Memorandum

Environmental
Resources
Management

To: Mark Putra, Wisconsin Department of Natural Resources

cc: John J. Pozorski, P.E., Johnson Controls, Inc.
Richard A. Tietz, Johnson Controls, Inc.

From: Victoria L. Oster, P.E.

Date: November 23, 1999

Subject: Third Quarter Ground Water Sampling Results
Johnson Controls, Inc., Watertown, Wisconsin

ERM

As you know, Johnson Controls, Inc. collected third quarter ground water samples from the new (MW-26 through MW-29) and selected existing monitoring wells at their Watertown, Wisconsin facility in September 1999. ERM received the analytical data validation report last week; therefore, we are providing you the data at this time as proposed in the July 30, 1999 well installation work plan. Enclosed please find the following:

1. Table 1 summarizing the analytical results for quarterly ground water samples collected in 1999,

2. Figure 1 showing the distribution of total concentrations of chlorinated volatile organic compounds (VOCs) detected in ground water samples collected from wells screened in the rubble layer,

3. Figure 2 showing the distribution of total concentrations of chlorinated VOCs detected in ground water samples collected from wells screened in the bedrock unit, and

4. Figure 3 showing a piezometric surface map based on water levels measured in the rubble layer.

You should have already received the well installation report that included soil boring logs and well installation diagrams for the new wells and the results of hydraulic conductivity testing. ERM and Johnson Controls, Inc. are currently evaluating the data and will propose further action as needed.

If you have any questions, please call Jim Polich or me at 847-680-6868. Thank you.

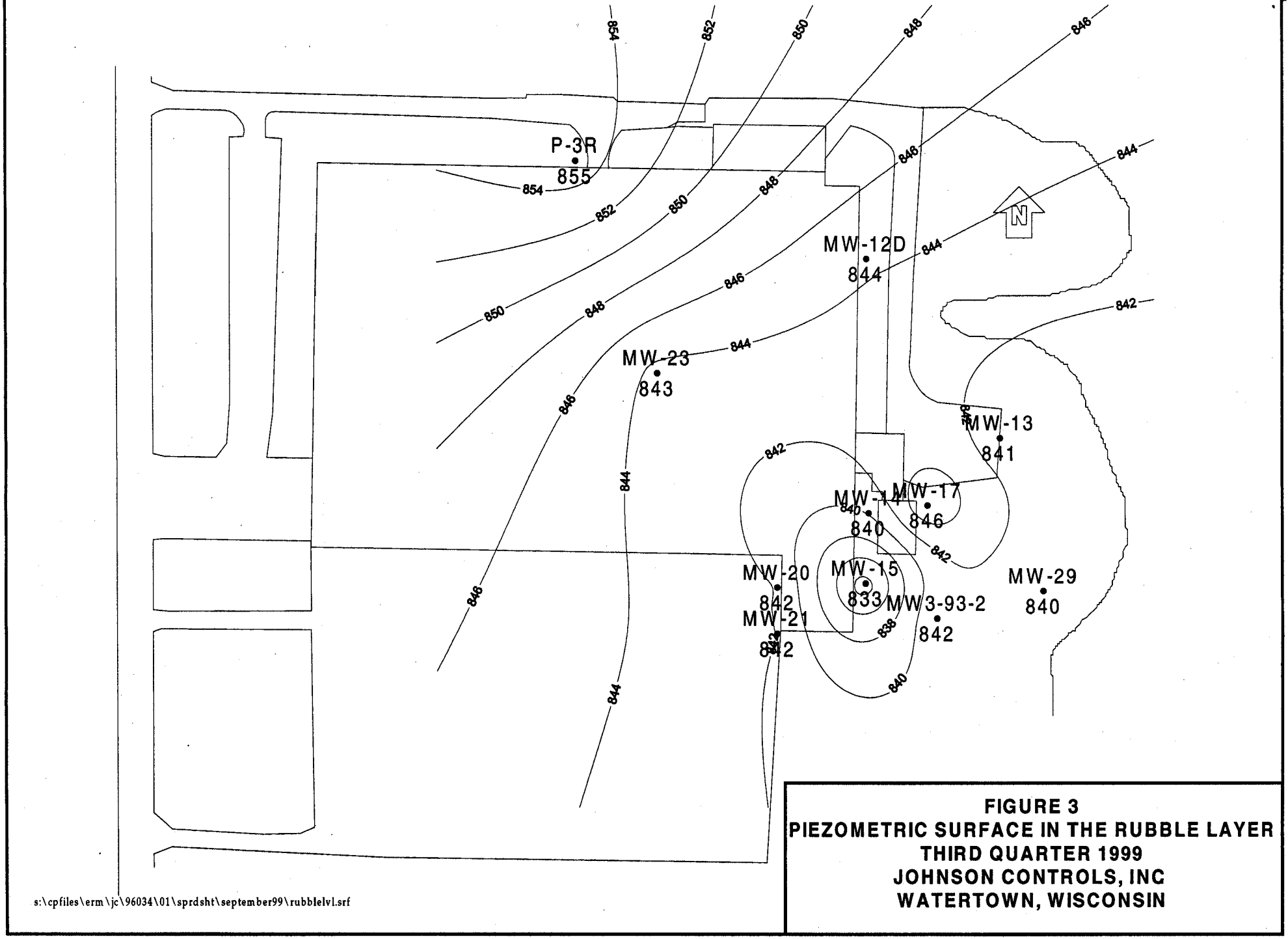

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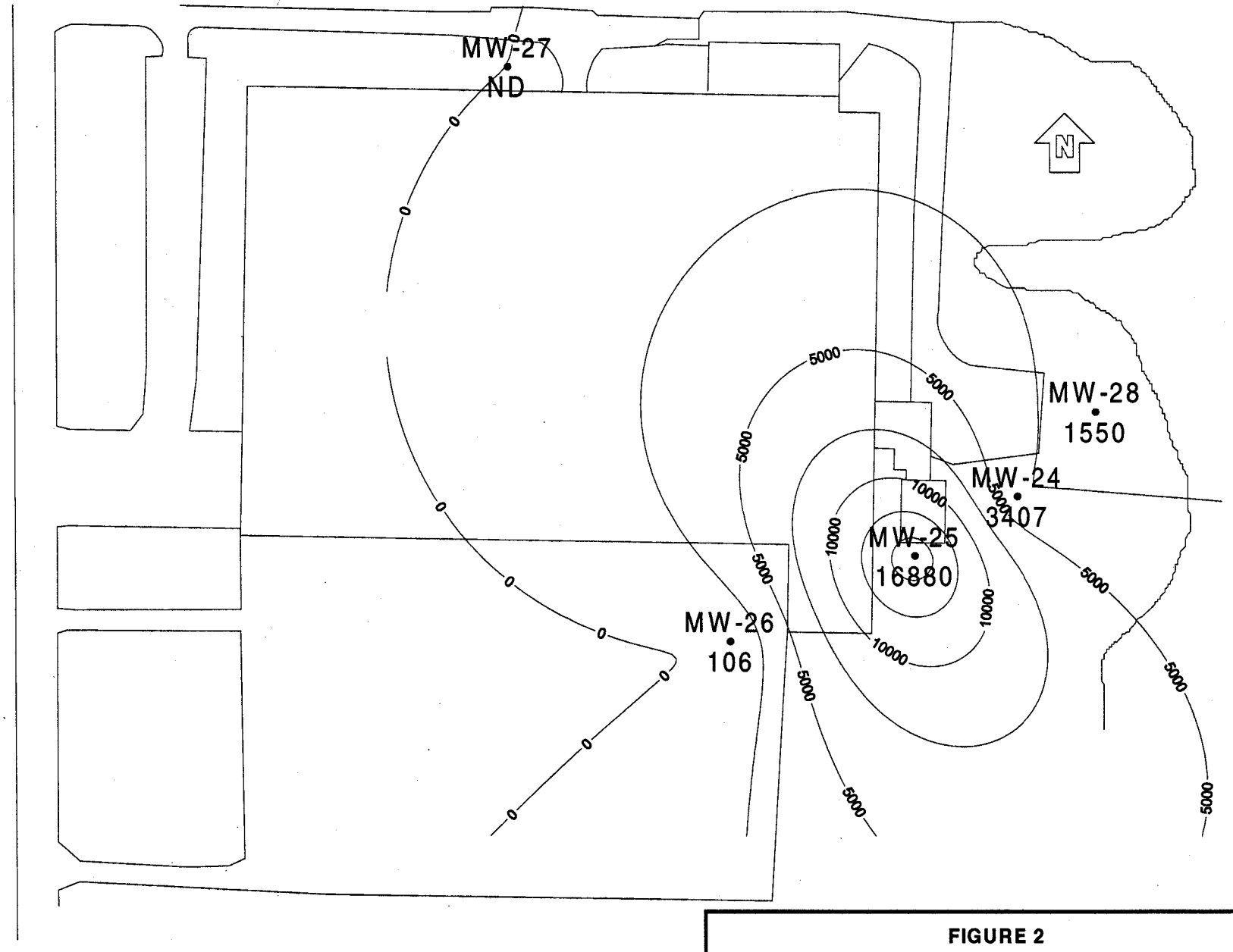
FIGURE 3
PIEZOMETRIC SURFACE IN THE RUBBLE LAYER
THIRD QUARTER 1999
JOHNSON CONTROLS, INC
WATERTOWN, WISCONSIN



NOTES:
Concentrations are in ug/l.
Total concentrations for MW-24 and MW-25 are the average of the first three quarters of data 1999.
Total concentrations for MW-26, MW-27, and MW-28 are for the thrid quarter 1999 only.

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FIGURE 2
TOTAL CONCENTRATIONS OF CHLORINATED VOCs
IN GROUND WATER SAMPLES
WELLS SCREENED IN THE BEDROCK UNIT
FIRST THREE QUARTERS 1999
JOHNSON CONTROLS, INC.
WATERTOWN, WISCONSIN

TABLE 1
GROUND WATER SAMPLING RESULTS [1]
JOHNSON CONTROLS, INC.
WATERTOWN, WISCONSIN
(Page 3 of 5)

Location	*MNA*	*MW-21*			*MW-22*			*MW-23*			*MW-24*			*MW-25*			*MW-26*	*MW-27*
Sample Date	*Screening [2]*	*3/4/99*	*5/27/99*	*9/9/99*	*3/3/99*	*5/27/99 [6]*	*9/10/99*	*3/3/99*	*5/27/99*	*9/10/99*	*3/3/99*	*5/26/99*	*9/8/99 [6]*	*3/3/99*	*5/26/99*	*9/8/99*	*9/9/99*	*9/9/99*
Volatile Organic Compounds [3]																		
Chloromethane	NA	1 U	1 U	1 UJ	62 U	120 U	2 U	100 U	170 U	8 UJ	83 U	25 U	1 U	2100 U	25 U	1 U	1 UJ	1 UJ
Tetrachloroethene	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	610	970	57 J	83 U	25 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
Trichloroethene	NA	0.7 J	0.9 J	0.9 J	620 J	2,100	4,200 D	1,100	2,400	450 DJ	690	460	2,600 D	3,600	3,200 D	1300 D	57 D	1 UJ
cis-1,2-Dichloroethene	Daughter Product	3	4	3 J	280 J	610	1,600 D	670	1,500	760 DJ	670	500	2,900 D	14,000	18,000 D	7400 D	42 D	1 UJ
trans-1,2-Dichloroethene	Daughter Product	1 U	1 U	1 UJ	62 UJ	120 U	24	100 U	170 U	19 J	83 U	25 U	24 J	2100 U	120	67 J	2	1 UJ
Vinyl chloride	Daughter Product	1 U	1 UJ	1 UJ	62 UJ	120 UJ	31	100 U	170 UJ	8 UJ	83 U	24 J	190	1,300 J	1,000 DJ	580 DJ	4	1 UJ
1,1-Dichloroethene	Daughter Product	1 U	1 U	1 UJ	120 J	180	420 D	100 U	170 U	8 UJ	1 U	25 U	17 J	1 U	54	49 J	1	1 UJ
1,1-Dichloroethane	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	83 U	25 U	65 DJ	2100 U	330	75 J	0.6 J	1 UJ
Chloroethane	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	83 U	25 U	0.6 J	2100 U	25 U	2	1 U	1 UJ
Methylene chloride	NA	2 U	1 U	2 UJ	120 UJ	250 U	2 U	200 U	330 U	8 U	170 U	50 U	1 U	4200 U	25 U	1 U	1 U	1 UJ
Acetone	NA	R	4 UJ	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Carbon disulfide	NA	1 U	1 U	1 UJ	62 U	120 U	2 U	100 U	U	8 UJ	83 U	25 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
Toluene	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	83 U	25 U	1 U	2100 U	25 U	2	1 U	1 UJ
Bromoform	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	83 U	25 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
1,4-Dichlorobenzene	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	83 U	25 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
1,2-Dichloroethane	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	13 J	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
1,1,1-Trichloroethane	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
Carbon tetrachloride	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
Bromodichloromethane	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
1,2-Dichloropropane	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
Cis-1,3-Dichloropropene	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
Dibromochloromethane	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
1,1,2-Trichloroethane	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
Benzene	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
Trans-1,3-Dichloropropene	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
4-Methyl-2-pentanone	NA	5 U	5 U	5 UJ	300 UJ	600 U	12 U	500 U	850 U	42 UJ	500 U	850 U	5 U	2100 U	125 U	5 U	5 U	5 UJ
1,2-Dibromoethane (Ethylene dibromide)	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
1,3-Dichlorobenzene	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
1,2-Dichlorobenzene	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 U	100 U	170 U	8 UJ	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
1,2,4-Trichlorobenzene	NA	1 U	1 U	1 UJ	62 UJ	120 U	2 UJ	100 U	170 U	8 UJ	100 U	170 U	1 U	2100 U	25 U	1 U	1 U	1 UJ
Metals																		
Iron (Dissolved)	NA	1,950	2,500	18.9 U	216	253 J	43.1 B	11.2 U	8.8 U	18.9 U	1,230	396	950	2,850	2,120	2370	18.9 U	18.9 U
Manganese (Dissolved)	NA	96.5	82.7	70.5	39.4	17.4 J	27.3	9.1 B	12.2 U	19	235	302	297	188	96.5	68.7	262	254
Geochemical Parameters																		
Ethene[4]	> 10	6.2 U	0.01	0.03	6.2 U	5.91	1.03	31.2 U	2.48	0.52	6.2 U	24.38	54.32	62.4 U	525.73	245.59	1.39	0.12
Ethane[4]	> 100	5.8 U	0.03	0.34	5.8 U	3.03	0.34	29 U	1.72	1.01	18.20	7.15	14.86	517.7 D	124.28	35.59	0.32	0.52
Methane[4]	> 500	22.4 B	45.2	52.1	8.3 B	12.1	7.1	35.3 BD	214.8	66.4	315.1 BD	983.7	1,481.6	2,987.5 BD	6,690.4	2,758.2	71.7	2.4
Organic Carbon (mg/l)	> 20	8.4	17	6.8	7,620	14.9 J	2	23.8	2.8	22.7	4.99	7.9	127	19.4	11.6	9.6	2.2	1.9
Nitrate-Nitrite-N (mg/l)	< 1	0.12 J	0.06 UJ	0.05 U	0.12 J	0.13 UJ	0.05 U	0.15 J	0.18 UJ	0.05 U	0.15 J	0.13 U	0.05 U	0.10 J	0.12 U	0.05 U	0.05 U	0.05 U
Sulfate (mg/l)	< 20	95.1 J	101	117	160	147	191	88	106	116	46.1	48.8	54.3	54.8	56.8	88.6	77.6	27.3
Chloride (mg/l)	> 2x Bkgrnd [5]	274	282 J	260	70.8	77.6 J	72.6	15.7	14.5 J	15.6	17.3	15.1	30.8	96.5	104.0	73.3	15.4	4.9
Field Parameters																		
Iron (II) (mg/l)	> 1	2.8	3.2	0.6	1.6	0.8	0.6	0.6	0.6	0.2	1.4	1.0	1.2	3.0	3.1	2.0	0.5	0.0
Alkalinity (mg/l)	> 2x Bkgrnd [5]	1,445	1,469	1,394	1,160	763	1,290	830	856	1,085	755	838	866	1,340	1,475	1,288	792	683
Initial dissolved oxygen (mg/l)[7]	< 5	3.47	1.74	5.70	6.41	1.10	1.40	2.13	0.56	0.54	7.24	1.64	3.26	5.40	1.00	3.74	4.30	3.50
Initial ORP (mV)	< 50	16.5	-54	-36	1.0	-103.5	-130.8	1.8	-103.2	-159.5	54.4	32.8	-75	97.1	-43.3	-44.1	94.2	22.9

TABLE 1
GROUND WATER SAMPLING RESULTS [1]
JOHNSON CONTROLS, INC.
WATERTOWN, WISCONSIN
(Page 4 of 5)

Location	MNA	MW-28	MW-29	MW3-93-2			MW3-93-3			MW3-93-4			MW3-93-5			MW3RR		
Sample Date	Screening [2]	9/8/99	9/8/99 [6]	3/3/99	5/26/99		3/3/99	5/25/99	9/7/99	3/3/99	5/26/99	9/9/99	3/4/99	5/27/99	9/10/99	3/3/99	5/26/99 [4]	9/9/99
Volatile Organic Compounds [3]																		
Chloromethane	NA	29 J	1 U	1 U	1 U	1 U	50 U	36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	5 U	10 U	1 UJ
Tetrachloroethene	NA	50 U	1 U	1 U	1 U	1 U	50 UJ	36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	2 J	2 J
Trichloroethene	NA	370	1 U	1 U	1 U	1 U	50 UJ	36 U	3	1 U	1 U	0.7 J	1 U	1 U	1 UJ	59 J	130	73 DJ
cis-1,2-Dichloroethene	Daughter Product	1,100	1 U	1 U	1 U	2	72 J	100	150 DJ	1 U	1 U	1 U	1 U	1 U	1 UJ	5 J	9 J	4 J
trans-1,2-Dichloroethene	Daughter Product	50 U	1 U	1 U	1 U	1 U	50 UJ	36 U	8	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
Vinyl chloride	Daughter Product	80	1 U	1 U	1 U	1 U	93 J	47 J	84 DJ	1 U	1 U	1 U	1 U	1 UJ	1 UJ	5 UJ	10 U	1 UJ
1,1-Dichloroethene	Daughter Product	50 U	1 U	1 U	1 U	1 U	50 UJ	36 U	0.5 J	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
1,1-Dichloroethane	NA	26 J	1 U	1 U	1 U	1 U	520 J	500	770 DJ	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
Chloroethane	NA	50 U	1 U	1 U	1 U	1 U	27 J	36 UJ	23	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
Methylene chloride	NA	100 U	1 U	1 U	1 U	1 U	100 UJ	71 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	10 UJ	20 U	1 UJ
Acetone	NA	R	R	25 J	8 UJ	R	R	190 UJ	R	R	R	R	8 J	R	R	R	R	R
Carbon disulfide	NA	50 U	1 U	1 U	1 U	1 U	50 U	36 U	2	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	5 U	1 UJ
Toluene	NA	50 U	1 U	1 U	1 U	1 U	50 UJ	36 U	2	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
Bromoform	NA	50 U	0.6 J	1 U	1 U	1 U	50 UJ	36 U	0.8 J	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
1,4-Dichlorobenzene	NA	50 U	0.3 J	1 U	1 U	1 U	50 UJ	36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
1,2-Dichloroethane	NA	50 U	1 U	1 U	1 U	1 U	50 UJ	36 U	9	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 U
1,1,1-Trichloroethane	NA	50 U	1 U	1 U	1 U	1 U	50 UJ	36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
Carbon tetrachloride	NA	50 U	1 U	1 U	1 U	1 U	50 UJ	36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 U
Bromodichloromethane	NA	50 U	1 U	1 U	1 U	1 U	50 UJ	36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
1,2-Dichloropropane	NA	50 U	1 U	1 U	1 U	1 U	50 UJ	36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
Cis-1,3-Dichloropropene	NA	50 U	1 U	1 U	1 U	1 U	50 UJ	36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
Dibromochloromethane	NA	50 U	0.5 J	1 U	1 U	1 U	50 UJ	36 U	0.6 J	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
1,1,2-Trichloroethane	NA	50 U	0.7 J	1 U	1 U	1 U	50 UJ	36 U	1	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
Benzene	NA	50 U	1 U	1 U	1 U	1 U	50 UJ	36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
Trans-1,3-Dichloropropene	NA	50 U	1 U	1 U	1 U	1 U	50 UJ	36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
4-Methyl-2-pentanone	NA	250 U	5 U	5 U	5 U	5 U	250 UJ	180 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	25 UJ	50 U	5 UJ
1,2-Dibromoethane (Ethylene dibromide)	NA	50 U	1 U	1 U	1 U	1 U	50 UJ	36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
1,3-Dichlorobenzene	NA	50 U	0.2 J	1 U	1 U	1 U	50 UJ	36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
1,2-Dichlorobenzene	NA	50 U	0.5 J	1 U	1 U	1 U	50 UJ	36 U	0.7 J	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
1,2,4-Trichlorobenzene	NA	50 U	1 J	1 U	1 U	1 U	50 UJ	36 U	2 U	1 U	1 U	1 U	1 U	1 U	1 UJ	5 UJ	10 U	1 UJ
Metals																		
Iron (Dissolved)	NA	550	831	245	831	18.9 U	11.2 U	8.8 U	18.9 U	11.2 U	8.8 U	18.9 U	11.2 U	235	518	11.2 U	8.8 U	18.9 U
Manganese (Dissolved)	NA	134	437	424	437	99.3	4.9 B	3.8 U	18.6	24.1	23.2	32.3	104	139	158	4.8 B	1.4 U	27.5
Geochemical Parameters																		
Ethene[4]	> 10	29.01	0.31	31.2 U	0.01	0.02	6.2 U	11.89	17.26	6.2 U	0.01 U	0.01	6.2 U	0.01 U	0.02	6.2 U	0.22	0.36
Ethane[4]	> 100	5.83	1.13	29 U	0.01 U	0.01 U	9	0.2	0.59	5.8 U	0.01 U	0.13	5.8 U	0.01 U	0.01	5.8 U	0.08	0.61
Methane[4]	> 500	764.0	183.1	96.3 BD	602.9	1,274.1	107.4 BD	468.6	407.6	3.7 B	1.7	1.7	3.8 B	7.3	25.7	5 B	3.6	9.8
Organic Carbon (mg/l)	> 20	7.1	12.9 J	33.2	45.2	12.8	24	13	10.2	189	16.4	1.6	60.2	32.6	5.8	9.89 J	25.8	19.2
Nitrate-Nitrite-N (mg/l)	< 1	0.05 U	0.05 U	0.48 J	0.16 U	0.05 U	0.14 J	0.05 U	0.05 U	0.38 J	0.40 U	0.29	0.20 J	0.06 UJ	0.05 U	1.56	1.62	1.6
Sulfate (mg/l)	< 20	38.6	35.4	5 U	5 U	5 U	34.3	47.9	33	72	101	67.3	79 J	64.5	137	132	92.8	70.7
Chloride (mg/l)	> 2x Bkgrnd [5]	22	47.5	11.8	12.4	13.8	29.5	22.8	30.3	91.4	112	96	206	191 J	256	49	57.3	48.6
Field Parameters																		
Iron (II) (mg/l)	> 1	0.9	1.2	0.2	0.4	1.5	0.6	0.6	0.4	0.4	0.6	0.2	0.0	0.4	1.0	0.6	1.0	0.0
Alkalinity (mg/l)	> 2x Bkgrnd [5]	991	1,437	1,863	1,878	1,547	1,108	225	478	835	754	842	1,058	1,043	917	778	941	886
Initial dissolved oxygen (mg/l)[7]	< 5	8.51	3.27	4.41	1.65	3.24	5.65	1.47	2.60	2.44	1.76	6.02	3.25	0.55	4.55	3.88	3.04	1.92
Initial ORP (mV)	< 50	7.2	-32.2	175	-111.5	-95.9	-136	-86.5	-56	52.5	101.2	68.2	104.8	-85.5	-95	62.8	70.3	-0.2

TABLE 1
GROUND WATER SAMPLING RESULTS [1]
JOHNSON CONTROLS, INC.
WATERTOWN, WISCONSIN
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Key:

J= The analyte was positively identified; quantitation is approximate because of limitations identified during the quality assurance review.
U= Analyte was analyzed for but not detected above the detection limit shown.
R= The sample results were rejected because of problems meeting quality control criteria; the presence or absence of the analyte cannot be verified.
N= The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
D= The concentration was detected in a diluted sample.
B= The analyte was also found in the associated blank; blank contamination is possible/probable.
UJ= The analyte was not detected above the detection limit shown; the detection limit shown should be considered estimated because of a bias identified during the quality assurance review.
E= The concentration exceeded the calibration range of the gas chromatography/mass spectrometry instrument used for the analysis.
ORP= Oxidation-reduction potential.
NA= Not Analyzed

Notes:

[1] Table contains validated data for 3/99, 5/99, and 9/99. Concentrations are in micrograms per liter except where units are given.
[2] *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water,* U.S. Environmental Protection Agency Office of Research and Development, Washington DC, EPA/600/R-98/128, September 1998.
[3] Volatile organic compound analysis using USEPA SOW Low Concentrations Method.
[4] Analysis using Method RSK175M.
[5] After four quarters of sampling, background concentrations will be calculated using concentrations detected in samples collected from wells located outside the plume.
[6] Duplicate samples were collected. Reported concentrations are the highest concentrations detected in the duplicate samples.
[7] Dissolved oxygen was measured in percent saturation. The concentration was calculated assuming the dissolved oxygen saturation concentration was 11.29 mg/L.

TABLE 1
GROUND WATER SAMPLING RESULTS [1]
JOHNSON CONTROLS, INC.
WATERTOWN, WISCONSIN
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Location	*MNA*	*MW-8*			*MW-11*			*MW-12S*			*MW-12D*			*MW-13*			*MW-14*		
Sample Date	*Screening [2]*	*3/4/99*	*5/27/99*	*9/9/99*	*3/3/99*	*5/27/99*	*9/10/99*	*3/3/99*	*5/26/99*	*9/9/99 [6]*	*3/3/99*	*5/28/99*	*9/9/99*	*3/3/99*	*5/25/99*	*9/8/99*	*3/2/99 [6]*	*5/25/99 [6]*	*9/7/99*
Volatile Organic Compounds [3]																			
Chloromethane	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 U	3 U	1 U	170 U	1 U	1 U
Tetrachloroethene	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
Trichloroethene	NA	1 U	1 U	1 U	**27**	**2**	**0.5 J**	**150**	**150**	**240 D**	1 U	1 U	**0.4 J**	3 UJ	3 U	1 U	**1,800 J**	**3,100**	**1,800 D**
cis-1,2-Dichloroethene	Daughter Product	1 U	1 U	1 U	**21**	**2**	1 U	**23**	25 U	**29 DJ**	1 U	1 U	1 UJ	**10 J**	**10**	**5**	**330 J**	**750**	**570 D**
trans-1,2-Dichloroethene	Daughter Product	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	**0.5 J**	1 U	1 U	1 UJ	3 UJ	3 U	**0.3 J**	170 UJ	170 U	**31 J**
Vinyl chloride	Daughter Product	1 U	1 UJ	1 U	2 U	1 UJ	1 U	17 U	25 U	**0.8 J**	1 U	1 U	1 UJ	**50 J**	**34 J**	**55 D**	170 UJ	**99 J**	**95 DJ**
1,1-Dichloroethene	Daughter Product	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	**0.9 J**	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	**68 DJ**
1,1-Dichloroethane	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	**2**	1 U	1 U	1 UJ	3 UJ	3 U	1 U	**220 J**	**240**	**180 D**
Chloroethane	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 UJ	1 U	170 UJ	170 UJ	**4**
Methylene chloride	NA	1 U	2 U	1 U	5 U	1 U	1 U	33 U	50 U	1 U	2 U	1 U	1 UJ	6 UJ	6 U	1 U	330 UJ	330 U	1 U
Acetone	NA	R	R	R	R	R	R	R	120 UJ	R	**6 J**	3 UJ	R	R	R	R	R	360 UJ	R
Carbon disulfide	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 U	3 U	1 U	170 U	360 UJ	1 U
Toluene	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
Bromoform	NA	**0.6 J**	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
1,4-Dichlorobenzene	NA	**0.8 J**	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
1,2-Dichloroethane	NA	**1 U**	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	**13**
1,1,1-Trichloroethane	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	**2**	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
Carbon tetrachloride	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
Bromodichloromethane	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
1,2-Dichloropropane	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
Cis-1,3-Dichloropropene	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
Dibromochloromethane	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
1,1,2-Trichloroethane	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	**0.4 J**	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
Benzene	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
Trans-1,3-Dichloropropene	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
4-Methyl-2-pentanone	NA	5 U	5 U	5 U	10 U	5 U	5 U	85 U	125 U	5 U	5 U	5 U	5 UJ	15 UJ	15 U	25 U	850 UJ	170 U	5 U
1,2-Dibromoethane (Ethylene dibromide)	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
1,3-Dichlorobenzene	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
1,2-Dichlorobenzene	NA	1 U	1 U	1 U	2 U	1 U	1 U	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
1,2,4-Trichlorobenzene	NA	1 U	1 U	1 U	2 U	1 U	1 UJ	17 U	25 U	1 U	1 U	1 U	1 UJ	3 UJ	3 U	1 U	170 UJ	170 U	1 U
Metals																			
Iron (Dissolved)	NA	**207**	**356**	**3,080**	11.2 U	8.8 U	18.9 U	11.2 U	8.8 U	18.9 U	17.8 B	8.8 U	18.9 U	**4,330**	**7,180**	**6710**	**28.7 B**	**1,370 J**	**37.4 B**
Manganese (Dissolved)	NA	**352**	**282**	**1,670**	**142**	**349**	**216**	13.7	**17.7**	**15.8**	**11.9**	**16.2**	**10.5**	**151**	**134**	**112**	**28.7**	**28.5**	**26.1**
Geochemical Parameters																			
Ethene[4]	> 10	6.2 U	0.01 U	**0.02**	6.2 U	**0.01**	**0.03**	6.2 U	**0.04**	**0.20**	6.2 U	**0.01**	**0.01**	156 U	**5.56**	**4.90**	62.4 U	**217.2**	**197.99**
Ethane[4]	> 100	5.8 U	0.01 U	0.01 U	5.8 U	**0.03**	**0.44**	5.8 U	**0.03**	**0.17**	5.8 U	**0.1**	**0.37**	145 U	**11.45**	**8.29**	**255.1 D**	**3.02**	**3.18**
Methane[4]	> 500	31.9 B	**270.9**	**95.9**	2 JB	**1**	**3.1**	5.5 B	**15.7**	**15.0**	5.8 B	**2.5**	**2.7**	**578 BD**	**1,360**	**766.4**	**1,265 BD**	**3,786**	**2,789.9**
Organic Carbon (mg/l)	> 20	**11.1**	**18.6**	**7.4**	**3.87**	**7.7**	**8.4**	**4.8**	**12.1**	**1.9**	**35.4**	**6.4**	**2.7**	**12.8**	**9.7**	**29.4**	**23.7**	**13**	**8.9**
Nitrate-Nitrite-N (mg/l)	< 1	**0.11 J**	0.16 UJ	0.05 U	**0.45 J**	0.29 UJ	0.05 U	**0.26 J**	0.15 U	**0.09**	**0.17 J**	0.13 U	0.05 U	**0.20 J**	0.05 U	0.05 U	**0.09 J**	0.13 UJ	0.05 U
Sulfate (mg/l)	< 20	**8.48 J**	**11.9**	**69.2**	**129**	**139**	**146**	**15.9 J**	**10.2**	**14.6**	**100**	**151**	**132**	**8.88**	**8.3**	**7.8**	**179**	**157**	5 U
Chloride (mg/l)	> 2x Bkgrnd [5]	**133**	**63.6 J**	**700**	**25.9**	**24.1 J**	**22.6**	3 U	3 U	3 U	**41.3**	**38.3**	**37.9**	**4.2**	**13.2**	**10.2**	**85.3**	**86.1**	**73.8**
Field Parameters																			
Iron (II) (mg/l)	> 1	**0.6**	**0.3**	**2.5**	**0.6**	**0.6**	**0.5**	**0.0**	**0.2**	**5.0**	**0.6**	**0.6**	**0.7**	**1.8**	**3.6**	**4.4**	**2.0**	**2.5**	**2.5**
Alkalinity (mg/l)	> 2x Bkgrnd [5]	**820**	**846**	**783**	**1,035**	**876**	NA	**448**	**412**	**423**	**488**	**608**	**930**	**1,830**	**1,890**	**1,363**	**1,583**	**1,270**	**858**
Initial dissolved oxygen (mg/l)[7]	< 5	**5.43**	**4.53**	**2.38**	**3.51**	**0.71**	**3.69**	**4.81**	**1.56**	**4.46**	**1.90**	**3.13**	**4.49**	**3.92**	**1.98**	**4.44**	**5.08**	**1.60**	**2.77**
Initial ORP (mV)	< 50	**123.9**	**-17.7**	**-63.2**	**41.2**	**68.3**	**-5.4**	**45.2**	**48.8**	**-149.7**	**-259**	**-88.5**	**-68.5**	**-73.4**	**-53.9**	**-66.5**	NA	**-99.7**	**-133**

TABLE 1
GROUND WATER SAMPLING RESULTS [1]
JOHNSON CONTROLS, INC.
WATERTOWN, WISCONSIN
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Location	MNA	MW-15			MW-16			MW-17			MW-18			MW-19			MW-20		
Sample Date	Screening [2]	3/2/99	5/26/99	9/8/99	3/2/99	5/26/99	9/8/99	3/2/99	5/25/99	9/7/99	3/3/99	5/25/99	9/7/99	3/3/99 [6]	5/25/99	9/8/99	3/4/99 [6]	5/27/99	9/9/99
Volatile Organic Compounds [3]																			
Chloromethane	NA	1 U	1 U	2 UJ	1 U	1 U	2 U	170 U	170 U	25 UJ	17 U	1 U	1 U	1 U	1 U	4 U	6 U	6 U	1 UJ
Tetrachloroethene	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
Trichloroethene	NA	1 U	6	1 J	1 U	1 U	2 U	170 UJ	170 U	490 J	3 J	9 J	1	1 UJ	1 U	4 U	20	11	11 D
cis-1,2-Dichloroethene	Daughter Product	5	91	29	2	1	13	1,600 J	2,100	140 J	200 J	190	270 DJ	6 J	6	5	89	76	51 D
trans-1,2-Dichloroethene	Daughter Product	0.9 J	7	2 J	1 U	1 U	0.2 J	170 UJ	170 U	6 J	17 UJ	25 U	1	0.7 J	0.6 J	4 U	6 U	2 J	3
Vinyl chloride	Daughter Product	1 U	9	2	2	0.6 J	6	1,200 J	920 J	28 J	13 J	25 UJ	23	7 J	3 J	43	6 U	5 UJ	3
1,1-Dichloroethene	Daughter Product	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	16 J	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	5
1,1-Dichloroethane	NA	1 U	5 U	2 U	1 U	1 U	2 U	350 J	440	48 J	17 UJ	25 U	3	1 UJ	1 U	4 U	6 U	5 U	1 U
Chloroethane	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 UJ	25 UJ	17 UJ	25 UJ	1 U	1 UJ	1 UJ	4 U	6 U	5 U	1 U
Methylene chloride	NA	1 U	9 U	2 U	2 U	0.6 J	2 U	330 UJ	330 U	25 UJ	33 UJ	50 U	1 UJ	2 UJ	1 U	4 U	12 U	10 U	1 U
Acetone	NA	R	R	R	R	R	R	R	R	R	R	R	R	9 J	6 UJ	R	R	R	R
Carbon disulfide	NA	1 U	5 U	2 U	1 U	1 U	12	170 U	170 U	25 UJ	17 U	25 U	1 U	1 U	1 U	4 U	6 U	6 U	1 U
Toluene	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
Bromoform	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
1,4-Dichlorobenzene	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
1,2-Dichloroethane	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
1,1,1-Trichloroethane	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
Carbon tetrachloride	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
Bromodichloromethane	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
1,2-Dichloropropane	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
Cis-1,3-Dichloropropene	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
Dibromochloromethane	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
1,1,2-Trichloroethane	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
Benzene	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
Trans-1,3-Dichloropropene	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
4-Methyl-2-pentanone	NA	5 U	25 U	10 U	5 U	5 U	10 U	850 UJ	850 U	120 UJ	85 UJ	125 U	5 U	5 UJ	5 U	21 U	30 U	25 U	5 U
1,2-Dibromoethane (Ethylene dibromide)	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
1,3-Dichlorobenzene	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
1,2-Dichlorobenzene	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
1,2,4-Trichlorobenzene	NA	1 U	5 U	2 U	1 U	1 U	2 U	170 UJ	170 U	25 UJ	17 UJ	25 U	1 U	1 UJ	1 U	4 U	6 U	5 U	1 U
Metals																			
Iron (Dissolved)	NA	2,140	303	287	2,630	2,970	8480	145	8.8 U	18.9 U	727	3,050	1530	15,700	18,700	11300	332	1,380	443
Manganese (Dissolved)	NA	35	36.2	29.3	1,710	1,450	1720	32.7	21.5	20.2	907	1,080	943	1,110	1,150	837	66.4	55.6	55.5
Geochemical Parameters																			
Ethene [4]	> 10	6.2 U	1.61	2.38	6.2 U	0.21	0.98	62.4 U	457.15	153.58	6.2 U	3.7	4.85	124.8 U	0.46	9.62	6.2 U	0.05	0.19
Ethane [4]	> 100	5.8 U	1.17	1.70	5.8 U	1.26	4.25	429.9 D	55.1	16.56	5.8 J	6.19	5.79	116 U	1.09	8.50	5.8 U	0.06	0.13
Methane [4]	> 500	23.4 B	143.8	163.1	31.5 B	107.5	129.1	1,290 BD	6,869	1967.3	1,364 BD	5,304	3,751.6	277.8 BD	292.9	744.5	26.4 B	83.9	208.4
Organic Carbon (mg/l)	> 20	14.2	6.8	11.7	14.3	13.1	15	14.4	62.4	10.8	26.2	35.2	21	24.7	20.6	16.5	6.3	24.7	3.7
Nitrate-Nitrite-N (mg/l)	< 1	0.15 J	0.07 U	0.05 U	0.23 J	0.08 U	0.05 U	0.18 J	0.05 U	0.05 U	0.18 J	0.06 U	0.05 U	0.20 J	0.05 U	0.05 U	0.15 J	0.05 UJ	0.05 U
Sulfate (mg/l)	< 20	146	170	174	157	81	84.3	72.8	66.9	63.2	5 U	5 U	5 U	72.7 J	62	30.3	201 J	175	198
Chloride (mg/l)	> 2x Bkgrnd [5]	122	123	116	5.7	4.9	4.8	314	272	272	10	11	14.6	95.7	111	59.4	231	251 J	182
Field Parameters																			
Iron (II) (mg/l)	> 1	1.2	3.1	1.5	2.0	2.0	5.2	0.6	2.8	1.7	3.2	2.8	2.6	2.0	2.8	8.0	1.4	3.0	1.5
Alkalinity (mg/l)	> 2x Bkgrnd [5]	1,363	1,461	1,816	1,570	1,222	1,388	1,963	1,553	1,040	1,183	1,058	785	1,628	2,013	1,934	1,115	1,071	1,829
Initial dissolved oxygen (mg/l) [7]	< 5	1.89	2.60	3.16	5.72	2.28	4.00	3.929	0.881	2.292	7.745	5.035	2.687	2.13	2.88	4.28	4.29	3.78	4.36
Initial ORP (mV)	< 50	71.5	-31.6	-100.1	163	36.4	-32.2	188	-121.4	-151	175	-142.3	-93.9	-90.1	-56.7	14.3	-0.5	-51.3	72.1