	78-87-5	Propylene dichloride
1,3-Dichloropropene (cis/trans) <sup>3</sup>		Telone, DCP, Dichloropropylene
Di(2-ethylhexyl) phthalate	117-81-7	DEHP, Bis(2-ethylhexyl) phthalate, 1,2-Benzenedicarboxylic acid, Bis(2-ethylhexyl)ester

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Substance	CAS RN <sup>1</sup>	Common synonyms/Trade name <sup>2</sup>
Dimethoate	60-51-5	
2,4-Dinitrotoluene	121-14-2	2,4-DNT, 1-methyl-2,4-dinitrobenzene
2,6-Dinitrotoluene	606-20-2	2,6-DNT, 2-methyl-1,3-dinitrobenzene
Dinoseb	88-85-7	2-(1-methylpropyl)-4,6-dinitrophenol
Dioxin	1746-01-6	2,3,7,8-TCDD, 2,3,7,8-Tetrachlorodibenzo-p-dioxin
Endrin	72-20-8	
EPTC	759-94-4	<i>Eptam, Eradicane</i>
Ethylbenzene	100-41-4	Phenylethane, EB
Ethylene glycol	107-21-1	
Fluoranthene	206-44-0	Benzo(jk)fluorene
Fluorene	86-73-7	2,3-Benzidine, Diphenylenemethane
Fluoride	16984-48-8	
Fluorotrichloromethane	75-69-4	<i>Freon 11, Trichlorofluoromethane</i>
Formaldehyde	50-00-0	
Heptachlor	76-44-8	<i>Velsicol</i>
Heptachlor epoxide	1024-57-3	
Hexachlorobenzene	118-74-1	Perchlorobenzene, <i>Granox</i>
N-Hexane	110-54-3	Hexane, Skellysolve B
Hydrogen sulfide	7783-06-4	Dihydrogen sulfide
Lindane	58-89-9	
Mercury	7439-97-6	
Methanol	67-56-1	Methyl alcohol, Wood alcohol
Methoxychlor	72-43-5	
Methylene chloride	75-09-2	Dichloromethane, Methylene dichloride
Methyl ethyl ketone	78-93-3	MEK, 2-Butanone
Methyl isobutyl ketone	108-10-1	MIBK, 4-Methyl-2-pentanone, Isopropylacetone, <i>Hexone</i>
Methyl tert-butyl ether	1634-04-4	MTBE, 2-Methoxy-2-methyl-propane, tert-Butyl methyl ether
Metolachlor	51218-45-2	<i>Dual, Bicep, Milocep</i>
Metribuzin	21087-64-9	Sencor, Lexone
Monochlorobenzene	108-90-7	Chlorobenzene
Naphthalene	91-20-3	
N-Nitrosodiphenylamine	86-30-6	NDPA
Pentachlorophenol	87-86-5	PCP, Pentachlorohydroxybenzene
Phenol	108-95-2	
Picloram	1918-02-1	<i>Tordon, 4-amino-3,5,6-trichloropicolinic acid</i>
Polychlorinated biphenyls <sup>4</sup>		PCBs
Prometon	1610-18-0	<i>Pramitol, Prometone</i>
Pyrene	129-00-0	Benzo(def)phenanthrene
Pyridine	110-86-1	Azabenzene
Simazine	122-34-9	<i>Princep, 2-chloro-4,6-diethylamino-s-triazine</i>
Styrene	100-42-5	Ethenylbenzene, Vinylbenzene
1,1,1,2-Tetrachlorethane	630-20-6	1,1,1,2-TCA
1,1,2,2-Tetrachloroethane	79-34-5	1,1,2,2-TCA
Tetrachloroethylene	127-18-4	Perchloroethylene, PERC, Tetrachloroethene
Tetrahydrofuran	109-99-9	THF
Toluene	108-88-3	Methylbenzene
Toxaphene	8001-35-2	
1,2,4-Trichlorobenzene	120-82-1	
1,1,1-Trichloroethane	71-55-6	Methyl chloroform
1,1,2-Trichloroethane	79-00-5	1,1,2-TCA, Vinyl trichloride
Trichloroethylene	79-01-6	TCE, Chloroethene

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Substance	CAS RN <sup>1</sup>	Common synonyms/Trade name <sup>2</sup>
2,4,5-Trichlorophenoxypropionic acid	93-72-1	2,4,5-TP, <i>Silvex</i>
1,2,3-Trichloropropane	96-18-4	1,2,3-TCP, Glycerol trichlorohydrin
Trifluralin	1582-09-8	<i>Treflan</i>
1,2,4-Trimethylbenzene	95-63-6	
1,3,5-Trimethylbenzene	108-67-8	
Vanadium	7440-62-2	
Vinyl chloride	75-01-4	VC, Chloroethene
Xylene <sup>5</sup>		

<sup>1</sup>Chemical Abstracts Service (CAS) registry numbers are unique numbers assigned to a chemical substance. The CAS registry numbers were published by the U.S. Environmental Protection Agency in 40 CFR Part 264, Appendix IV

<sup>2</sup>Common synonyms include those widely used in government regulations, scientific publications, commerce and the general public. A trade name, also known as the proprietary name, is the specific, registered name given by a manufacturer to a product. Trade names are listed in *italics*. Common synonyms and trade names should be cross-referenced with CAS registry number to ensure the correct substance is identified.

<sup>3</sup>This is a combined chemical substance which includes *cis* 1,3-Dichloropropene (CAS RN 10061-01-5) and *trans* 1,3-Dichloropropene (CAS RN 10061-02-6).

<sup>4</sup>Polychlorinated biphenyls (CAS RN 1336-36-3); this category contains congener chemicals (same molecular composition, different molecular structure and formula), including constituents of Aroclor-1016 (CAS RN 12674-11-2), Aroclor-1221 (CAS RN 11104-28-2), Aroclor-1232 (CAS RN 11141-16-5), Aroclor-1242 (CAS RN 53469-21-9), Aroclor-1248 (CAS RN 12672-29-6), Aroclor-1254 (CAS RN 11097-69-1), and Aroclor-1260 (CAS RN 11096-82-5).

<sup>5</sup>Xylene (CAS RN 1330-20-7) refers to a mixture of three isomers, *meta*-xylene (CAS RN 108-38-3), *ortho*-xylene (CAS RN 95-47-6), and *para*-xylene (CAS RN 106-42-3)



Photo 2  
NE Area of the Subject Property;  
Methane Gas Probe GP-17 in the  
Foreground; Looking NE

Photo 1  
Southeast Area of the Subject  
Property; Coppis Food Center  
in the Distance; Looking SE

Photo 4  
NW Area of The Portion of the  
Subject Property bounded by a  
Chain Link Fence; Looking NW  
Towards The Rifken Group's Building

Photo 3  
NE Area of the Subject Property  
As Seen From the Closed Trux  
Landfill to the North of the  
Subject Property; Looking South

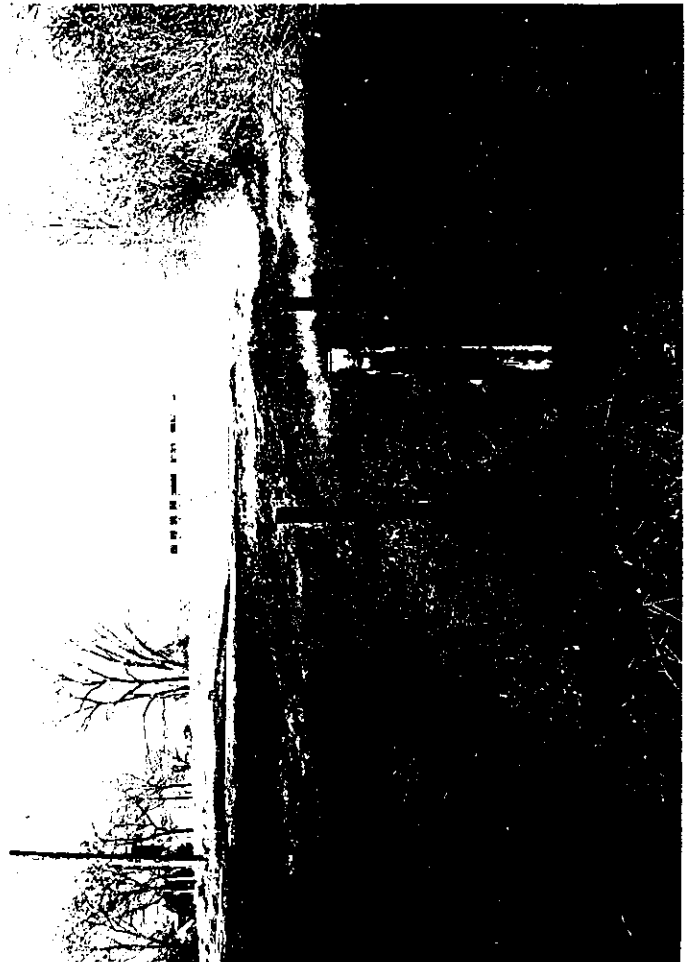




Photo 6  
Vacant Land Along West Side of the  
Subject Property As Seen From the  
NW Corner of the Property;  
Packers Ave. on Right; Looking SE

Photo 5  
Subject Property As Seen From  
the NW Corner of the Property;  
Looking E-SE Towards Trees in NW  
Area of Fenced-In Part of Property

Photo 8  
Vacant Land at the Southern  
End of the Subject Property;  
Looking West From Near SW  
Corner of the Property

Photo 7  
Well TG-2 Along West Side of the  
Subject Property; Access Road to the  
Former Treatment Plant; Looking  
North Towards NW Area of Property

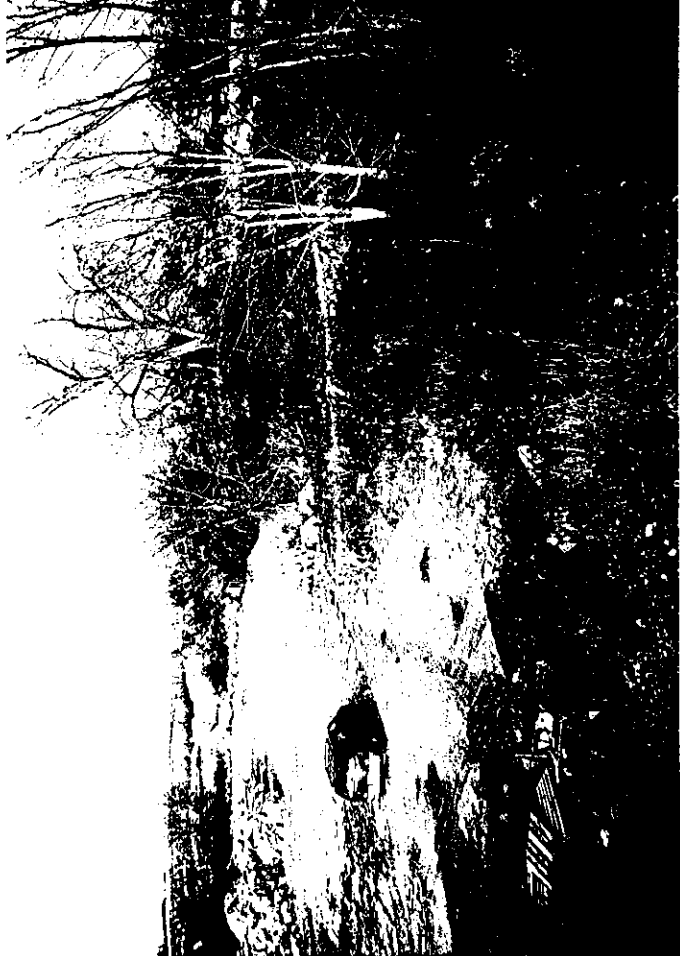


Photo 10  
East End of Pile of Concrete Pieces  
at the Property on Fill Material  
That Was Brought to the Property;  
Looking NE

Photo 9  
Pile of Concrete Pieces in the  
Central Area of the Subject  
Property; Looking North

Photo 12  
The Rifken Group Building at  
1402 Pankratz Street North  
of the NW Area of the Subject  
Property; Looking NE

Photo 11  
North End of Pile of Concrete Pieces  
at the Property Near the Road that  
Enters the West Side of the Former  
Treatment Plant Area; Looking East



Photo 14  
Part of the Bridges Golf Course  
East of the NE Area of the  
Subject Property, Looking SE.  
Copp's & Shopko in the Distance

Photo 13  
Southern End of the Inactive  
Truax First Landfill; Looking SW  
From North of the NE Corner of the  
Subject Property

Photo 16  
Packers Avenue West of the  
NW Area of the Subject Property;  
Looking West

Photo 15  
Copp's Food Center and Parking  
Lot East of the SE Area of the  
Subject Property; Looking NE



Photo 18  
NW End of the Former Sludge Beds  
at the Subject Property;  
Looking SE

Photo 17  
Wells MW-5, MW-5A and MW-5B in  
SW Area of the Subject Property,  
Looking NW

Photo 20  
Boat and Plastic Chair Which  
Someone Has Disposed at the  
Subject Property;  
Looking SE

Photo 19  
Pipe to the West of the NW  
Corner of the Former Sludge  
Beds at the Subject Property;  
Looking North