WARZYN
ENGINEERING INC

Consulting Engineers • Civil • Structural • Geotechnical • Materials Testing • Soil Borings • Surveying

1409 EMIL STREET, P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

March 22, 1979
C 7606W

Mr. Carl Pedretti, Chairman
Town Hall
Town of Onalaska
RR 2
Onalaska, WI 54650

Re: Groundwater Monitoring -
Onalaska Sanitary Landfill

Dear Mr. Pedretti:

Discussed below are the results of groundwater quality monitoring at the Onalaska Sanitary Landfill for samples obtained on December 20, 1978, and January 29, 1979. The groundwater samples obtained in January, 1979 coincide with the date of sampling of the Cecil Miller well by the Department of Natural Resources. For your convenience, a copy of this data has been forwarded to the appropriate DNR personnel, Mr. Cecil Miller and Assemblyman Virgil Roberts.

A. Groundwater Flow Directions

Measurements of groundwater levels in the observation wells indicate groundwater flow directions similar to those observed in October, 1978. The Black River is recharging the adjacent sand and gravel aquifer resulting in a southerly direction of groundwater flow. As shown on the attached Drawings C 7606-A14 and A15, the Cecil Miller residence is downgradient of the Onalaska Sanitary Landfill. Vertical gradients have remained very slightly downward at approximately 10^{-3} to 10^{-4}. Groundwater elevations remain within approximately 1' of previously reported levels.

B. Groundwater Quality

Results of the chemical analysis of samples from the landfill observation wells and the Miller well are also attached as obtained on December 20, 1978 and January 29, 1979. Conductivity, chloride and, to a lesser extent, COD concentrations tend to be higher in Wells 2, 2A, 3A and 4 within or downgradient of the landfill than Wells 1 and 5 located upgradient. In contrast, iron exhibits the opposite trend, being lowest in downgradient Wells 3A and the Miller well with higher concentrations occurring upgradient and within the landfill.

Compared to previous monitoring results, the pH of all wells monitored appears to show a general decrease. Iron generally tends to show increasing concentrations over time except at the Miller well in which there has been essentially no change in the iron concentration.

Based primarily on conductivity and chloride levels, it appears that the Onalaska Sanitary Landfill is affecting groundwater quality immediately below and adjacent to the fill area. The extent of contamination with distance downgradient from the landfill is unknown. It does not appear that sufficient data is available to conclusively assess whether groundwater quality has been adversely affected in the Miller well. Based on testing done to date, contamination is not apparent. As discussed in our previous report, there are questions as to the Miller's well installation and whether it meets current well codes. Moreover, our analysis is complicated by the fact that the Miller well is substantially deeper than the monitoring wells installed in the vicinity of the landfill. We do not have sufficient data to determine whether the variances in the quality of the Miller well are attributable to landfill contamination or changes in groundwater quality with depth in the aquifer.

On March 9 and 14, 1979, Warzyn Engineering Inc. received analytical data supplied by the DNR on chemical analysis of the Miller well water. The State Laboratory of Hygiene did not detect bacteriological contamination nor hydrocarbon contamination at the one ppm detection limit. Moreover, an analysis for thirteen other parameters (Table 1) indicated the well was within applicable Wisconsin drinking water standards except for iron which was exceeded by less than 1 mg/l. Iron concentrations in groundwater in excess of 1 mg/l are quite common in many areas.

Closing Remarks

As discussed previously, our recommendation at this point is to expand the sampling program in the area of the landfill to include sampling of additional private wells. We will also expand the number of analytical parameters to include nitrate-nitrogen, sulfate and hardness. This expanded monitoring program has already commenced with our routine sampling of the observation wells and the Miller well on March 21, 1979.

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TABLE 1

SUMMARY OF DEPARTMENT OF NATURAL RESOURCES
ANALYSES OF SAMPLES FROM THE CECIL R. MILLER RESIDENCE,
TOWN OF ONALASKA, WISCONSIN

PARAMETER	DATE DEC. 28, '78	DATE JAN 29, '79	DRINKING WATER STANDARDS[1]
Lead, ug/l	<3	<3	50
Cadmium, ug/l	0.7	<0.2	10
Chromium, ug/l	<3	<3	50
Copper, ug/l	-	<3	1000
Arsenic, ug/l	-	<10	50
Iron, mg/l	-	1.2	0.3
COD, mg/l	-	15	-
Residue (NFLT), mg/l	-	2	500
Conductivity, umho/cm	-	830	-
Chloride, mg/l	70	70	250
Mercury, ug/l	-	0.25	2
Nitrate + Nitrate, mg/l	<0.5	-	10[2]
pH	7.7	-	-
Coliform Bacteria	-	0	0
Gasoline, mg/l	-	<1	-
Petroleum Ether, mg/l	-	<1	-
Naptha, mg/l	-	<1	-
Kerosine, mg/l	-	<1	-

[1] Chapter NR 109, Wisconsin Administrative Code

[2] 10 mg/l standard applies to Nitrate-N, only

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We will advise you in the next several weeks as to the results of this additional sampling and suggest we meet to discuss various alternatives to resolve this matter. Please feel free to contact us if you should have any questions on the above or desire further clarification.

Very truly yours,

WARZYN ENGINEERING INC.

Robert J. Karnauskas
Hydrogeologist

RJK/lac

Enclosures: Groundwater Contour Map, December 20, 1978
Groundwater Contour Map, January 29, 1979
Water Quality Monitoring Results, December 20, 1978
Water Quality Monitoring Results, January 29, 1979

cc: Mr. Jack Eslien, DNR, Westcentral District, 1300 W. Clairemont Avenue, Eau Claire, WI 54701

Mr. Cecil Miller, Box 184, Route 2, Onalaska, WI 54650

Mr. Virgil Roberts, Assemblyman, 94th District, 308 Park Lane, Holman, WI 54636

Mr. Jim Boetcher, DNR, 3550 Mormon Coule Road, State Office Building La Crosse, WI 54601

Mr. Jeff Miller, Westcentral District, 1300 W. Clairemont Avenue Eau Claire, WI 54701

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WATER QUALITY MONITORING RESULTS

Date of Sampling: 12/20/78

SAMPLE LOCATION	WATER ELEVATION	PARAMETER TESTED: pH	TEMPERATURE °C	CONDUCTIVITY μmhos/cm²	CHLORIDE PPm	COD PPm	DISS. IRON PPm					
B1	643.15	6.30		184	3.5	5	3.31					
B2	642.94	6.30		960	54	59	1.07					
B2A	642.92	6.85		770	37	61	1.92					
B3A	642.82	7.05		510	26.5	12	<0.02					
B4	642.93	6.25		610	23	348	28.0					
B5	644.12	7.05		360	8.5	12	0.05					
Private Home			NO SAMPLE (NO ONE HOME)									
River Staff Gauge	643.55											

Conductivity at 25°C

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MADISON Consulting Engineers WISCONSIN

WATER QUALITY DATA
ONALASKA SANITARY LANDFILL
ONALASKA, WISCONSIN

DWN jas | CHK'D CGK | APP'D Robert Kennedy | DATE 3/22/79 | C 7606W

WATER QUALITY MONITORING RESULTS

Date of Sampling: 1/29/79

SAMPLE LOCATION	WATER ELEVATION	PARAMETER TESTED: pH	TEMPERATURE °C	CONDUCTIVITY μmhos/cm²	CHLORIDE PPM	COD PPM	DISS. IRON PPM					
B-1	643.40	6.50		230	13.0	85	5.15					
B-2	643.15	6.60		980	50.0	88	4.65					
B-2A	643.12	6.60		755	33.5	127	7.55					
B-3A	642.98	6.20		555	26.0	36	0.05					
B-4	643.14	6.60		620	12.0	253	29.5					
B-5	644.41	6.75		460	7.5	20	1.6					
MILLER HOME		6.70		650	73.0	61	0.68					
RIVER STAFF GAUGE	644.45		(FROZEN)									

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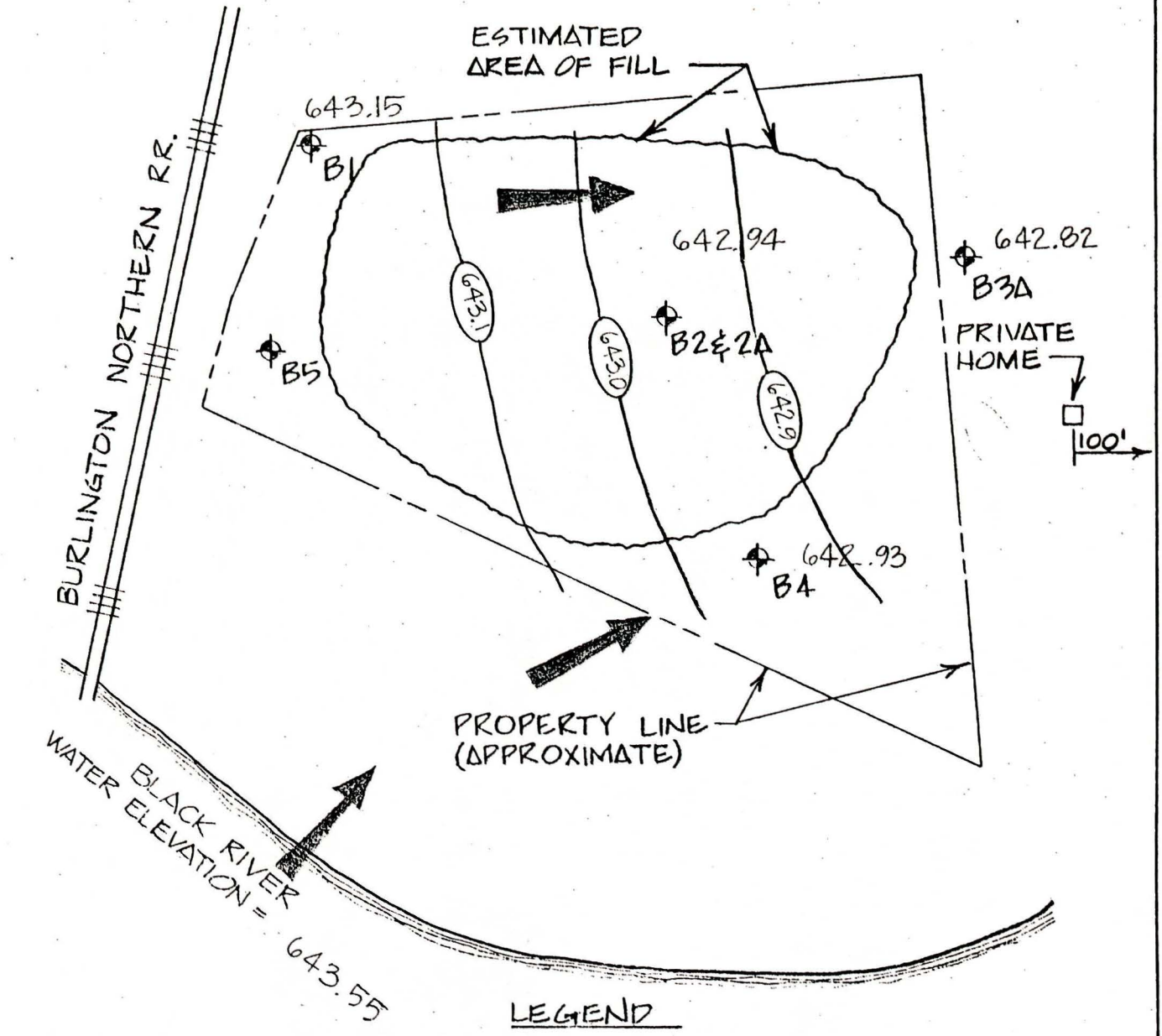
MADISON Consulting Engineers WISCONSIN

WATER QUALITY DATA
ONALASKA SANITARY LANDFILL
ONALASKA, WISCONSIN

DWN jas | CHK'D CGK | APP'D Robert Kaumeyer | DATE 3/22/79 | C 7606



LEGEND

(640) GROUNDWATER CONTOUR

DIRECTION OF HORIZONTAL GROUNDWATER FLOW

B4 GROUNDWATER MONITORING WELL, NUMBER & ELEVATION

NORTH

SCALE: 1" = 200'

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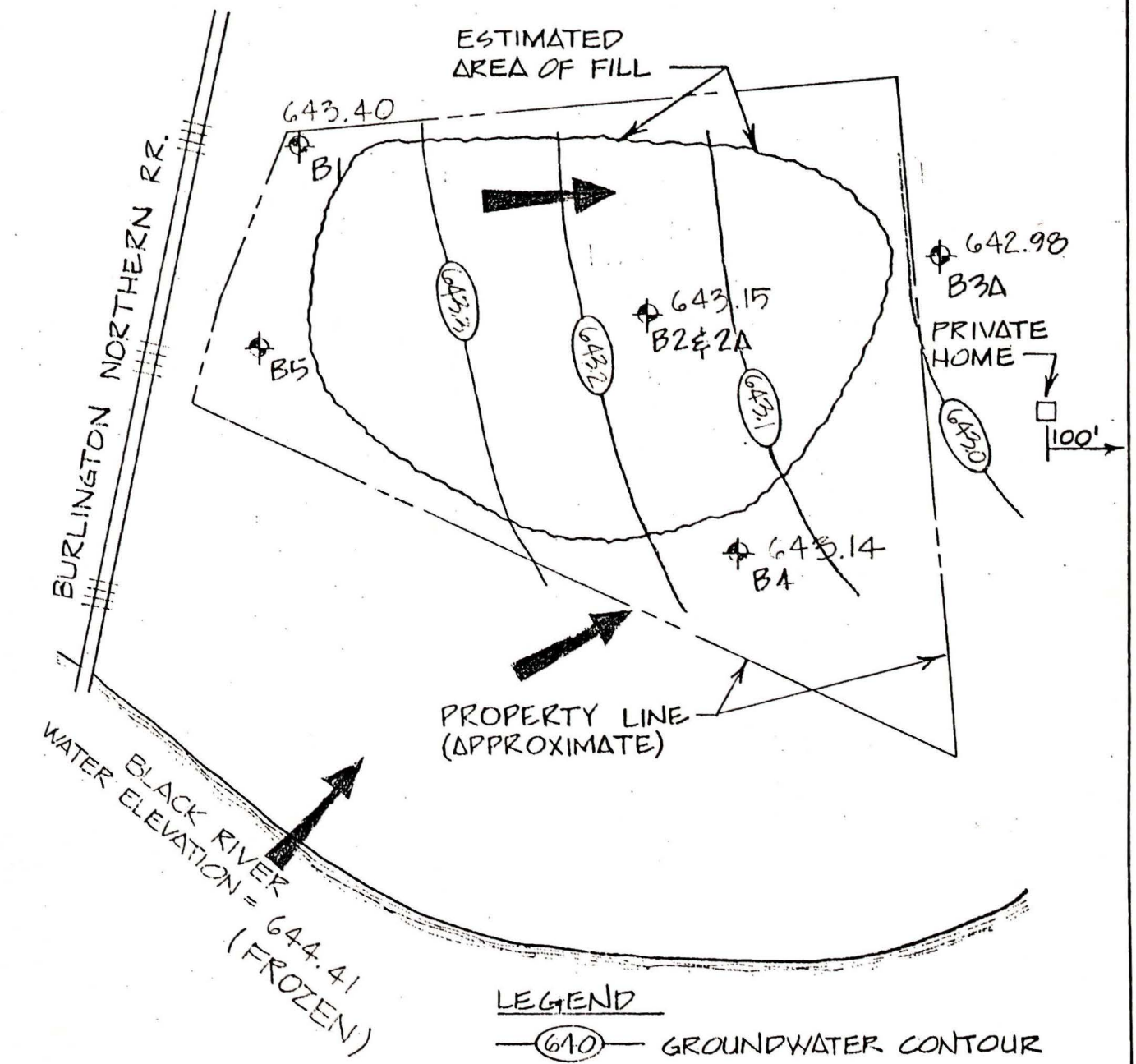
GROUNDWATER CONTOUR MAP
12/20/78 DATA

ONALASKA SANITARY LANDFILL
ONALASKA, WISCONSIN

DWN TDH	CHK'D CGK	APP'D Robert J. Komanchuk	DATE 3/22/79	C7606-A|4



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GROUNDWATER CONTOUR MAP
1/29/78 DATA

ONALASKA SANITARY LANDFILL
ONALASKA, WISCONSIN

DWN TDH	CHK'D CGV	APP'D Robert Kammerud	DATE 3/22/79	C7606-A15