

J. Bottches

WARZYN



ENGINEERING INC

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October 13, 1978
C 7606

Mr. Earl Pedretti, Chairman
Town of Onalaska
Route 2
Onalaska, WI 54650

Re: Groundwater Monitoring
Onalaska Sanitary Landfill

Dear Mr. Pedretti:

Discussed below are the water quality results of the groundwater monitoring program for the Onalaska Sanitary Landfill. The attached data include the results of the organic analyses sampled on July 19, 1978 relative to possible groundwater contamination due to naphtha disposal at the subject site. Also discussed are recent groundwater flow directions measured at the site since the submittal of the In-Field Conditions Report as well as available information requested by the DNR regarding construction details on two private wells.

Groundwater Flow Directions

Measurements of water levels in the observation wells indicated some shifts in the direction of groundwater flow under the site. The attached Drawings C 7606-A12 and A13 illustrate the configuration of the water table on July 19, 1978, and August 28, 1978, respectively.

Since submittal of the In-Field Conditions Report on April 17, 1978, the direction of groundwater flow has shown considerable variability. These changes are directly related to elevation changes of the Black River which either recharges the adjacent sand and gravel aquifer or receives groundwater discharge as the river level fluctuates. When the Black River recharges the sand and gravel aquifer, the direction of groundwater flow occurs in a south to southeast orientation (Drawing C 7606-A13). On July 19, 1978, the surface water level was below the adjacent groundwater levels and groundwater was discharging into the Black River. Under these conditions, groundwater flows towards the river in a more southwest orientation (Drawing C 7606-A12). Vertical gradients remained very slightly downward on the order of 10^{-3} during July and August.

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OCT 16 1978

DNR La Crosse Area

The attached groundwater contour maps for July and August, 1978 do not include measurements taken from Well No. B5 in that we believe this particular well may have been tampered with. Partial plugging of the well is indicated by a very slow recovery rate when bailed even though the boring logs indicate the screen is in sand and gravel type deposits. Furthermore, reduction in depth to water readings from this well indicate a distinct groundwater mound in this area which we believe is related to a possible change in the casing elevation and not the water elevation. We would recommend that Well No. B5 be re-surveyed to confirm this during the next quarter.

Groundwater Quality

The analytical results from groundwater samples taken on the subject dates are shown on Drawing C 7606-A10 and A11. Also included on Drawing C 7606-A9 are the analytical results on March 21, 1978 from the In-Field Conditions Report. Values of pH tended to be highest in upgradient Well No. 5 and lowest in Wells 2, 2A and 4 located within or near the areas of waste disposal. Over the three sampling periods, pH ranged from 6.55 to 7.9. Specific conductance was the most consistent parameter being greatest in Wells 2 and 2A (up to 1290 micromhos/cm) near the center of the disposal site. Downgradient Wells 3A and 4 were also consistently higher than upgradient Wells 1 and 5. Also included on Drawing C 7606-A9 are the analytical results on March 21, 1978 from the In-Field Conditions Report.

Similar trends as those above were also noted with respect to chloride and COD, but less consistently. In general, higher concentrations of chloride and COD were observed in wells located within or downgradient of the disposal site. Dissolved iron tended to be highly variable ranging from 0.10 mg/l to 21.5 mg/l such that trends in iron concentration were not evident.

Of significant concern is the impact of the Onalaska Sanitary Landfill on the adjacent private well (C.R. Miller residence) located approximately 300' south of the site. A sample from the Miller well was obtained on July 19, 1978 and analyses included gasoline, kerosene and petroleum ether. These organic compounds are common constituents of naphtha, a waste product of a local manufacturing firm which released approximately 2500 gallons of this compound per month at the site. Warzyn Engineering boring crews also noted the smell of organic compounds in soil samples at Boring Locations 3A and 4.

Per our recommendations and after consultation with the DNR representatives, it was agreed to perform a scan of organic compounds on samples from Well No.'s 3A and 4 and the Miller well, to determine the extent of contamination of local groundwater quality by the naphtha compounds. These analyses are shown on Drawing C 7606-A10. Also note the attached cover letter received from Camp, Dresser & McKee, the laboratory which performed the analyses using gas chromatography techniques.

The results of the organic analysis indicate the presence of "gasoline-like" compounds in Well No. 4 only, at concentrations of 0.35 mg/liter. "Gasoline-like" compounds, kerosene and petroleum ether were not found at the detection limits indicated in the other wells which included the Miller residence. This analysis does not exclude the possible presence of these compounds at lower detection limits nor other compounds longer than about 16 carbon alkanes as specified in the laboratory report.

With respect to the other parameters analyzed, concentrations of chloride, COD and iron at the Miller well are generally more similar to the concentrations of these elements observed in or downgradient of the landfill than upgradient of the disposal area. Chloride concentrations in the Miller well of 12.0 mg/l were comparable to downgradient Well No.'s 3A and 4. The COD concentrations in the Miller well was the highest (352 mg/l) among all wells sampled. Although iron concentrations in the private well were higher than those observed within and downgradient of the landfill, upgradient Well No. 1 exhibited the highest iron value (1.23 mg/l).

As mentioned earlier, the data on chloride, COD and iron tended to be less consistent than specific conductivity measurements between sampling intervals. Examination of pH and specific conductance in the private well however, shows values which are comparable to the wells upgradient of the waste area.

The quality of water in the Miller well significantly exceeded the drinking water standard of 0.3 mg/liter for iron, exhibiting a concentration of 0.57 mg/liter. This high iron value is somewhat unexpected considering the owner indicated no taste problems with the well when questioned by Warzyn Engineering Inc. personnel on the date of sampling. It may be possible that high iron concentrations have been typical of the well for a long period of time such that possible increases associated with the landfill are unnoticeable or that high iron concentrations occur naturally in the groundwater at the depth the Miller well is pumping.

Private Well Construction Data

1. Miller Well

The occupant and owner of the private well located about 300' south of the Onalaska Sanitary Landfill is Mr. Cecil R. Miller, P.O. Box 184, Route 2, Onalaska, WI 54650. Based on Mr. Miller's description, the well appears to consist of a hand driven sand point set at a depth of 63'. The well was constructed in the Fall of 1971 by Mr. Prebee of French Island in La Crosse County. There is no log in the DNR files on this well. Mr. Miller has indicated no problems with the well with respect to smell, taste, or color. There is no water softening device connected to the home distribution system.

It has been brought to our attention that a recent analysis of a sample obtained by Mr. Miller from his well has indicated bacterial contamination and such that he is required to boil his drinking water. At this time, we cannot comment on the source of the bacterial contamination, whether it is related to the landfill, a contaminated sample bottle or contamination within the well installation only. Without further information, we would suspect that the latter two possibilities are the more probable.

2. Abandoned Rendering Plant Well

Per DNR requests, we have also sought information on the abandoned well adjacent to the uninhabited rendering plant building to the northwest of the Onalaska Sanitary Landfill. The Bly Rendering Works of Viroqua, Wisconsin, previous owners of the well, and Rahn Plumbing, the well installer, were contacted for construction details. The well is believed to be a 6" casing installed to a depth of 180' between 1966 and 1968. The capacity of the well was estimated to be on the order of 70 gallons/minute. No well log was available from the DNR files.

Conclusions & Recommendations

In summary, groundwater flow directions under the site are closely associated with Black River level fluctuations changing from a southeast to southwest orientation as the river level rises and declines, respectively. Vertical gradients remained unchanged. Anomalous water level elevations have been observed in Observation Well No. 5 which warrant further investigation with respect to possible casing elevation changes. We recommend that this observation well be re-surveyed during the next quarterly sampling period in January, 1979 and the reasons for apparent plugging of this well evaluated.

Water quality data indicates that elevated concentrations of several parameters appear to be associated with the landfill site. These elevated concentrations, however, represent a relatively minor groundwater contamination problem, mainly due to the small volumes of solid waste disposed at the Onalaska Sanitary Landfill. The contamination would be expected to be reduced somewhat in the near future following abandonment of the site with proper soil types and promotion of surface water drainage off the site.

Comparison of the water quality data in the downgradient private well with wells in and adjacent to the landfill indicate pH and specific conductance values comparable to Upgradient Wells 1 and 5. Chloride, COD and iron concentrations, however, may indicate some impact of the landfill on the private well. Considering that the private well is set at a depth of 63' and vertical groundwater gradients were very slight, it is possible that the concentrations of these parameters in the Miller well are associated with natural changes in groundwater quality with depth. The Miller well should be included in future quarterly monitoring of local groundwater quality. Furthermore, we recommend that the Town of Onalaska and the DNR advise Mr. Miller as to the results of these analyses and the necessity to perform additional monitoring.

There has been some verbal indication that the area northwest of the landfill may be developed with residential homes relying on the Bly well as a public water supply. Given the close proximity of the landfill, the coarseness of subsurface deposits and probable drawdowns around such a public water supply well, we would recommend that the new owners of the Bly well also be advised of the possible unsuitability of this well as a drinking water source.

For your convenience, we have forwarded copies of this report to the Department of Natural Resources. If you should have any questions on the above or if we can be of further assistance, please do not hesitate to contact us.

Very truly yours,

WARZYN ENGINEERING INC.

Robert J. Karnauskas

Robert J. Karnauskas
Hydrogeologist

RJK/pf

Encls: C 7606-A9 Water Quality Monitoring Results, March 21, 1978
C 7606-A10 Water Quality Monitoring Results, July 19, 1978
C 7606-A11 Water Quality Monitoring Results, August 28, 1978
C 7606-A12 Groundwater Contour Map, July 19, 1978
C 7606-A13 Groundwater Contour Map, August 28, 1978

Cover letter from Camp, Dresser, McKee Laboratory report, August 28, 1978

cc: Tom Ryan, DNR, Madison
~~Jim~~ Boettcher, DNR District Office, La Crosse
Jeff Miller, DNR, Westcentral District, Eau Claire

WATER QUALITY MONITORING RESULTS

March 21, 1978

DWN PJS

CHK'D RJK

APP'D *Reinhold Kammacher*

DATE 4/17/78

CT606-A9

SAMPLE LOCATION	WATER ELEVATION	PARAMETER TESTED								
		PH	TEMPERATURE °C	CONDUCTIVITY μ mhos/cm ²	CHLORIDE ppm	PPM	COD	DISS. IRON ppm		
B #1	643.14	7.2	--	280	3.5	155	0.10			
B #2A	642.90	7.1	--	1120	6.5	379	0.15			
B #2	642.92	7.0	--	730	45.5	192	0.10			
B #3A	642.78	7.4	--	590	16.5	246	0.10			
B #4	642.91	7.6	--	640	10.5	394	21.5			
B #5	643.16	7.9	--	280	6.5	125	0.10			

WARZYN ENGINEERING AND SERVICE COMPANY, INC.
 MARISON
 Consulting Engineers
 WISCONSIN
 WATER QUALITY
 TOWN OF ONALASKA SANITARY LANDFILL
 PART OF THE SE 1/4, SECT. 9, T17N, R8W,
 ONALASKA, LA CROSSE COUNTY, WISCONSIN

DWN

NPB

CHK'D CGK

APP'D

DATE

9/13/78

C 7606 - A10

WATER QUALITY MONITORING RESULTS

Date of Sampling: 7/19/78

SAMPLE LOCATION	WATER ELEVATION	PARAMETER TESTED										
		PH	TEMPERATURE °C	CONDUCTIVITY μ mhos/cm ² *	CHLORIDE PPM	PPM	COD PPM	DISS. IRON PPM	GASOLINE (LIKE) PPM	KEROSENE PPM	PETROLEUM ETHER PPM	PETROLEUM PPM
B1	644.18	7.30		340	5.0	<1	1.23					
B2	644.04	6.90		870	30.5	71	0.23					
B2a	644.01	6.90		1050	46.0	76	0.43					
B3a	644.02	7.05		655	10.0	49	0.20	<0.05	<0.05	<150		
B4	643.95	6.55		745	10.5	213	0.47	0.35	<0.1	<250		
B5	645.08	7.05		450	4.0	20	0.20					
Private Home		7.15		420	12.0	352	0.57	<0.1	<0.1	<25		
River Staff Gauge	643.91											

* Conductivity at 25°C

WATER QUALITY DATA
ONALASKA SANITARY LANDFILL
ONALASKA, WISCONSIN



WARZYN ENGINEERING AND SERVICE COMPANY, INC.
MADISON
Consulting Engineers
WISCONSIN

WATER QUALITY MONITORING RESULTS

Date of Sampling: 8/28/78

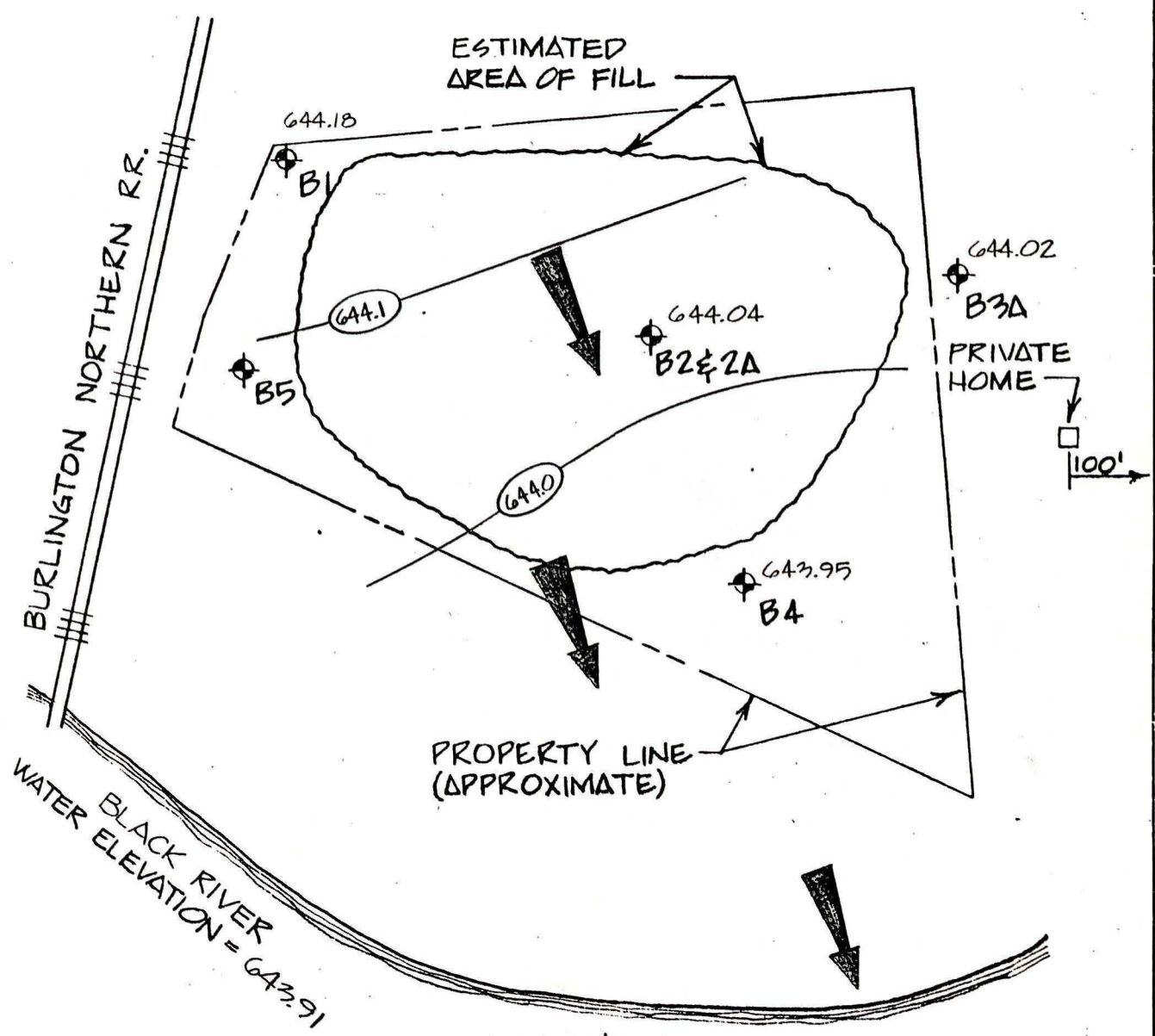
DWM NPB CHK D CGK APP D DATE 9/27/78 C 7606-A11

SAMPLE LOCATION	WATER ELEVATION	PARAMETER TESTED												
		PH	TEMPERATURE °C	CONDUCTIVITY μ mhos/cm ² *	CHLORIDE PPM	PPM	COD	DISS. IRON PPM						
B-1	643.85	6.8		285	6.0	88	0.20							
B-2	643.57	6.9		1290	5.5	118	1.33							
B-2A	643.55	6.95		1075	2.5	71	2.25							
B-3A	643.33	7.2		460	5.0	157	0.15							
B-4	643.65	6.7		550	9.5	83	0.30							
B-5	644.83	7.6		450	6.5	26	0.10							
Staff Gauge	644.83													

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WATER QUALITY DATA
 ONALASKA SANITARY LANDFILL
 ONALASKA, WISCONSIN

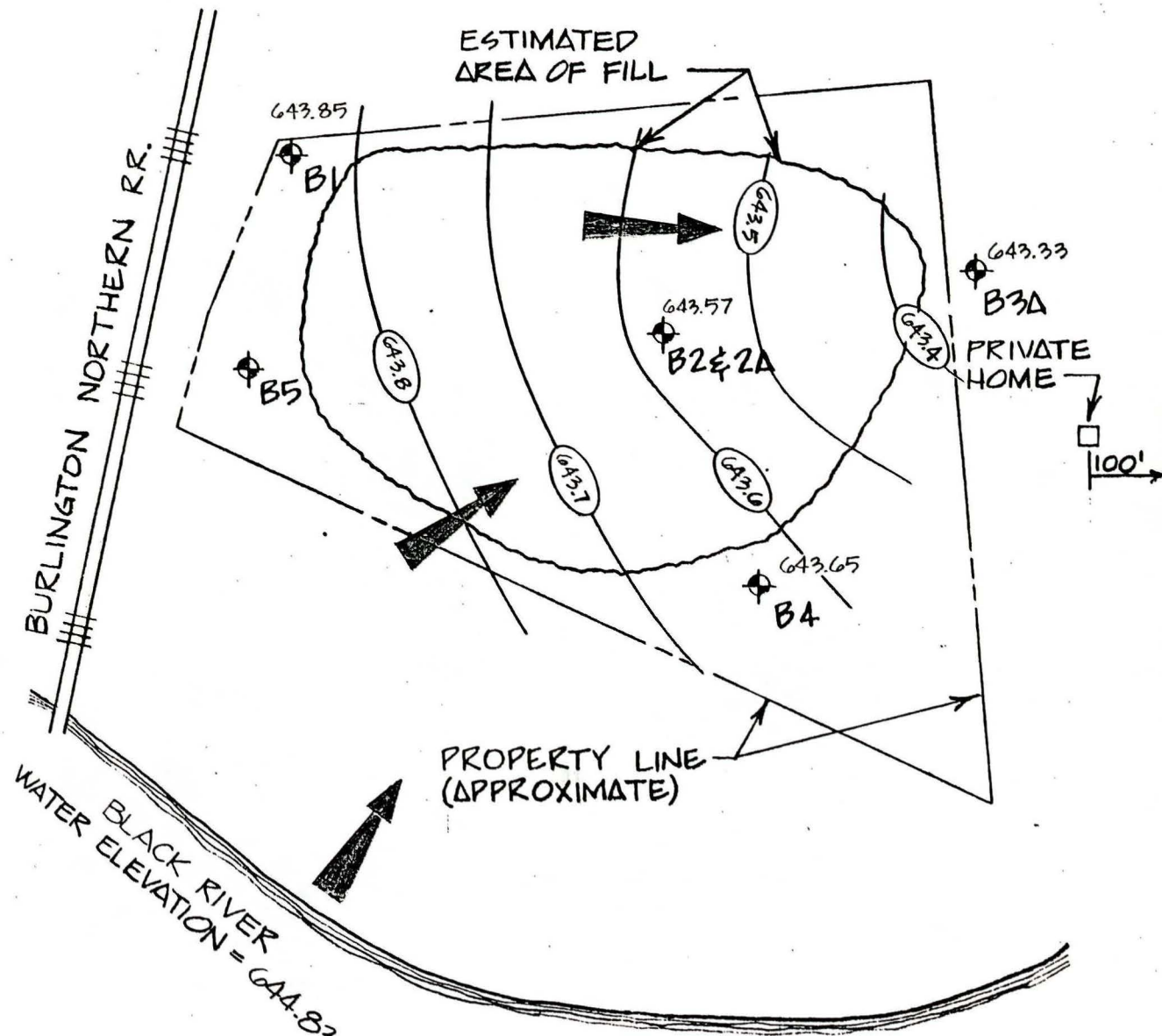
* Conductivity at 25°C



NORTH
 SCALE: 1" = 200'

- LEGEND**
- GROUNDWATER CONTOUR
 - DIRECTION OF HORIZONTAL GROUNDWATER FLOW
 - GROUNDWATER MONITORING WELL, NUMBER & ELEVATION

	GROUNDWATER CONTOUR MAP 7/19/78 DATA		
	ONALASKA SANITARY LANDFILL ONALASKA, WISCONSIN		
DWN TDH	CHK'D CGK	APP'D <i>Robert J. Kennen</i>	DATE 10/13/78
			C7606-A12



NORTH
 SCALE: 1" = 200'

- LEGEND**
- GROUNDWATER CONTOUR
 - DIRECTION OF HORIZONTAL GROUNDWATER FLOW
 - GROUNDWATER MONITORING WELL, NUMBER & ELEVATION

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 ENGINEERING INC

GROUNDWATER CONTOUR MAP
 8/28/78 DATA

ONALASKA SANITARY LANDFILL
 ONALASKA, WISCONSIN

DWN TDH	CHK'D CGK	APP'D Robert Kowalski	DATE 10/13/78	C7606-A13
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