Natural
Resource
Technology, Inc.
N R T

October 30, 1996
(1179)

Mr. Michael Schmoller
WDNR Southern District
201 East Washington Avenue
P.O. Box 7969
Madison, WI 53707-7969

RE: Project Update and Supplemental Remedial Alternatives Evaluation
Ursula Borgerding Estate Property, 433-437 Woodward Avenue, Beloit, WI
WDNR LUST ID # 301
PECFA ID #: 53511-5462

Dear Mr. Schmoller:

On behalf of the Ursula Borgerding Estate (Estate) Property, Natural Resource Technology, Inc. (NRT) is submitting this *Supplemental Remedial Alternatives Evaluation (RAE) and Recommended Action.* Previously, Dames & Moore, Inc. submitted a *Remedial Alternatives Cost Evaluation* to the Wisconsin Department of Natural Resources (WDNR) and the Department of Industry, Labor, and Human Relations (DILHR), dated January 3, 1994. NRT was retained in 1996 to re-evaluate remedial costs to identify a more cost effective approach to remediate the site. This letter provides background as to the status of the project, current groundwater quality information and a revised approach to remediate the site in light of current site conditions and available funding.

BACKGROUND

The January 1994 cost evaluation by Dames & Moore selected groundwater recovery and treatment coupled with soil vacuum extraction as the recommended alternative with a total estimated cost of $1,060,155. Mr. Eric Scott of DILHR (now Department of Commerce) issued a letter, dated February 1, 1994, requesting a meeting with the Estate to discuss the substantial costs of the recommended alternative. Because of DILHR's concerns and due to the limited remaining reimbursement funds for the site, the Estate requested additional proposals for remediation of the property. In 1994 and 1995 significant effort was put forth by the Estate to: 1) establish an alternative lower cost remediation approach for the site; 2) identify possible supplemental funding through the Wisconsin Environmental Repair Fund; 3) pursue the possible purchase of the property by the City of Beloit; and 4) to procure a loan through Firstar Bank for funding of the remediation phase of the project.

Finally in June 1996, NRT was selected as the consultant to perform the remediation and establishment of a loan through Firstar was substantially complete. One of NRT's first steps was collection of an additional round of groundwater samples on July 16, 1996 to evaluate the current groundwater concentrations, since samples were last collected in July of 1993. The monitoring

well locations are shown on Figure 1. Results of this sampling, included on attached Tables 1 and 2, indicated a general decline in contaminant levels since July 1993. However, considering that the values exceed NR 140 standards, the potential for off-site impacts, and the proximity of the site to a water supply aquifer, it appears active remediation is still warranted. Note that since 1994, well nest MW-11, located south of the site, was abandoned due to reconstruction of Woodward Avenue. The extent of groundwater impacts in this direction, if related to a past release on the Borgerding property, has not been defined.

RECOMMENDED SITE MANAGEMENT STRATEGY

NRT then proceeded with evaluation of an alternative more cost effective remediation approach. Based on the site conditions, funding situation, and current regulatory requirements, NRT recommended the Estate proceed with the following objectives:

- Implement active soil and groundwater remediation in the former source areas on the property. The best use of available PECFA Funds is to remediate the property to the extent practical, to minimize the potential for continued migration off-site.

- Design an aggressive, active remediation approach which focuses on contaminant removal and minimizes long term operation and maintenance requirements.

- Monitor the groundwater off-site, pending access approval, to the east (direction of WP&L Water Supply Well No. 4) and south (apparent direction of contaminant migration). With an effective remediation of the property itself, it may be appropriate to perform only attenuation monitoring of the off-site portion of the plume provided the potential migration pathways can be adequately evaluated.

The remaining sections of this letter provide additional details regarding the proposed remediation plan and, in addition to the Dames and Moore January 1994 letter, is intended to satisfy the requirements of NR 722.

REMEDIAL ALTERNATIVES COST EVALUATION

NRT reviewed two additional remedial alternatives, both of which are innovative technologies with potentially short remediation time frames. This strategy of a short remediation time-frame offers savings to the PECFA fund by eliminating costly annual operations and maintenance. In addition, based on our experience, these alternatives are WDNR approvable technologies.

The two additional remedial alternatives include: 1) Soil Excavation and In-situ Chemical Oxidation, and 2) Steam Enhanced Vapor Extraction (SEVE). Due to its predominantly sandy soil nature, both technologies are well-suited for this site.

In-situ oxidation has been used mainly as a groundwater remediation technology at selected sites in Wisconsin with significant success. Mr. Steve Ales of the WDNR has recently approved in-situ oxidation for groundwater treatment at a similar petroleum-contaminated site in Beloit. The process involves injection of a solution of hydrogen peroxide, acetic acid, and ferrous sulfate into the saturated zone to chemically oxidize the petroleum contaminants in the groundwater. The process yields a fast groundwater remediation (typically less than one year) requiring little to no capital remediation equipment. Two to three different vendors across the country employ this technology, however, each in a different manner. The trace amounts of free product observed at the site would also be chemically oxidized. Additionally, vadose zone soils would be excavated to prevent further leaching of contaminants into the groundwater.

SEVE is a unique technology which incorporates standard soil venting and air sparging technologies combined with steam injection to greatly speed remediation time. Soil and groundwater remediation will occur in both the vadose and saturated zones. A free product recovery and surface treatment system would be necessary for this technology. Based on information gathered from a vendor of this technology, the remediation time-frame is estimated to be nine months to one year.

A cost comparison was performed using a one year remediation time-frame followed by two years of groundwater monitoring for both technologies. **Based on effectiveness and costs, NRT recommends Excavation and In-situ Oxidation (Alternative A) as the preferred alternative.** The capital and first year consulting and commodity costs, annual monitoring costs, project closure costs, and present worth costs are shown on Table 3. The present worth costs for both alternatives are approximately one-half the cost of the original groundwater recovery/SVE alternative. A more detailed breakdown of the consultant and commodity costs for both alternatives is provided in Attachment A.

REMEDIAL ACTION PLAN

A pilot test of the in-situ oxidation process will be conducted prior to full-scale remediation by proposed injection into existing monitoring wells MW1, MW2D, MW3S, and/or MW3D. Based on the pilot test results, NRT will recommend whether installing additional injection points is needed for the full-scale remediation. As mentioned previously, each vendor of the in-situ oxidation technology employs the technology in a different manner. NRT recommends using a non-pressurized/siphoning approach for injection of the chemicals as it results in a less violent reaction and creates less heat such that a PVC monitoring well can be used as an injection point.

NRT is proposing that in-situ oxidation injection be performed on-site only, despite impacts detected at MW-11D (south of Woodward Avenue) during the 1993 sampling. The MW-11 well nest was abandoned during recent road construction. As discussed previously, it is NRT's opinion that removal of on-site source areas and in-situ groundwater treatment on-site may result

in the eventual attenuation of off-site impacts previously detected at MW-11D. Natural attenuation will be monitored through the installation and monitoring of a new well nest located south of former nest MW-11. In addition, a new well nest located near former well MW-9 is proposed to continue to monitor groundwater quality between the site and WP&L Well #4. Monitoring well MW-9 could not be located during the July 1996 sampling round due to recent paving at the property to the east. Previous data at MW-9 showed no detection of VOCs or PAHs (Table 1). These new well nests would consist of two wells screened from approximately 4 to 14 and 20 to 25 feet. Monitoring would be performed on a semi-annual basis.

The proposed remediation schedule is shown on Table 4. Based on the proposed remediation schedule, NRT is requesting a timely review of this submittal. We recognize the WDNR 's current policy is to no longer provide case management on sites until case closure is requested. However, because of the history of this site and your prior involvement, your input on the project prior to implementing remedial actions would be appreciated. Following your input, a pilot test work plan and request for several WDNR approvals for injection will be submitted. Also, this supplemental RAE and remedial budget will be sent to the Department of Commerce upon your approval. If you have any questions regarding this request or if you require further information please do not hesitate to contact us at (414)523-9000 or Ms. Jane Clokey, Quarles & Brady (Estate representative) at (608)251-5000.

Sincerely,

NATURAL RESOURCE TECHNOLOGY, INC.

Julie A. Griswold, P.E.
Environmental Engineer

Laurie J. Parsons, P.E.
Senior Environmental Engineer

Attachments: Figure 1 - Site Plan
Table 1 - Groundwater Analytical Results - VOCs
Table 2 - Groundwater Analytical Results - PAHs, Metals
Table 3 - Alternatives Cost Comparison
Table 4 - Proposed Remediation Schedule
Attachment A - Cost Breakdown Sheets

cc: Ms. Jane Clokey, Quarles & Brady
Ms. Frances B. Sheehy, Ursula Borgerding Estate Rep.

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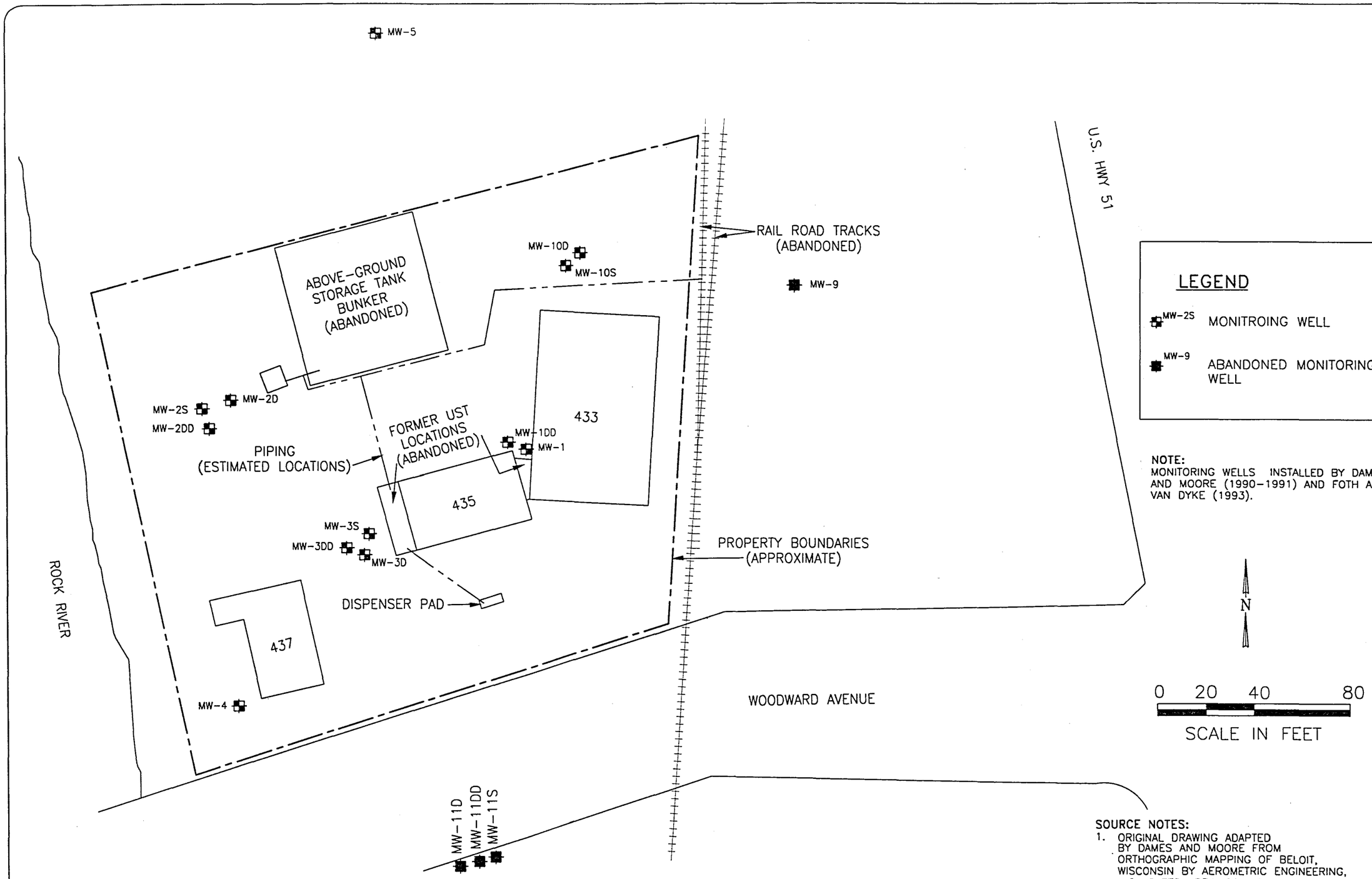
FIGURE



LEGEND

MW-2S — MONITROING WELL

MW-9 — ABANDONED MONITORING WELL

NOTE:
MONITORING WELLS INSTALLED BY DAMES AND MOORE (1990-1991) AND FOTH AND VAN DYKE (1993).

SOURCE NOTES:

1. ORIGINAL DRAWING ADAPTED BY DAMES AND MOORE FROM ORTHOGRAPHIC MAPPING OF BELOIT, WISCONSIN BY AEROMETRIC ENGINEERING, INC., DATED APRIL 26, 1991.
2. SITE PLAN DEVELOPED FROM DRAWING DISK FILE PROVIDED BY MCLAREN HART (1996) ADAPTED FROM DAMES AND MOORE (1992).

DRAWN BY: TAS — DATE: 10/8/96
CHECKED BY: JAG — DATE: 10/31/96
APPROVED BY: LJP — DATE: 10/31/96
AUTOCAD FILE: 1179-B01.DWG

SITE PLAN

URSULA BORGERDING ESTATE PROPERTY
433-437 WOODARD AVENUE
BELOIT, WISCONSIN

Natural Resource Technology

PROJECT NO. 1179/1

DRAWING NO. 1179-B01

FIGURE NO. 1

TABLES

Table 1 - Groundwater Analytical Results - VOCs
Borgerding Estate Property
Beloit, WI

		VOC (ug/L)																								
Location	Sampling Date	Benzene	Bromoform	n-Butylbenzene	tert-Butylbenzene*	sec-Butylbenzene	Carbon Disulfide	Chloroform	trans-1,2-Dichloroethene	cis-1,2-Dichloroethene	1,1-Dichloroethane	Ethylbenzene	p-Isopropyltoluene	Isopropylbenzene	Methylene Chloride	Naphthalene	n-Propylbenzene	Tetrachloroethene	1,1,1-Trichloroethane	Trichloroethene	Toluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Styrenes & o-xylene**	p-, m-xylenes	Xylenes (total)	MTBE
MW-1	6/5/91	828	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd
	10/2/91	1200	nd	na	na	na	150	nd	nd	nd	nd	nd	na	na	nd	na	na	nd	nd	nd	nd	na	na	na	na	nd	na
	6/25/93	1,600	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	130	43	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	7/21/93	7,000	nd	nd	*	nd	na	nd	nd	nd	nd	1,000	300	nd	nd	360	nd	nd	nd	nd	1,300	1,100	250	610	3,000	3,610	nd
	7/16/96	330	nd	42	9.8	14	na	nd	nd	nd	nd	15	nd	36	nd	200	94	nd	nd	nd	9.5	nd	nd	na	na	30	nd
MW-1DD	6/25/93	1.3	nd	nd	nd	nd	na	nd	nd	1.8	42	nd	nd	nd	nd	nd	nd	nd	1.8	2.9	3.1	nd	nd	nd	nd	nd	nd
	7/21/93	5.2	nd	nd	*	nd	na	nd	nd	1.5	51	nd	nd	nd	nd	nd	nd	nd	1.8	1.6	2.2	nd	nd	nd	nd	nd	nd
	7/16/96	2.9	nd	nd	nd	nd	na	nd	nd	nd	57	nd	nd	nd	nd	nd	nd	nd	1.8	nd	nd	nd	nd	na	na	nd	nd
MW-2S	6/5/91	241	nd	nd	nd	1.6	na	nd	nd	nd	nd	20.1	nd	3.6	nd	nd	5.4	nd	nd	nd	4	68	29	na	na	34.1	5.9
	6/25/93	83	nd	58	nd	6.8	na	nd	nd	nd	nd	43	nd	21	nd	99	62	nd	nd	nd	nd	160	54	9.6	58	67.6	nd
	7/21/93	78	nd	14	*	2.0	na	nd	nd	nd	nd	19	8.6	11	nd	56	29	nd	nd	nd	7.5	33	13	nd	28	28	nd
	7/16/96	30	nd	8.6	nd	2.0	na	nd	nd	nd	nd	nd	nd	6.0	14[A]	16	17	nd	nd	nd	1.6	3.3	3.8	na	na	4.6	nd
MW-2D	6/5/91	390	nd	nd	nd	nd	na	nd	nd	nd	nd	2.6	nd	nd	nd	nd	nd	nd	nd	nd	2.6	nd	nd	na	na	3.4	129
	6/25/93	3,100	nd	59	nd	nd	na	nd	nd	nd	nd	430	nd	nd	nd	nd	73	nd	nd	nd	82	370	120	nd	1,000	1,000	55
	7/21/93	2,700	nd	43	*	nd	na	nd	nd	nd	nd	300	70	nd	nd	150	64	nd	nd	nd	29	270	75	nd	710	710	nd
	7/16/96	1,900	nd	25	nd	3.7	na	nd	nd	nd	nd	200	1.9	16	nd	110	35	nd	nd	nd	38	100	33	na	na	340	nd
MW-2DD	6/25/93	1.0	nd	nd	nd	nd	na	nd	nd	16	13	nd	nd	nd	nd	nd	nd	2.9	3.4	14	4	nd	nd	nd	nd	nd	1.0
	7/21/93	2.4	nd	nd	*	nd	na	nd	1.3	34	28	nd	nd	nd	nd	nd	nd	3.6	4.6	26	5.4	nd	nd	nd	nd	nd	nd
	7/16/96	nd	nd	nd	nd	nd	na	nd	nd	17	3.7	nd	nd	nd	57[A]	nd	nd	nd	nd	2.3	nd	nd	nd	na	na	nd	nd

Table 1, continued - Groundwater Analytical Results - VOCs
Borgerding Estate Property
Beloit, WI

		VOC (ug/L)																								
Location	Sampling Date	Benzene	Bromoform	n-Butylbenzene	tert-Butylbenzene*	sec-Butylbenzene	Carbon Disulfide	Chlororform	trans-1,2-Dichloroethene	cis-1,2-Dichloroethene	1,1-Dichloroethane	Ethylbenzene	p-Isopropyltoluene	Isopropylbenzene	Methylene Chloride	Naphthalene	n-Propylbenzene	Tetrachloroethene	1,1,1-Trichloroethane	Trichloroethene	Toluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Styrenes & o-xylene**	p-, m-xylenes	Xylenes (total)	MTBE
MW-3S	6/5/91	2,430	nd	nd	nd	nd	na	nd	nd	nd	nd	164	nd	nd	nd	nd	nd	nd	nd	nd	378	nd	nd	na	na	nd	nd
	6/25/93	7,500	nd	330	nd	nd	na	nd	nd	nd	nd	1,000	nd	nd	nd	510	240	nd	nd	nd	810	1,300	390	830	3,300	4,130	nd
	7/21/93	6,900	nd	220	*	nd	na	nd	nd	nd	nd	1,200	380	68	nd	610	210	nd	nd	nd	1,500	1,300	330	740	3,500	4,240	nd
	7/16/96[B]	3,300	<200	270	<100	<100	na	nd	<100	<100	<100	800	<100	<100	5,800	420	210	<100	<100	<100	260	880	330	na	na	2,100	<100
MW-3D	6/7/91	8,600	nd	340	nd	nd	na	nd	nd	nd	nd	760	nd	180	nd	480	280	nd	nd	nd	nd	690	300	nd	1,900	1,900	660
	6/25/93	2,400	nd	26	nd	nd	na	nd	nd	nd	nd	280	nd	nd	nd	100	41	nd	nd	nd	39	96	47	30	460	490	31
	7/21/93	1,400	nd	nd	*	nd	na	nd	nd	nd	nd	70	37	nd	nd	nd	nd	nd	nd	nd	nd	nd	23	nd	150	150	nd
	7/16/96	210	nd	3.7	nd	1.0	na	nd	nd	nd	nd	19	nd	3.4	nd	15	6.7	nd	nd	nd	4.2	8.9	2.9	na	na	32	nd
MW-3DD	6/25/93	nd	1.6	nd	nd	nd	na	nd	nd	2.6	2.0	nd	nd	nd	nd	nd	nd	nd	nd	3.5	3.3	nd	nd	nd	nd	nd	nd
	7/21/93	1.1	nd	nd	*	nd	na	nd	nd	5.2	7.2	nd	nd	nd	nd	nd	nd	1.5	1.1	6.3	5.2	nd	nd	nd	nd	nd	nd
	7/16/96	2.8	nd	nd	nd	nd	na	nd	nd	1.3	11	nd	nd	nd	60[A]	nd	nd	nd	nd	1.5	nd	1.7	nd	na	na	nd	nd
MW-4	6/7/91	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	4.0
	6/25/93	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	7/20/93	nd	nd	nd	*	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	7/16/96	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd
MW-5	6/11/91	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	2.5	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	10/2/91	nd	nd	na	na	na	nd	nd	nd	nd	nd	nd	nd	na	nd	na	na	nd	nd	nd	nd	na	na	nd	nd	nd	na
	6/25/93	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	22
	7/21/93	nd	nd	nd	*	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	18
MW-9	6/7/91[C]	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	10/2/91	nd	nd	na	na	na	nd	nd	nd	nd	nd	nd	nd	na	nd	na	na	nd	nd	nd	nd	na	na	nd	nd	nd	na
	6/25/93	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	7/20/93	nd	nd	nd	*	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Table 1, continued - Groundwater Analytical Results - VOCs
Borgerding Estate Property
Beloit, WI

		VOC (ug/L)																								
Location	Sampling Date	Benzene	Bromoform	n-Butylbenzene	tert-Butylbenzene*	sec-Butylbenzene	Carbon Disulfide	Chlororform	trans-1,2-Dichloroethene	cis-1,2-Dichloroethene	1,1-Dichloroethane	Ethylbenzene	p-Isopropyltoluene	Isopropylbenzene	Methylene Chloride	Naphthalene	n-Propylbenzene	Tetrachloroethene	1,1,1-Trichloroethane	Trichloroethene	Toluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Styrenes & o-xylene**	p-, m-xylenes	Xylenes (total)	MTBE
MW-10S	6/7/91[C]	6.9	nd	5.4	2.2	6.1	na	nd	nd	nd	nd	2.1	2.5	12	nd	130	29	nd	nd	nd	3.2	2.9	1.6	nd	nd	nd	4.5
	9/6/91	8	nd	na	na	na	nd	nd	nd	nd	nd	nd	na	na	nd	na	na	nd	nd	nd	nd	na	na	nd	nd	nd	na
	6/25/93	8.4	nd	27	3.4	9.3	na	nd	nd	nd	nd	3.2	4.0	16	nd	170	47	nd	nd	nd	4.5	nd	nd	nd	nd	nd	2.9
	7/21/93	10	nd	7.1	*	3	na	nd	nd	nd	nd	nd	3.9	5.4	nd	94	12	nd	nd	nd	1.9	2.2	nd	nd	nd	nd	nd
	7/16/96	3.1	nd	6.9	1.2	3.3	na	nd	nd	nd	nd	nd	nd	7.0	nd	59	17	nd	nd	nd	nd	nd	nd	na	na	nd	nd
MW-10D	6/7/91[C]	nd	nd	nd	nd	1.3	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	4.2
	10/2/91	nd	nd	na	na	na	na	nd	nd	nd	nd	16	nd	na	nd	na	na	nd	nd	nd	6.7	na	na	na	na	13	na
	6/25/93	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	1.3	2.2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	7/21/93	nd	nd	1.5	*	1.2	na	nd	nd	nd	nd	nd	nd	nd	nd	5.6	2.9	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	7/16/96	nd	nd	8.8	1.2	4.6	na	nd	nd	nd	nd	nd	nd	2.9	nd	11	2.6	nd	nd	nd	nd	nd	nd	na	na	nd	nd
MW-11S	6/25/93	2.7	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	3.2	nd	nd	4.5	nd	4.5	nd
	7/20/93	nd	nd	nd	*	nd	na	nd	nd	nd	1.2	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.2	nd	nd	nd	nd	nd	nd
MW-11D	6/25/93	1,900	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	140	nd	210	240	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	7/20/93	430	nd	16	*	12	na	nd	nd	nd	nd	nd	nd	79	nd	230	160	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
MW-11DD	6/25/93	nd	nd	nd	nd	nd	na	nd	nd	3.5	44	nd	nd	nd	nd	nd	nd	nd	1.5	5.2	1.6	nd	nd	nd	nd	nd	nd
	7/20/93	nd	nd	nd	*	nd	na	nd	nd	2.7	65	nd	nd	nd	nd	nd	nd	nd	1.8	3.6	nd	nd	nd	nd	nd	nd	nd
MW-2SA	6/5/91	253	nd	nd	nd	nd	na	nd	nd	nd	nd	17.1	nd	2.8	nd	nd	3.4	nd	nd	nd	5.3	47.4	15.3	na	na	22.4	9.6
	6/25/93	86	nd	73	nd	7.1	na	nd	nd	nd	nd	48	nd	22	nd	87	66	nd	nd	nd	7.2	180	62	8.9	66	74.9	nd
	7/21/93	74	nd	14	*	nd	na	nd	nd	nd	nd	18	8.9	10	nd	56	28	nd	nd	nd	7.8	33	13	nd	28	28	nd
MW-3DA	6/25/93	2,000	nd	41	nd	nd	na	nd	nd	nd	nd	270	nd	23	nd	140	41	nd	nd	nd	22	110	57	nd	440	440	34
	7/21/93	1,300	nd	nd	*	nd	na	nd	nd	nd	nd	64	35	nd	nd	nd	nd	nd	nd	nd	nd	nd	21	nd	130	130	nd
MW10-DZ	7/16/96	nd	nd	8.1	1.2	4.4	na	nd	nd	nd	nd	nd	nd	2.8	nd	11	2.5	nd	nd	nd	nd	nd	nd	na	na	nd	nd

Table 1, continued - Groundwater Analytical Results - VOCs
Borgerding Estate Property
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		VOC (ug/L)																								
Location	Sampling Date	Benzene	Bromoform	n-Butylbenzene	tert-Butylbenzene*	sec-Butylbenzene	Carbon Disulfide	Chlororform	trans-1,2-Dichloroethene	cis-1,2-Dichloroethene	1,1-Dichloroethane	Ethylbenzene	p-Isopropyltoluene	Isopropylbenzene	Methylene Chloride	Naphthalene	n-Propylbenzene	Tetrachloroethene	1,1,1-Trichloroethane	Trichloroethene	Toluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Styrenes & o-xylene**	p-, m-xylenes	Xylenes (total)	MTBE
Trip Blank	6/5/91	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd
	6/25/93	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	7/21/93	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Field Blank	6/5/91	nd	nd	nd	nd	nd	na	0.4	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.3	nd	nd	na	na	nd	nd
	6/25/93$_1$	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	1.3	nd	nd	nd	nd	2.2	nd	nd	nd	nd	nd	nd
	6/25/93$_2$	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	2.2	nd	nd	nd	nd	nd	nd
	7/21/93$_1$	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.5	nd	nd	nd	nd	nd	nd
	7/21/93$_2$	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.0	nd	nd	nd	nd	nd	nd
Method Blank	6/5/91	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	6.2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
NR140	ES	5	4.4	ns	ns	ns	ns	6	100	70	850	700	ns	ns	5	40	ns	5	200	5	343	ns	ns	ns	ns	620	60
NR140	PAL	0.5	0.44	ns	ns	ns	ns	0.6	20	7	85	140	ns	ns	0.5	8	ns	0.5	40	0.5	68.6	ns	ns	ns	ns	124	12

Notes:

[A]common lab solvent and contaminant

[B]matrix interference present in MW-3S, 7/96 analysis

[C]analyzed past hold time - results must be considered minimum values

*tert-Butylbenzene co-elutes with 1,2,4-Trimethylbenzene in 7/93 analysis

**Styrenes and o-xylenes analyzed for in 6/93 analysis, o-xylenes only in 7/93

NR140 ES and PAL are the WDNR Enforcement Standard and Preventive Action Limit for groundwater quality, respectively.

Samples exceeding the ES are shaded and samples exceeding the PAL are underlined.

ns = no NR140 ES or PAL standard has been established for parameter.

na = parameter not analyzed for in this sample.

nd = parameter not detected in this sample.

MW-10DZ is a duplicate of sample MW-10D.

MW-2SA is a duplicate of MW-2S.

MW-3DA is a duplicate of MW-3D.

1991-1993 data collected by Dames & Moore.

1996 data collected by NRT.

w:/1179/1179groundwater

Table 2 - Groundwater Analytical Results - PAHs, Metals
Borgerding Estate Property
Beloit, WI

Location	Sampling Date	POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs) (ug/L)																			Metals (ug/L)			
		Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Lead	Barium	Arsenic	Cadmium
MW-1	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	87	11	nd	16	130	na	na
	7/21/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	11	nd	na	na	120	25	nd	7.1	190	na	na
	7/16/96	nd	nd	nd	1.7	0.09	0.18	0.40	0.26	0.3	nd	na	0.98	nd	0.17	11	13	130	1.4	0.5	4.1	na	na	na
MW-1DD	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	160	na	na
	7/21/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	120	na	na
MW-2S	6/5/91	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	nd	nd	nd	na	na	14	nd	nd	nd	180	3.9	0.3
	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	44	nd	nd	nd	190	na	na
	7/21/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	13	nd	nd	nd	160	na	na
MW-2D	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	36	nd	nd	2.9	140	na	na
	7/21/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	56	nd	nd	2.2	150	na	na
MW-2DD	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	130	na	na
	7/21/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	5	130	na	na
MW-3S	6/5/91	37	nd	nd	12	25	nd	11	nd	14	nd	na	28	24	nd	na	na	120	42	20	6.4	240	3.8	nd
	6/25/93	74	nd	59	100	89	nd	45	37	83	nd	na	190	74	45	na	na	600	240	130	8.3	220	na	na
	7/21/93	23	nd	15	18	17	nd	nd	nd	17	nd	12	50	25	nd	na	na	65	72	34	13	230	na	na
	7/16/96	nd	nd	nd	nd	9.2	10	17	16	14	nd	na	55	28	8.2	460	550	550	nd	13	nd	na	na	na
MW-3D	6/5/91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	nd	99	5.8	0.7
	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	64	nd	nd	nd	130	na	na
	7/21/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	2.5	110	na	na
MW-3DD	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	44	na	na
	7/21/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	2.8	78	na	na

Table 2, continued - Groundwater Analytical Results - PAHs, Metals
Borgerding Estate Property
Beloit, WI

Location	Sampling Date	POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs) (ug/L)																			Metals (ug/L)			
		Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Lead	Barium	Arsenic	Cadmium
MW-4	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	110	na	na
	7/20/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	130	na	na
MW-5	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	220	na	na
	7/21/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	190	na	na
MW-9	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	50	na	na
	7/20/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	54	na	na
MW-10S	6/5/91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	51	180	9.2	0.4
	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	61	nd	nd	15	73	na	na
	7/21/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	22	nd	nd	7.7	130	na	na
MW-10D	6/5/91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	nd	120	nd	0.3
	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	5	30	na	na
	7/21/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	38	na	na
MW-11S	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	160	na	na
	7/20/93	nd	nd	nd	nd	nd	na	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	190	na	na
MW-11D	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	34	nd	nd	nd	130	na	na
	7/20/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	75	nd	nd	nd	110	na	na
MW-11DD	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	150	na	na
	7/20/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	160	na	na

Table 2, continued - Groundwater Analytical Results - PAHs, Metals
Borgerding Estate Property
Beloit, WI

Location	Sampling Date	POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs) (ug/L)																		Metals (ug/L)			
		Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Lead	Barium	Arsenic	Cadmium
MW-2SA	6/5/91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	nd	170	5.7	nd
	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	38	nd	nd	nd	190	na	na
	7/21/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	18	nd	nd	2.4	160	na	na
MW-3DA	6/25/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	38	nd	nd	2.4	55	na	na
	7/21/93	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na	nd	nd	nd	nd	100	na	na
Field Blank	6/5/91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	nd	nd	nd	nd
	7/21/93$_1$	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	na	na
	7/21/93$_2$	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	nd	nd	na	na
ES		ns	5 *	3000 *	ns	0.2 *	ns	0.2	ns	0.2 *	ns	ns	400 *	400	ns	ns	ns	40	ns	250 *	15	2000	50	5
PAL		ns	0.5 *	600 *	ns	0.02 *	ns	0.02	ns	0.02 *	ns	ns	100 *	80	ns	ns	ns	8	ns	50 *	1.5	400	5	0.5

Notes:
Benzo(a)pyrene, Fluorene, Naphthalene, Lead, Barium, Arsenic, and Cadmium ES and PAL are WDNR NR 140 standards for groundwater quality.
* ES and PAL for other compounds are values proposed by the Department of Health and Social Services (DHSS) memos dated 8/24/95 and 10/23/95, to be used as guidance only.
ES = enforcement standard
PAL = preventive action limit
nd = compound not detected in analysis
na = compound not analyzed for.
Samples exceeding the ES are shaded and samples exceeding the PAL are underlined.
ns = no NR140 or DHSS proposed ES or PAL standard has been established for parameter.

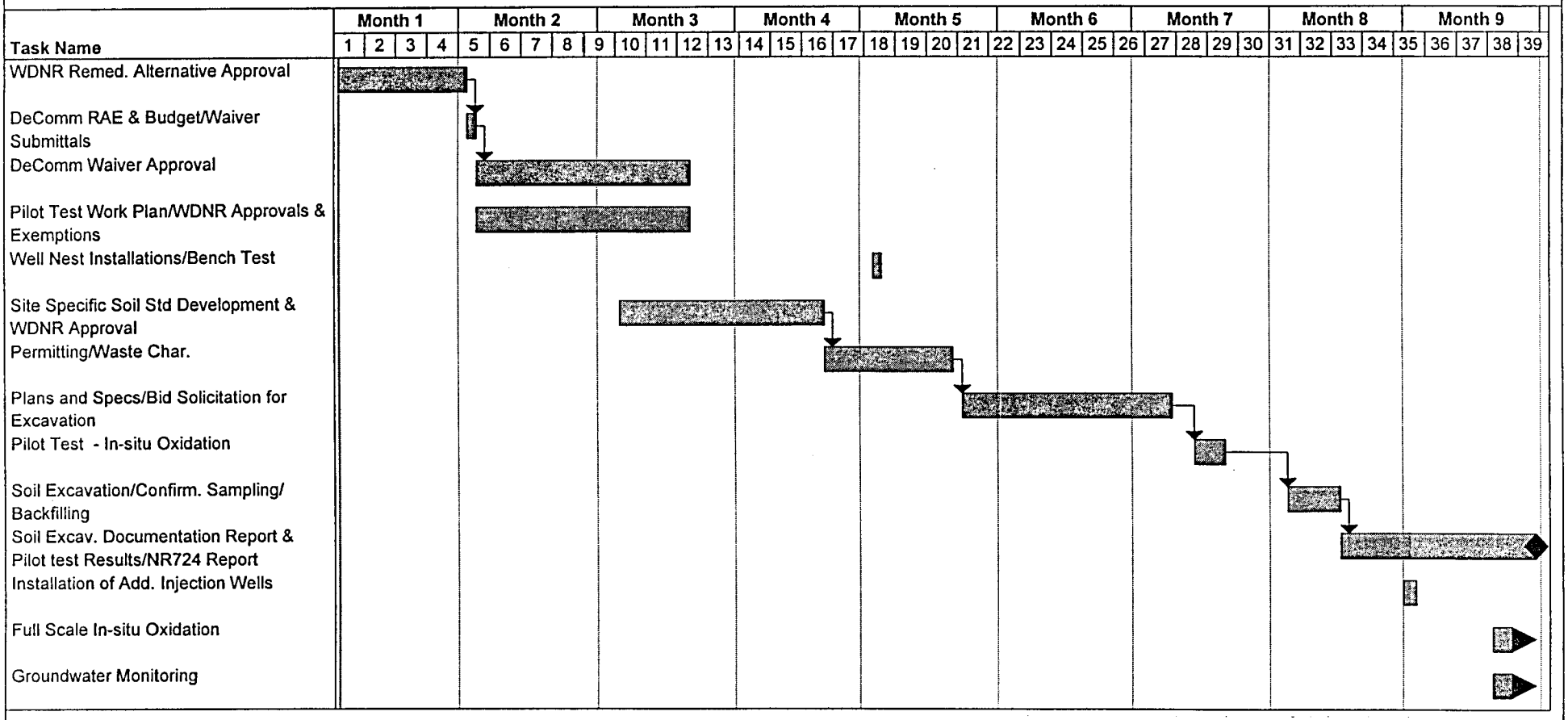
MW-2SA is a duplicate of MW-2S.
MW-3DA is a duplicate of MW-3D.
1991-1993 data collected by Dames & Moore.
1996 data collected by NRT.

Table 3 - Alternatives Costs Comparison
Borgerding Estate Property
Beloit, WI

	Capital & 1st Year O & M Costs ($)		Annual Monitoring Cost ($)	Project Closeout Costs ($)	Present Worth @ 5% 3 Years ($)
	Consultant	Commodity			
ALTERNATIVE A					
In-Situ Oxidation w/ Soil Excavation	$82,928	$406,258	$18,900	$13,000	$533,885
ALTERNATIVE B					
Steam Enhanced Vapor Extraction	$68,233	$431,610	$18,900	$23,000	$553,180

Notes: 1. Refer to Appendix A for breakdown of costs.

TABLE 4 - Proposed Remediation Schedule for Borgerding Estate Property



w:/projects/1179/1179schd.mpp
Date: 10/31/96

Task Continues ▬▶ Deliverable ◆

NOTE: ABOVE INDICATES APPROXIMATE MONTH/WEEK FOLLOWING WDNR SUBMITTAL; GENERAL GOAL IS TO COMPLETE FULL SCALE IN-SITU OXIDATION IN 1997.

ATTACHMENT A

PROJECT: Borgerding Estate Property, Beloit WI.	NRT PROJECT NO.: 1179
	BY: jag CHKD BY: ljp
Preliminary Engineering and Construction Cost Estimate	DATE: 10/31/96
Soil and Groundwater Remediation	FILE: w:\1179costest\insitu ox.

ALTERNATIVE A - Soil Excavation with Off-site Bioremediation and In-situ Chemical Oxidation

CAPITAL AND FIRST YEAR COSTS	ITEM COST	SUB-TOTAL
CONSULTING COSTS		
Initial		
Groundwater Sampling Labor	$2,200	
Remediation Evaluation/DNR&DeCOM Submittals	$9,350	
		$11,550
Well Nest Installation(2)		
Well Installation Prep./Approvals	$1,980	
Well Installation Oversight	$2,063	
Well/Development/Sampling	$1,650	
Travel/Equip.	$880	
		$6,573
Excavation/Test Pits		
Site Specific Soil Stnd Dev.	$2,200	
Environmental Permitting	$1,100	
Plans and Specifications	$3,465	
Bidding & Contractor Procurement	$3,465	
Health and Safety Plan	$330	
Pre-Bid and Pre-Construction Mtgs.	$1,386	
Test Pits/Excavation Oversight	$8,800	
Project Management	$2,420	
Travel/Equip.	$3,300	
Documentation Report	$3,300	
PECFA Claim	$500	
		$30,266
In-situ Oxidation		
Pilot Test Work Plan	$2,750	
Environmental Permitting/Exemptions	$2,200	
Project Management/Meetings	$2,420	
Bench Test		
Bench Test Sampling	$990	
Travel/Equip./Shipping	$275	
Pilot Test		
Baseline and Follow-up Samp.	$1,815	
Oversight	$2,772	
Travel/Equip.	$1,100	
Pilot Test Results Report/NR724 Design Report	$3,630	
Full Remediation		
Install Add. Injection Wells	$2,860	
Baseline and Follow-up Sampling	$2,118	
Oversight	$3,960	
Travel/Equip.	$2,200	
Final Results/Documentation Report	$4,950	
PECFA Claim	$500	
		$34,540
TOTAL CONSULTING CAPITAL AND FIRST YEAR COSTS		$82,928
COMMODITY COSTS		
Initial		
GW Sampling Analytical	$2,200	$2,200
Well Nest Installation (2)		
Drilling & Install. water table wells	$2,200	
Drilling & Install. piezometers	$3,960	
Soil/GW Sampling Analytical	$2,200	
		$8,360

PROJECT: Borgerding Estate Property, Beloit, WI.	NRT PROJECT NO.: 1179
	BY: jag CHKD BY: ljp
Preliminary Engineering and Construction Cost Estimate	
Soil and Groundwater Remediation	FILE: w:\1179costest\insitu ox.

ALTERNATIVE A - Soil Excavation with Off-site Bioremediation and In-situ Chemical Oxidation (cont.)

Excavation/Test Pits		
Waste Characterization	$550	
Site Mob/Demob	$2,200	
Soil Excavation (1500 cy)	$7,425	
Field GC during Excavation	$3,960	
Confirmatory Soil Testing (DRO,GRO, PVOCs)	$4,400	
Special Waste Transportation (1500 cy)	$12,375	
Off-site Bioremediation (1500 cy)	$65,588	
Clean Backfill (1500 cy)	$24,750	
		$121,248
In-situ Oxidation		
Bench Test	$1,650	
Bench Test Analytical	$550	
Pilot Test	$43,000	
Pilot Test Analytical	$2,750	
Install Add. Injection Wells	$11,000	
Full Remediation (as necessary, based on pilot test)	$210,000	
Full Remediation Analytical	$5,500	
		$274,450
TOTAL COMMODITY CAPITAL AND FIRST YEAR COSTS		$406,258
TOTAL CAPITAL AND FIRST YEAR COSTS		**$489,186**
ANNUAL MONITORING COSTS (Years 2 and 3)		
Consultant		
Sampling Labor, Prep	$4,400	
Travel/Equip.	$1,500	
Data Anal./ Reports	$4,000	
Project Management	$2,000	
		$11,900
Commodity		
GW Mon. Well Sampling Anal.	$7,000	$7,000
TOTAL ANNUAL MONITORING COSTS		**$18,900**
PROJECT CLOSURE COSTS (After three years)		
Consultant Closure Costs	$8,000	
Commodity Closure Costs	$5,000	
TOTAL CLOSURE COSTS		**$13,000**
TOTAL NET PRESENT WORTH (3 yr, 5%)		**$533,885**

NOTES:
1. Above is a preliminary engineering estimate only & may be revised during final design.
2. Excavation and backfill costs include labor and equipment.
3. Assumes excavation, pilot test and full remediation to be conducted during first year followed by two additional years of monitoring.
4. Assumes no active remediation off-site.
5. Assume maximum of four additional wells installed off-site for attenuation monitoring.

PROJECT: Borgerding Estate Property, Beloit, WI	NRT PROJECT NO.: 1179
	BY: jag CHKD BY: ljp
Preliminary Engineering and Construction Cost Estimate	DATE: 10/31/96
Soil and Groundwater Remediation	FILE: w:\1179costest\SEVE

ALTERNATIVE B - Steam Enhanced Vapor Extraction (SEVE)

CAPITAL AND FIRST YEAR COSTS	ITEM COST	SUB-TOTAL
CONSULTING COSTS		
Initial		
Groundwater Sampling Labor	$2,200	
Remediation Evaluation/DNR&DeCOM Submittals	$9,350	
		$11,550
Well Nest Installation(2)		
Well Installation Prep./Approvals	$1,980	
Well Installation Oversight	$2,063	
Well/Development/Sampling	$1,650	
Travel/Equip.	$880	
		$6,573
Pilot Test		
Pilot Test Work Plan	$3,300	
Environmental Permitting	$3,300	
Project Management/Meetings	$2,420	
Pilot Test Oversight/Drilling	$1,650	
Baseline and Follow-up Samp.	$1,815	
Travel/Equip.	$1,375	
		$13,860
Remediation System Final Design		
Pilot Test Results/Design Report NR724	$3,465	
Environmental Permitting	$3,300	
		$6,765
Full Remediation		
Vehicle/Equip.	$1,100	
Install Add. Injection Wells/Extract. Wells	$3,575	
Monitoring - First Year		
Progress Well Sampling/O&M labor	$7,260	
Travel/Equip.	$2,200	
Data Analysis/Reports	$6,600	
Project Management	$3,300	
Documentation Report	$4,950	
PECFA Claim	$500	
		$29,485
TOTAL CONSULTING CAPITAL AND FIRST YEAR COSTS		$68,233
COMMODITY COSTS		
Initial		
GW Sampling Analytical	$2,200	$2,200
Well Nest Installation (2)		
Drilling & Install. water table wells	$2,200	
Drilling & Install. piezometers	$3,960	
Soil/GW Sampling Analytical	$2,200	
		$8,360
Pilot Test		
Drilling, Field Monit., elect., plumbing, anal.	$42,000	$42,000
Full Scale Installation		
Equip. Specs Prep./Design	$26,250	
Drilling, 38 steam inj., vapor extract., and recovery wells	$53,550	
SVE and Air Sparging System	$21,000	
Free Product Recovery System / Treatment	$18,900	
Steam Generator Rental/Mob/Demob	$63,000	
Electrical, Gas, Water, Sewer Hook-up	$21,000	
Plumbing/Hook-up Steam/SVE lines	$23,100	
Permitting Fees (Air, Water, Construction)	$5,250	
Control Panel Setup / Emission Control	$15,750	
Treatment Building	$10,500	
Heating, Ventilation, Sump Pump Control	$7,350	
		$265,650

PROJECT: Borgerding Estate Property, Beloit, WI	NRT PROJECT NO.: 1179
	BY: jag CHKD BY: ljp
Preliminary Engineering and Construction Cost Estimate	
Soil and Groundwater Remediation	FILE: w:\1179costest\SEVE

ALTERNATIVE B - Steam Enhanced Vapor Extraction (SEVE) (cont.)

O&M First Year		
GW Mon. Well / Vapor Sampling Anal.	$8,400	
O&M Labor (EGSL, twelve months)	$50,400	
Utilities (nine months)	$47,250	
Status Reports from EGSL	$7,350	
		$113,400
TOTAL COMMODITY CAPITAL AND FIRST YEAR COSTS		$431,610
TOTAL CAPITAL AND FIRST YEAR COSTS		**$499,843**
ANNUAL MONITORING COSTS (Years 2 and 3)		
Consultant		
Sampling Labor, Prep	$4,400	
Travel/Equip.	$1,500	
Data Anal./ Reports	$4,000	
Project Management	$2,000	
		$11,900
Commodity		
GW Mon. Well Sampling Anal.	$7,000	$7,000
TOTAL ANNUAL MONITORING COSTS		**$18,900**
PROJECT CLOSURE COSTS (After three years)		
Consultant Closure Costs	$8,000	
Commodity Closure Costs	$15,000	
TOTAL CLOSURE COSTS		**$23,000**
TOTAL NET PRESENT WORTH (3 yr, 5%)		**$553,180**

NOTES:
1. Above is a preliminary engineering estimate only & may be revised during final design.
2. Remediation equipment costs are based on typical 1996 prices.
3. Assumes SEVE system will operate for nine to twelve months followed by two years of monitoring.
4. Assumes no active remediation off-site.
5. Assumes maximum of four additional wells installed off-site for attenuation monitoring.

Wisconsin Power & Light
222 W Washington Ave
PO Box 192
WP&L Madison WI 53701-0192

608/252-3311
Fax 608/252-3397

called Bob Kluge, said the proposal is acceptable as proposed 7/25/95 MS

Monday, July 24, 1995

Mr. Mike Schmoller
Wisc. DNR—Southern District
3911 Fish Hatchery Road
Fitchburg, WI 53711

Dear Mr. Schmoller:

Enclosed is a copy of a specification to install a caisson foundation near Portland Avenue and the Rock River in Beloit, Wisconsin. I am sending you a copy because this location is also adjacent to a contaminated property that you have investigated. Please review this specification to insure that I've instructed the contractor to take sufficient precautions to protect the river and surrounding properties. To facilitate your review I've highlighted those sections that deal with the containment and removal of the excavated soils and ground water.

If you have any additional requirements or precautions that should be included please let me know. You can contact me at 608-252-3056.

Very truly yours,

Bob Kluge

Robert Kluge
Project Engineer

CC: Linda Lynch, GO
Gene Sommers, GO-1

PROPOSAL
to
Wisconsin Power & Light Co.
P.O. Box 192
Madison, WI 53701

Subject: Proposal to Construct Concrete Foundation in Beloit WI

Attn: Bob Lohr, Purchasing

For the following price, we propose to furnish all labor, materials, equipment and supervision to construct one (1) concrete caisson foundation in accordance with the Wisconsin Power & Light's specification 0003-1 dated 07-21-95 and associated drawings and in accordance with all local, state and federal regulations.

Item 1	To construct one concrete caisson foundation including providing all reinforcing steel, concrete	$ _____
Item 2	To contain excavated material as it is removed from the excavation and during storage at site, and to load and haul excavated material to landfill in Janesville WI.	$ _____
Item 3	To capture ground water from excavation and hold in a tank, for a period not to exceed twelve days, until a sample is analyzed and to deposit in Beloit sanitary sewer as directed by the City of Beloit.	$ _____
	TOTAL ABOVE ITEMS	$ _____
Item 4	Additional price to provide a foundation reveal greater than 6 inches but not to exceed 30 inches.	$ _____ /ft.
Item 5	Additional price to construct foundation to greater depth.	$ _____ /ft.
Item 6	Additional price to hold ground water more than twelve days	$ _____ /day
Item 7	Additional price to haul ground water or excavated materials greater distances than provided for in item 2 and 3 above. Price is based on truck mileage, per truck, that exceeds the Janesville or Beloit depository locations.	$ _____ /mile

signed: _____

Company: _____

_____

date: _____

ELECTRIC TRANSMISSION LINE CONSTRUCTION (EHV)

WISCONSIN POWER AND LIGHT COMPANY'S BLACKHAWK GENERATING PLANT INTERSECTION OF HIGHWAY 51 AND PORTLAND AVENUE IN BELOIT, WISCONSIN

1. SCOPE OR WORK

This specification covers all of the WORK required to complete the construction of one concrete, caisson foundation.

2. GENERAL

The contractor shall furnish all materials (except those itemized herein as supplied by the company), supervision, labor, tools and construction equipment necessary to complete the construction of the foundation. The WORK includes, but is not limited to, ascertaining requirements for materials; scheduling, procuring and receiving materials; giving notices to property owners, utilities, government agencies and others; obtaining permits; cooperating with others; unloading, hauling, storing and protecting materials furnished by the company from damage or loss until erected and until WORK is accepted by the company; returning and unloading excess materials at storage areas designated by the company; excavating and installing foundations.

3. LOCATION OF WORK

At Wisconsin Power and Light Company's Blackhawk Generating Plant at the intersection of Highway 51 and Portland Avenue in Beloit, WI.

4. SCHEDULE OF WORK

a. The WORK shall be performed in accordance with the following schedule:

Start Installation - Any time after June 1, 1995

Complete Installation - November 10, 1995

b. Revisions to the above schedule may be necessary, but must be approved by the company.

c. The work shall be performed using a normal work week of eight hours per day five days per week, Monday through Friday, or ten hours per day, four days per week, Tuesday through Friday.

5. APPLICABLE DOCUMENTS

In addition to the supplements listed in the Instructions to Bidders (A-1), the following drawings and documents form a part hereof:

Plan and Profile Drawings P522 Sheet 12
Structure Drawing(s) Meyer Industries Division, Dwg. #5462, dated 01-22-88
Soil Boring Report(s)
Foundation Drawing P522.C

6. PERMITS AND EASEMENTS

a. Easements

The company has easements and/or highway permits to construct and maintain an electric transmission line and has notified all property owners of our intention to rebuild this line. The company will supply the contractor with the names of property owners and copies of easements and/or licenses. Contractor shall comply with all provisions stated in the easement or license. Contractor shall comply with all provisions of Wisconsin State Statute - Section 182.017(8) and any special conditions contained therein.

b. Permits

The contractor shall comply with the requirement stated in all applicable permits. If, in the opinion of the contractor, the requirements of the permit conflict with the terms of the Contract, the contractor shall so inform the company and the company's instructions shall be followed in a manner consistent with the law. Building, Army Corps, and other permits for the permanent line will be obtained by the company. It is the responsibility of the contractor to inform the company well in advance of the planned construction activity should any guard poles or other temporary facilities be needed to be located in the highway or railroad right-of-way. Specific information regarding such facilities shall be supplied to the company with adequate time to obtain an amended Highway or Railroad Permit. The contractor shall obtain at his own cost, any licenses or permits for moving material and/or equipment. If flagmen are required, the contractor shall arrange for them directly with the railroad.

7. COORDINATION OF WORK

a. The contractor shall coordinate his construction work with other contractors and utilities performing such work concurrently.

Construction conflicts which arise shall be the responsibility of the contractor to resolve.

b. The contractor shall coordinate with other contractors retained by WP&L in association with this project.

c. If the contractor subcontracts the WORK, the subcontractor must be approved by the company and the contractor shall have a supervisor in charge at the work site.

8. **INSPECTION AND SUPERVISION**

a. **Inspection**

The WORK shall be performed subject to inspection by the company. The word "Engineer" or "Inspector" is used synonymously herein to refer to a representative of the company assigned to this job by the company. The Engineer (Inspector) shall interpret the contract, specifications, and drawings.

b. **Supervision**

Each operation shall at all times be under the charge of a responsible supervisor. Such supervisors shall be identified to the Engineer.

c. **Work Schedule**

The contractor shall outline the sequence of operations and the time required for completion of the WORK under each item. The contractor shall advise the Engineer of any proposed changes in his construction schedule.

9. **PUBLIC RELATIONS**

The contractor shall strive to carry out the WORK in a manner that promotes good public relations for the company. The WORK shall be performed in a manner that minimizes damage to real estate and improvements that are crossed by the line, and the contractor shall not proceed with any operation on property without contacting the company's representative and the property owner. At all times the contractor shall work with the affected parties to limit property damage and schedule work and make arrangements for accessing the work site and performing the WORK. If any difficulty with the property owner or the tenant is encountered, the contractor shall advise the engineer immediately.

10. PUBLIC SAFETY

Contractor shall take all precautions to protect people and property from any injury by acts of the contractor in the performance of all work under this Specification. Flags, signals, lights, barricades, and watchmen shall be provided where required for public safety. No fires shall be permitted unless contractor secures a permit. The contractor shall keep open all drainage ditches, and he shall also immediately fill and tamp pole holes after removing guard poles. The use of sheeting in excavation is the contractor's responsibility for his worker's protection.

11. FOUNDATION INSTALLATION

a. Location

Three reference stakes for angle towers and two reference stakes for all other towers will be set by the company's surveyor so that contractor can determine the correct location and elevation of the excavation for the structures. Any stakes disturbed due to contractor's negligence shall be replaced by contractor at his cost.

All footings shall be set to correct elevation and alignment within tolerances permitted by the type of structure. Contractor shall submit his method for holding leg stubs, anchor bolts and/or H-frame poles in place to correct alignment for approval.

b. Special Excavation Requirements

The proposed location of this caisson foundation, on the north side of Portland Avenue in Beloit, is immediately adjacent to a contaminated property. Therefore, the following special construction methods must be employed. The soil excavated from the hole must be placed on the ground near the site and the water contained within the spoil pile area. The soil must then be loaded and hauled to a landfill site in Janesville for disposal. WP&L will pay the tipping charges for the disposal of the materials. The contractor is responsible for berming and containing the spoil, loading the spoil on to a truck, and trucking it to the disposal site. The disposal site is on BlackRidge Road in Janesville, Wisconsin.

When placing the concrete, the water that is removed from the excavation must be contained in a tank trailer until a sample is analyzed (approximately 7 to 10 days) and then disposed of into the sanitary sewer system of the city of Beloit. WP&L will pay for the analysis and the tipping charges for disposal of the water into the sanitary sewer system. The contractor shall provide a containment vessel to hold the water until it is analyzed and the pumping required to remove the water from the excavation and pumping the water into the sanitary sewer system. (The city may permit you to pump the water directly into the sanitary sewer but that has not been agreed to yet, so tank storage is anticipated.)

c. **Excavation**

All caissons shall be constructed by the "drill-in" method or variation thereof which will not result in excessive excavation of the earth surrounding the caisson. Augering operation shall be performed with reasonable care so as not to undermine the soil, thus causing a disturbance.

All caissons shall be constructed to the depth, dimensions and elevations shown on the drawings, and shall be plumb and true to form. Excavation shall be inspected and approved by the company's Inspector before any concrete may be placed. Alterations of the depths or dimensions may be specified by the company if soil conditions are found to be different than reported by the soil boring log. Any resulting changes in payment will be according to unit prices stated in proposal.

Contractor shall furnish and install removable steel barrel type liners, when necessary, to hold the sides of the excavation and prevent caving. Casing, so required, shall have a diameter at least equal to the diameter of the desired foundation and sufficient strength to withstand handling stresses and earth pressures. They must be advanced continuously to the depth of the excavation. Any casing that cannot be removed is the expense of the contractor and the company reserves the right to reject the footing if such a casing is not firmly seated against undisturbed soil for its entire length and circumference.

If ground water is encountered, pumping or bailing shall be performed to keep the holes dry unless a "quick" condition due to hydrostatic pressure exists. Should a quick condition exist that would cause loss of bearing strength of the soil at the bottom of the excavation, a hydrostatic head must be maintained within the excavation that will balance the pressure of the ground water. This head may be created using either clear water or bentonite and water and shall be maintained during the last five feet of excavation and until replaced by concrete. (See placing concrete under water.)

Rock excavation shall be defined as requiring special tools, such as air hammer or blasting, to break up the solid rock into pieces that can be excavated. An occasional stone or loose broken rock is not "rock excavation."

Blasting will not be permitted unless permission is given by the Engineer. The contractor shall assume all responsibility for any damage due to blasting including, but not limited to, any line, tower, dwelling or building, person or livestock, wells, springs or gas lines that may occur as a result of this blasting operation. All blasting shall be performed by a Wisconsin licensed blaster, and an approved mat shall be used to prevent debris from flying. The contractor shall be responsible for conforming to all legal requirements for blasting.

d. **Concrete**

1) Materials

The contractor should be prepared to furnish the company upon request reports prepared by an independent laboratory certifying that the materials to be used in the manufacture of concrete meets the following requirements:

a) Portland cement shall meet ASTM test designation C-150 requirements for Type I.

b) All aggregates shall conform to ASTM test designation C-33. Sand, 3/4 inch stone and 1-1/2 inches stone shall be segregated according to the above described gradation requirements and shall be added independently to the conrete mixture.

c) Water shall be clean and free of deleterious substances.

d) Fly ash may be used as a partial substitute for Portland cement. Fly ash shall conform to ASTM test designation C-618.

e) Admixtures, other than air entraining agents and plasticizing agents, shall not be used without written consent of Purchaser. Air entraining and plasticizing admixtures shall conform to ASTM test designation C-260 and C-494 type A, respectively. The type of admixture shall be subject to the Engineer's approval.

f) Material shall be stored in a suitable fashion in accordance with ACI or ASTM standards. Cement shall be stored properly to prevent the absorption of moisture. Aggregates shall be stored in a fashion that will not cause segregation. As the moisture content of the aggregate changes, proportionate adjustments

shall be made to water added so as to keep the water-cement ratio consistent.

2) Mix Design Requirements

The proposed mix designs of the concrete to be furnished shall be submitted in writing to the company. Also the contractor should be prepared to furnish upon request data from either an independent laboratory or recent use indicating the proposed mix conforms to the following requirements:

a) Mix #1 (vibration required during placement)

Minimum ultimate compressive strength of 3500 psi at 28-day age
Slump 3 to 5 inches
Entrained air content of 4 to 6%
Max Aggregate size 1-1/2"
Recommend 75 to 120 lbs. of fly ash per cu. yd.

b) Mix #2 (for tremmie or pump placement under water)

Minimum ultimate compressive strength of 4000 psi at 28-day age
Slump 6 to 8 inches
Entrained air content of 4 to 6%
Max Aggregate size 3/4"
75 to 120 lbs. of fly ash per cu. yd. (or, if fly ash is not available, an approved plasticizing admixture may be substituted.)

c) Maximum Water - cement ratio shall not exceed 6 gallons per bag of cement.

d) The addition of fly ash is strongly urged as it improves the quality of the concrete, makes it more workable and costs less. If fly ash is not provided in the mix the slump requirements shall all be reduced one inch.

3) Field and/or laboratory tests may be performed by the company as it deems necessary to verify that the concrete furnished meets the design requirements. Tests for slump, air entrainment and compressive strength will be secured in accordance with ASTM C-172 and performed in accordance with ASTM C-143, C-173 and C-31 and C-39, respectively. The concrete strength shall be evaluated in accordance with ACI 214-76. If laboratory cure cylinders fail to meet this requirement, the design mix proportions shall be adjusted accordingly at no additional cost to the company.

Should the above tests indicate that concrete of questionable quality has been used in a footing, additional in site testings shall be performed. Such tests shall be performed according to ACI 318-71 and ASTM C-42. If such tests demonstrate that the in place concrete does not conform to the specifications, the contractor shall bear the cost of the additional tests and correction of the deficiency to the satisfaction of the company.

With each load of concrete delivered to the job site, the ready-mixed concrete producer shall furnish one ticket to the Engineer. Delivery tickets shall provide the following information:

a) Date
b) Name of ready-mix concrete plant, contractor and job.
c) Type of cement and other additives.
d) Mix proportions per cu. yd. of concrete, and total amount of various ingredients in the truck load.
e) Whether the water has been heated.
f) Truck number and time the truck was loaded at the batch plant.
g) Amount of concrete in the load in cu. yds.
h) Water added at the job, if any.

4) Mixing and Placing

Concrete proportions shall be measured, mixed, transported and placed in accordance with ACI 304-73 and ready-mix in accordance with ASTM C-94.

The minimum amount of ready-mix concrete per truck load that is batched shall be 3 cu. yd.

Concrete will be considered unacceptable if it undergoes initial set or if not deposited within 90 minutes of the time the water is introduced. If the concrete is to be transported a long distance, the "90 minute requirement" could be modified by properly using an approved set retarding admixture.

Concrete should be placed in a continuous and uninterrupted manner. If interruptions of the pouring is necessary, the company shall be provided the opportunity to inspect and approve the surface of the concrete in place before placement is resumed. Any construction joints shall be approved by the company.

When discharged from chute, the concrete must neither hit against reinforcing nor the side of the excavation as it drops. If needed to prevent this, a funnel and vertical chute shall be used.

All concrete placed at the level of the stub angle or anchor bolt cages and all Mix #1 type concrete shall be vibrated as it is placed by means of a mechanical vibrator, the type and use of which shall be as approved by the company.

The surface of the concrete shall be trowled and leveled so as not to collect water. Also it shall be protected from freezing or drying.

The temperature of the concrete at discharge from the mixer shall not be less than 50°F in winter nor more than 80°F in the summer. Appropriate measures such as heating the water or using ice (50 pounds of ice equals 6 gallons of water) may be used as needed to control temperatures.

5) Reinforcing cages, anchor bolts and stub angles shall be formed and placed according to the dimensions indicated on the design drawings. All reinforcement and anchoring material shall be free from tags, loose rust, scale, grease, dirt or any other coating or foreign substances that will reduce or destroy the bond. Except for the top and bottom hoop, no welding of specified reinforcing bars will be permitted. Contractor may provide additional steel to support the shape of the cage.

12. **CLAIMS OF DAMAGE**

Contractor agrees that if, during the performance of any part of the WORK, contractor shall cause any damage to crops, livestock, driveways, roads, fences, land or improvements on land outside or inside the limits of the company's right-of-way, with the only exception being damages that are due to the presence of the transmission line or other company owned improvements and not due to the construction thereof and future year crop damages inside the limits of the company's right-of-way due specifically to soil compaction due to normal construction activity, contractor shall settle all such damages (hereinafter called the "contractor's Damages") directly with the person, partnership or corporation of any other entity, sustaining such damages. Upon completion of construction, the contractor shall obtain a signed release from each property owner along the line (except condemnations). The release shall be delivered to Wisconsin Power and Light Company as evidence of payment for all damages. In the event contractor's Damages incurred are not settled within a reasonable time, the company reserves the right to settle damages withheld, out of any monies then held by the company and which are due contractor for work previously done by contractor under this agreement, a sum sufficient to reimburse the company for the amount of contractor's Damages so paid. In the event contractor is unable to settle damages with a property owner for a reasonable amount, and if the company determines that contractor's offer was reasonable and fair for the amount of damages, the company will assume responsibility for settlement of such damages. The contractor's

liability will then be limited to his above-mentioned reasonable offer. Contractor shall keep a record of damages, including types of crops, and assist the company as may be necessary in settling all claims.

13. **MATERIALS**

a. **Materials Furnished by the Company**

The company will furnish guard poles, anchor bolts, and all other material which are a permanent part of the line as listed and shown on the drawings and in the drawings to be issued later, excepting concrete and items hereinafter listed in Section 7.b.

These materials will be available at the following marshalling yards:

Wisconsin Power and Light Company
Southern Area Warehouse
500 Townline Road
Beloit, WI

b. **Materials Furnished by Contractor**

The contractor shall furnish all equipment and materials, excepting those noted in Section 7.a. which are required to properly complete the WORK including, but not limited to, the following:

1) Concrete and reinforcing steel will be furnished and installed by the contractor. Contractor shall make all necessary arrangements for ordering concrete materials from the sources approved by the company giving enough advance notice so that they will arrive at the tower sites on time. Pumping, sheet piling, steel liners, special backfill, crushed stone, sheeting, bracing, shoring, etc., where required, shall be furnished by contractor.

2) All materials required for repairing fences and for temporary fences when required by the WORK.

3) All materials required by the construction work, whether expendable or not (except guard poles which will be loaned by the company) including temporary supports, bridges, barriers, fuel and all tools and equipment including maintenance materials for same. Materials and tools covered by this subparagraph which are left over after completion of the WORK, will remain the property of the contractor (except aforesaid guard poles).

c. **Salvage Material**

Removal and/or salvage materials shall be subject to the following special conditions:

-- Excavated soil shall be left at the site.

14. **JOB CONDITIONS**

a. **Site Conditions**

The contractor shall carefully examine the worksite to determine the existing conditions. No plea of ignorance of conditions (due to failure to make the necessary examination) will be accepted as an excuse for any failure or omission on the part of the contractor to fulfill the requirements of the specification and drawings. Furthermore, the contractor's plea of ignorance is not an acceptable basis for any claims whatsoever for additional compensation.

b. **Safety Rules**

The contractor shall abide by and enforce all OHSA regulations pertaining to the handling of men, equipment and materials and working near energized lines.

c. **Sanitary Facilities**

The contractor shall furnish necessary temporary facilities at a muturally agreed upon location.

d. **Burning**

Burning of materials for disposal purposes on the line route will not be permitted unless contractor secures a burning permit.

e. **Construction Roads**

No construction of permanent roads shall be permitted over the right-of-way unless the company gives specific written instructions otherwise. If bulldozing is necessary, it must be approved by the Engineer, and contractor shall restore property to its original contours.

f. **Equipment Storage**

Contractor shall provide his own equipment yard for storing equipment not being used in a progressive construction of this transmission line.

g. **Litter**

Good housekeeping shall be a must on all right-of-way. Bottles, papers, bits of wire and hardware shall be cleaned up promptly and kept in containers for eventual disposal.

h. **Fences**

Special caution will be required on all fences cut or broken. They shall be repaired promptly or gated to prevent livestock from entering or leaving premises.

i. **Soil Erosion and Stream Sedimentation Control**

All construction activities must be performed in a manner that will satisfy the requirements of existing "Soil Erosion and Stream Sedimentation" laws.

Overflow water or bentenite slurry displaced while tremmie placement of concrete must be contained and not allowed to flow directly into Rock River.

j. **Cleanup**

Contractor shall clean up each tower site within 30 days after completion of the work.

Should the contractor fail to comply with the Engineer's notification to clean up or make repairs to prevent soil erosion and stream sedimentation from roads, tower sites, or the right-of-way in general, the company shall employ the necessary labor and equipment to make the repairs and shall withheld, out of any monies then held by the company and which are due the contractor for work previously done by the contractor under this agreement, a sum sufficient to reimburse the company for the amount of the required repairs.

k. **Power Outages for Construction Purposes**

The contractor shall schedule and request any transmission or distribution line outages with Wisconsin Power and Light Company. The contractor shall schedule and coordinate his work to accommodate the requirements of the company. The company shall make every reasonable effort to assist the contractor in obtaining the outage and restoring the system, but the integrity and reliability of the company's electrical system shall at all times be safeguarded and have priority.

15. **EXTRA WORK**

a. **Extra Work**

Extra work will ordinarily be paid for at the lump sum or unit price stated in the contractor Work Authorization. Whenever in the judgement of the Engineer, it is unreasonable because of the nature of the extra work to apply unit prices set forth in the proposal, the labor and material for the extra work shall be paid for as provided for in Item ___ in the proposal form and the equipment for the extra work shall be paid for as provided for in Item ___ of the proposal form. Extra material will be paid for at the actual net cost to contractor plus an allowance for overhead and profit as set forth in Item ___ of proposal form. In respect to such material, contractor shall furnish receipted invoices or other evidence of payment. The Engineer shall approve the crew size for all extra work, based on the type of work to be performed.

b. **Lost Time**

Unproductive time due to inclement weather or "Report Time" shall not be billed to the company under any circumstances.

c. **Rental Equipment**

Equipment rental hours will be allowed only for the actual time equipment is used on extra work. The cost of moving equipment to and from the job site or from place to place on the right-of-way shall not be billable as extra work unless contractor is specifically directed in writing to move equipment. When working on an hourly rate basis, the tools and equipment shall be approved on an hourly rate basis by the Engineer.

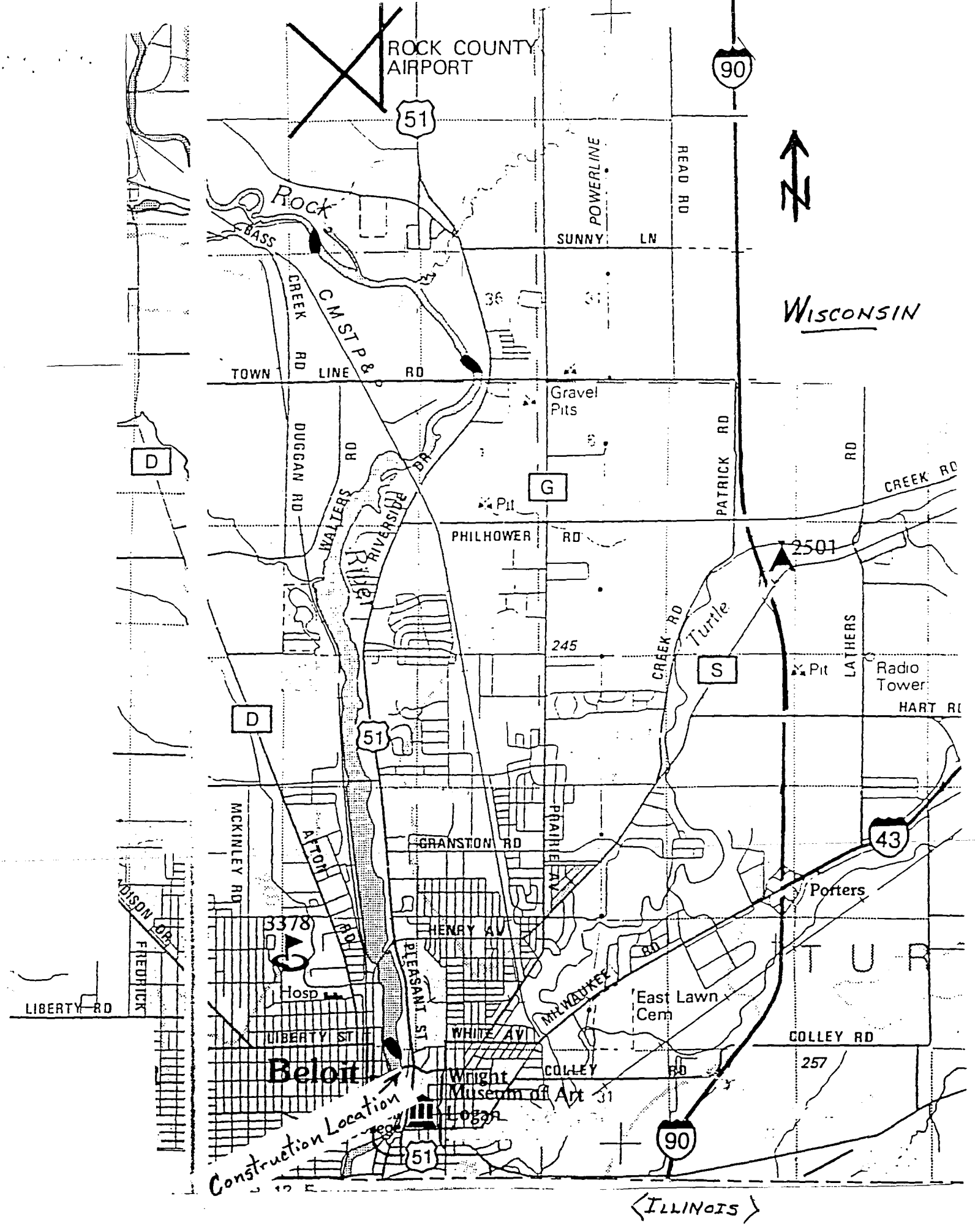
d. **Work Reports**

When working on an hourly time sheet and rate basis, contractor, once each week, shall submit to the Inspector reports showing all work performed, labor and equipment hours, and materials used by each crew on that day. Invoices for hourly rate work shall be submitted weekly.

16. **UTILITY NOTIFICATION**

Contractor shall be responsible for any damages done to existing pipelines, telephone cables or other buried utility. Before excavating, the contractor shall notify utilities and request that buried facilities be identified and located.

RK:pm
Construction Project Spec
0003-1/1-14
950721


ROCK COUNTY AIRPORT
51
90
N
POWERLINE
READ RD
SUNNY LN
Rock
BASS CREEK RD
CMSTP&P
36
WISCONSIN
TOWN LINE RD
Gravel Pits
D
DUGGAN RD
WALKERS RD
RIVERSIDE DR
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Pit
PHILHOWER RD
PATRICK RD
CREEK RD
2501
245
Turtle CREEK RD
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LATHERS RD
Radio Tower
HART RD
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MCKINLEY RD
AFTON RD
GRANSTON RD
PRAIRIE AV
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Porters
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LIBERTY RD
Hosp
PLEASANT ST
MILWAUKEE RD
East Lawn Cem
LIBERTY ST
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Wright Museum of Art
COLLEY RD
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Logan
Construction Location
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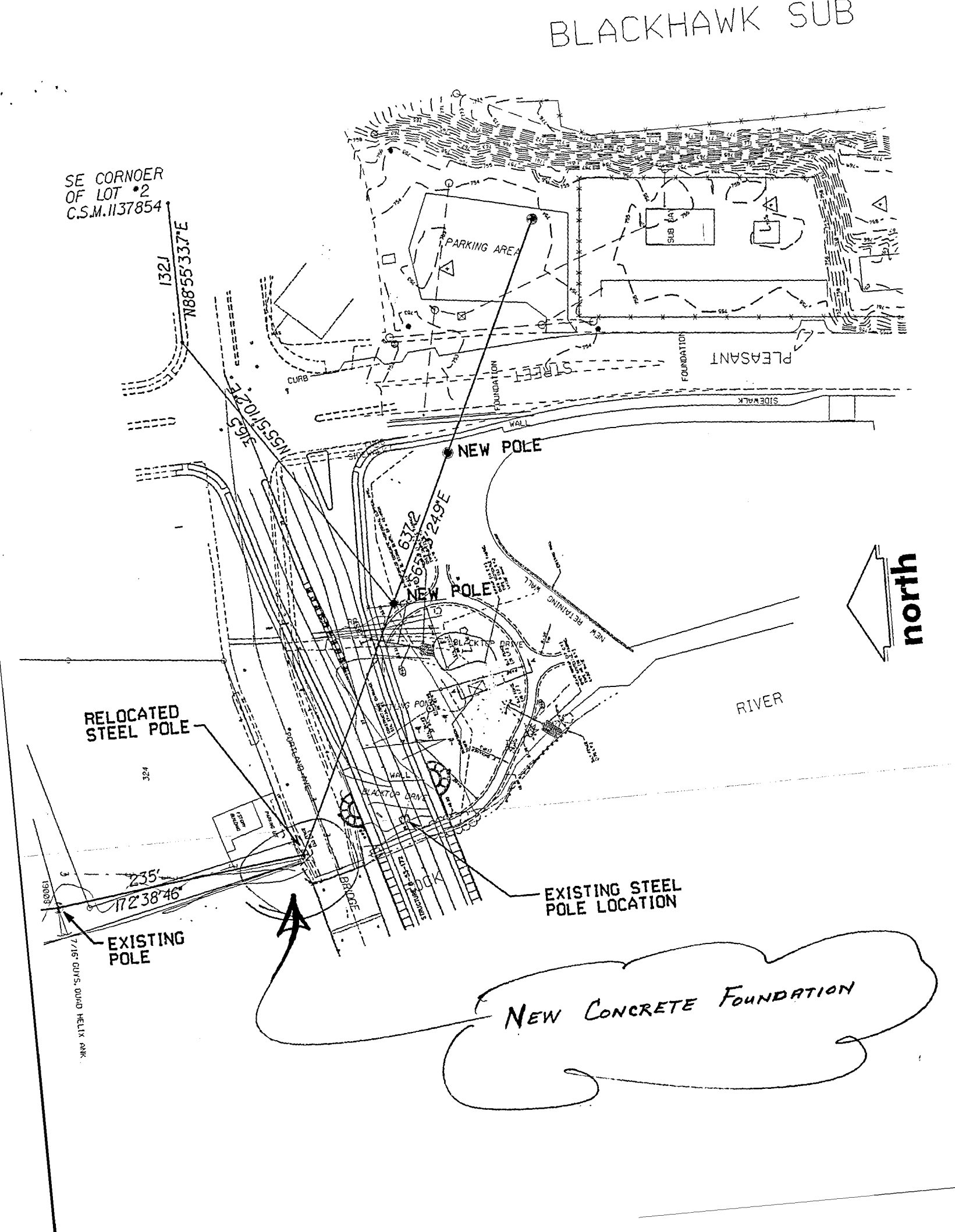
90
ILLINOIS

BLACKHAWK SUB



WP&L

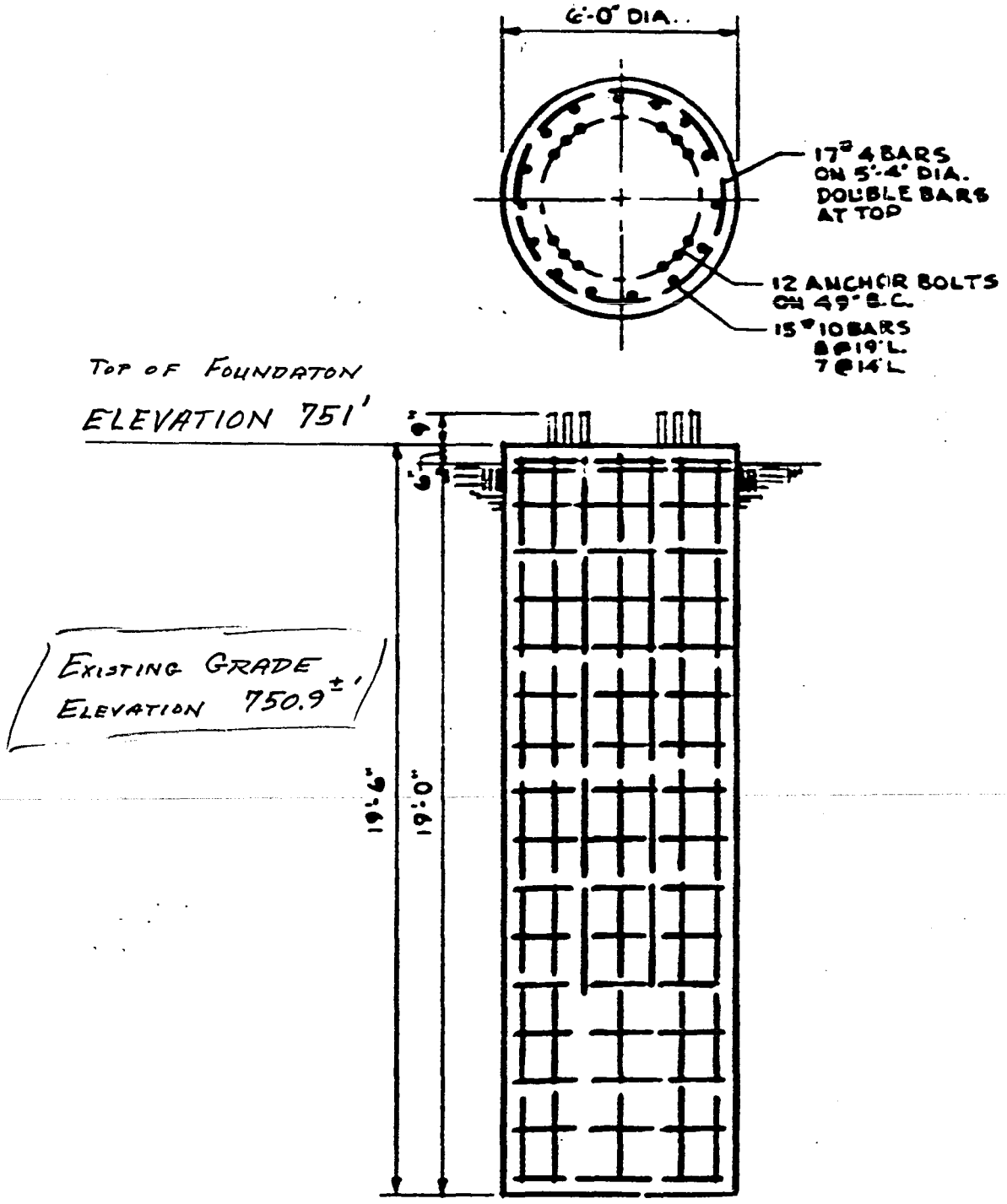
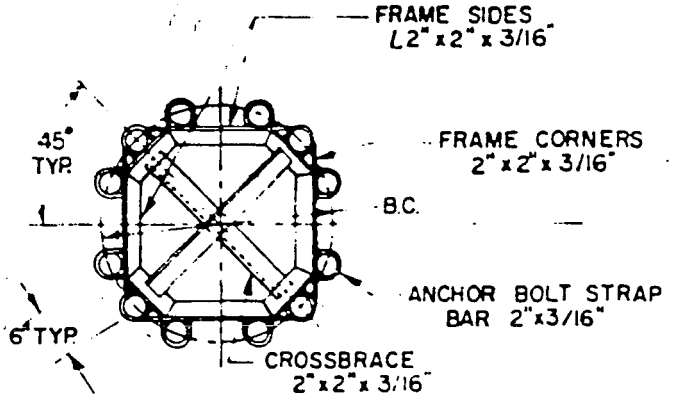
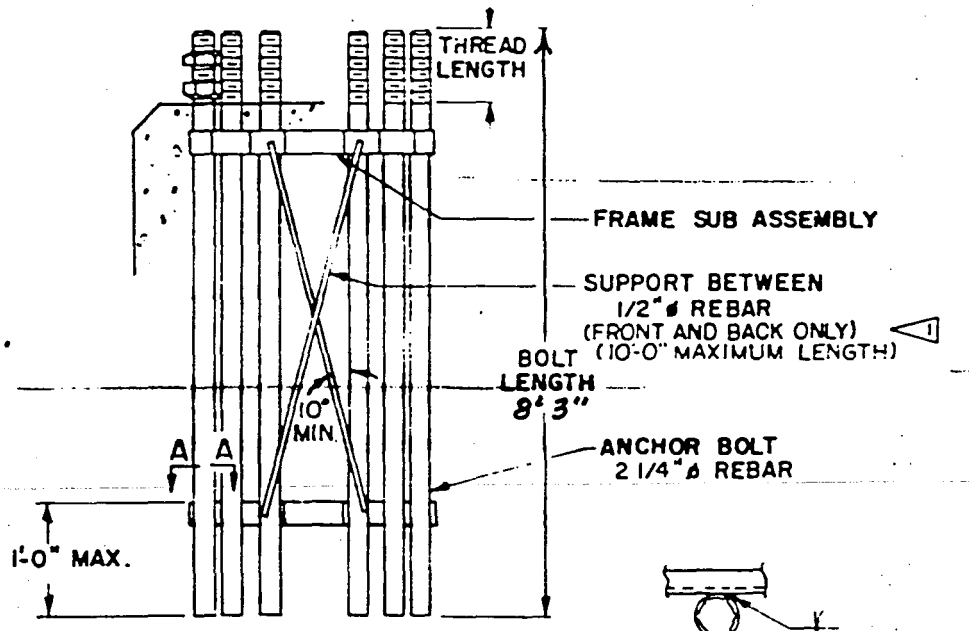


FIG. #16
FD'N. FOR RIVER CROSSING
STRUCTURE #122

ANCHOR BOLTS PROVIDED BY WIS. POWER & LIGHT



CLUSTER WEIGHT 1,700 LBS.



SECTION A-A

12 BOLT CLUSTER