State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

WISCONSIN
DEPT. OF NATURAL RESOURCES

Tommy G. Thompson, Governor
George E. Meyer, Secretary
William H. Smith, Regional Director

6250 South Ranger Road
Brule, Wisconsin 54820
Telephone 715-372-4866
FAX 715-372-4836

January 22, 1999

FILE COPY

MR ERIC R CHRISTIANSEN
CM CHRISTIANSEN COMPANY INC
PO BOX 100
PHELPS WI 54554

Subject: Conditional Approval of the Soil Remedial Action at the Former C.M. Christiansen Company Pole Treatment Facility (BRRTS #02-64-000068)

Dear Mr. Christiansen:

I am writing to inform you that the Department has completed our review of various submittals related to the proposed soil remedial action at the above named site. The evaluation of this proposed action included review of the *Revised Soil Remedial Action Options Report*, the *Design Report and Plan of Operation*, prepared by Natural Resource Technology, Inc., (NRT) and dated May 15, 1998 and June 12, 1998, respectively; NRT's October 21, 1998 *Site Transfer Status and Update* letter; and various telephone conversations with NRT and Department staff. NRT's proposal for further investigation of Military Creek will be addressed under separate cover.

Based on our evaluation, the Department finds the proposed soil remedial action to be acceptable, subject to the following conditions:

1. The Department realizes that there have been delays in implementation of the soil remedial action. However, we now expect that the remediation will begin by June 1, 1999. The Department believes that the four-plus months between now and the remediation start date should provide you and your contractors with enough time to receive all permits, variances and Department approvals, as agreed to in Item 6 of the Spill Response Agreement.

2. Prior to implementing the soil remedial action, you must obtain the variance to hazardous waste treatment and licensing requirements in chs. NR 600 to NR 685, Wis. Adm. Code, from the Department's Waste Management program, for excavated contaminated soil. It is my understanding that you have initiated the variance request process, but that a waste code determination is needed for the variance request to be complete. In order for the Waste Management program to have adequate time to review the variance request, you should supply the Waste Management program with the appropriate waste code information by March 5, 1999.

3. The Department is receptive to the proposed performance standard approach to prevent additional impacts to groundwater and surface water resources. However, we believe that a more detailed long-term groundwater monitoring plan is necessary in order to demonstrate that the proposed soil remedial action has been successful in reducing further contaminant leaching to groundwater. You should note that an expanding groundwater plume will necessitate additional soil and/or groundwater remediation.

4. The Department still has concerns regarding the potential direct contact hazards posed by contamination at the site, and we believe that a Residual Contaminant Level (RCL) for pentachlorophenol (PCP) needs to be determined prior to the initiation of the remedial action. We agree with NRT that the exact nature of the final engineering or institutional controls will depend on the performance of the treatment cell and excavation confirmation sampling results. However, we also feel that without an RCL available beforehand, you will not be able to demonstrate which area(s) of residual (non-excavated) soil contamination will need to be covered and/or restricted both during and after treatment cell operation in order to be protective of human health, as required by s. NR 720.19(5), Wis. Adm. Code. Similarly, you will be unable to demonstrate whether cover and/or restrictions will be needed for soil from the treatment cell once treatment has been completed. We will also require more discussion of how the necessary inspection and maintenance of cover materials will be assured.

5. As I pointed out in my August 7, 1998 letter to you, ss. NR 714.07(5) and NR 722.09(2)(a)2., Wis. Adm. Code, require responsible parties to publish a class 1 public notice in compliance with the requirements of ch. 985, Wis. Stats., whenever a performance standard is proposed to be selected for a soil remedial action. You should proceed with this requirement as soon as possible, as this must be completed prior to initiation of the remedial action. Confirmation that this requirement has been met should then be forwarded to me.

6. NRT has indicated that the WPDES permit for the soil remedial action was approved on September 1, 1998. As I did not receive a copy of this permit, you should forward one to me.

7. Based on an evaluation of NRT's October 21, 1998 correspondence, the proposed modifications to the post-excavation soil confirmation and groundwater sampling plans appear to be acceptable. However, as stated in Item 3 above, further information on the frequency of subsequent groundwater monitoring should be submitted. We are also in agreement with the proposed locations of additional monitoring wells and piezometers. You should note, though, that additional wells may be necessary if the proposed wells do not define the complete degree and extent of groundwater contamination.

8. The Department is in substantial agreement with NRT's proposed criteria for close out sampling of the treatment cell, and the final details can be worked out at a later date, if necessary. However, we feel that in addition to the analyses for PCP and dioxins/furans, samples should also be analyzed for polynuclear aromatic hydrocarbons (PAH), as several PAH compounds are present in soil at the site at concentrations which are of concern.

9. As I stated in my August 7, 1998 letter, you should notify Mr. Mike O'Keefe of the U.S. Army Corps of Engineers prior to initiation of the remedial action regarding excavation in the site's wetland areas.

10. You should provide a written addendum to the *Design Report and Plan of Operation* detailing measures which will be employed to control dust during excavation and treatment cell construction.

It was assumed during negotiation of the Spill Response Agreement that the soil remedial action was going to be conducted in the summer of 1998. Unfortunately, due to many unforeseen delays, this has not occurred. However, the Department believes that you should now have sufficient time for planning and preparation to begin the remediation in June of this year. If the remedial action does not begin by that time, the Department may determine that you are out of compliance with the Spill Response Agreement, and we will have to consider our enforcement options.

If you have any questions about this letter or the project in general, please do not hesitate to write or call me at 715/372-8539, extension 120.

Sincerely,

Christopher A. Saari
Hydrogeologist

cc: Laurie Parsons - NRT
Elizabeth Gamsky Rich - Whyte Hirschboeck Dudek SC
Linda Meyer - LS/5
Michelle DeBrock-Owens - DNR Rhinelander
Gary Kulibert - DNR Rhinelander
Don Miller - DNR Rhinelander
Jim Hansen - DNR Park Falls
Robin Capen - DNR Rhinelander
Mike O'Keefe - USACOE

# PHONE CONVERSATION RECORD

**DATE:** 2/15/99
**TIME:** 1058 hrs.

**CONVERSED WITH:** Laurie Parsons
NRT
414/523-9000

**SUBJECT/PROJECT:** C M Christiansen

**UNIQUE ID#.:** 02-64-000068

I returned a call to Parsons. Parsons said CMC wanted clarification on portions of my 1/22/99 letter.

Item 1 - why did I pick a start date of 6/1/99? Because the Spill Response Agreement had a start date of 6/1/98. I also said if the start date is delayed due to Dept. causes, we can reassess the date.

Item 2 - Parsons said a letter will be forthcoming on the waste code, indicating F027.

Item 3 - we agreed that 2 years of semi-annual monitoring would be acceptable, and could be modified.

Item 4 - Parsons said this issue is most problematic for CMC, as they fear that too low a number will restrict their options, and may result in the whole property being remediated. Instead, Parsons said they were considering picking a number (say 24 ppm), then capping what's over that based on post-excavation results. I then explained

Signature: Christopher A Saar
(please write legibly)

-over-

why I thought an RCL was needed, and how such a number would allow me to have a starting point for review and approval. Parsons said they may use a published number (ie. EPA) and work from that. Parsons said she will discuss this issue further with CMC, and if they wish to discuss further, we can have a 3-way conference call.

Item 5 - Parsons said they haven't been forced to public notice remedies in other parts of the state, but may be because these remedies were done more under NR 708 than NR 722. Parsons asked if I would consider this as a NR 708 interim action, since the groundwater remedy, if needed, would be public noticed anyway. I said I could look at this issue further, but from a consistency standpoint, I was leaning towards the notice requirement. Parsons said an addendum would be written after the excavation describing what areas will be capped and how thick. We also touched on the direct contact RCL at Weisenberger Tie & Lumber.

Item 9 - Parsons said she had a problem with leaving the excavation near the wetland open, due to flooding concerns. Parsons said they may pursue a ch. 30 permit and backfill with an appropriate organic material. Parsons said she would contact the Corps and work on the permit as a contingency. I also suggested she contact Liesa Nesta, WDNR, in Woodruff.

Parsons also mentioned that monitoring wells may be installed in March, she'll let me know. Parsons said they are looking for a local company to conduct the groundwater monitoring as a cost saving measure.

Parsons then said she was concerned about comments Don Miller might have in reviewing the hazardous waste variance (ie. specs for liner and groundwater treatment system), as these could potentially add delays to the project implementation. I told Parsons I would relay these concerns to Miller, and ask Miller to contact Parsons if Miller sees problems with the variance.

Natural
Resource
Technology, Inc.
N R T

COPY

February 26, 1999
(1226)

Mr. Eric R. Christiansen
C. M. Christiansen Co., Inc.
5501 N. Santa Monica
Milwaukee, WI 53217

Re: January 22, 1999 WDNR Correspondence, Item 4
CMC, Co. Inc. Former Pole Treatment Property, Phelps, WI

Dear Eric:

At your request we developed a soil standard for potential direct contact exposure at the former pole treatment facility in response to the WDNR January 22, 1999 correspondence, Item 4. Our analysis is presented below and in the attachment to this letter. Recommendations and comment on future submittals for addressing cover requirements are also made.

We propose a direct contact residual contaminant limit (RCL) of 24 mg/kg, using the USEPA Soil Screening Guidance equation, and applied in a commercial exposure setting. This equation is used to calculate acceptable risk-based concentrations for carcinogenic contaminants to establish an RCL for the site. References, exposure variables, and the governing equation are shown on Table 1.

If the average final treated soil or in-place residual soil concentration within 6 inches of the ground surface is above the 24 mg/kg RCL, then a cover consisting of 6 inches of general fill will be placed over the areas exceeding 24 mg/kg, seeded and mulched. Surface runoff controls will be in place until vegetative growth is established in the covered areas. We recognize that along with this scenario, deed instruments will be necessary to be protective of the cover and possibly restricting use commensurate with a 6-inch cover.

An addendum to the soil remediation work plan will be submitted following treatment cell construction to specify areas to be covered, if any, and the necessary inspection and maintenance of cover materials. If necessary another addendum prior to decommissioning the treatment cell could be submitted to specify disposition of treated soil, if different than the approved plan.

We reiterate that the exact nature of the final engineering or institutional controls will depend on the performance of the treatment cell and excavation confirmation sampling results. The established value is a goal corresponding to a certain anticipated final use and can be changed with WDNR approval subject to providing adequate basis and rationale for a modification. In the case of the referenced property we understand your current plans do not include residential development. During the operation of the treatment cell, no substantial change in use of the

property is anticipated. We understand the most likely long term scenario is development as a green space in a park-like setting with a possible historical museum or other similar establishment. To that end we believe the proposed standard to be consistent with both short and long term anticipated use. We trust this discussion meets your current needs. Please call if you have any questions about this letter or the project in general.

Sincerely,

NATURAL RESOURCE TECHNOLOGY, INC.

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

Spiros L. Fafalios, E.I.T.
Environmental Engineer

Enclosures: Table 1 Calculation of Direct Contact Residual Contaminant Level

[1226 CMC 99.2.26.lw]

Natural Resource Technology

N R T

**Table 1**
**Calculation of Direct Contact Residual Contaminant Level, Commercial Setting**
**CM Christiansen Site, Phelps, WI**

| *Variable* | *Description* | *Commercial Setting* | *Units* | *Pentachlorophenol* |
|---|---|---|---|---|
| **SOIL INGESTION MODEL (USEPA Soil Screening Guidance)** | | | | |
| TR | Target excess lifetime cancer risk | 1.00E-06 | unitless | |
| BW | Adult body weight | 70 | kg | |
| ATc | Averaging time for carcinogen | 70 | years | |
| SFo | Oral cancer slope factor | chemical specific | 1/mg/kg-day | 0.12 |
| $IR_{soi}$ | Soil ingestion rate | 100 | mg/day | |
| EF | Exposure frequency | 250 | days/year | |
| ED | Exposure duration | 25 | years | |
| RCL | Residual Contaminant Level (direct contact) | chemical specific | mg/kg | 24 |

Notes: Exposure variables are in compliance with NR 720.19(5)(c.)2.b.
Equation reference: USEPA Soil Screening Guidance: Technical Background Document, May 1996.
Oral cancer slope factor reference: ATSDR Toxicological Profile for Pentachlorophenol, May 1994.
Soil Ingestion Model formula shown below.

$$RCL = \frac{TR * BW * ATc * 365\ days/year}{SFo * 1 \times 10^{-6}\ kg/mg * EF * ED * IR_{soil}}$$

COPY

# C.M. CHRISTIANSEN CO., INC.

P.O. Box 100
Phelps, WI 54554
Tel: (715) 545-2333
Fax: (715) 545-2334

Eric R. Christiansen
*President*
email: erc@execpc.com

February 26, 1999

Mr. Donald Miller
Wisconsin Department of Natural Resources
Northern Region Headquarters
107 Sutliff Avenue
Rhinelander, WI 54501-0818

Re: C. M. Christiansen Co., Inc. ("CMC") Variance Request

Dear Mr. Miller:

As you may recall, our consultants have discussed with you and our attorneys have discussed with Mr. Peter Flaherty and other DNR staff members the possible waste classification for remediation waste generated at the CMC Poleyard site. Originally, we believed that an appropriate waste code classification for any hazardous pentachlorophenol (PCP) soils at the site would be "D037." We also discussed whether "F027 state-only" or "F032" would be appropriate options for the PCP waste at the site.

Based upon the information we have at this time, we have concluded that an appropriate waste code for any hazardous waste that may be generated at the CMC Poleyard site is "F027 state-only." As permitted by applicable law, we reserve the right to modify this waste code determination in the future if information should come to light that indicates that another waste code determination would be more appropriate.

Should you have any questions regarding this letter, please do not hesitate to contact me.

Very truly yours,

C. M. CHRISTIANSEN CO., INC.

Eric Christiansen,
President

cc: Mr. P.C. Christiansen
Ms. Elizabeth Gamsky Rich
Ms. Laurie Parsons
Mr. Christopher Saari
Mr. Peter Flaherty

# C.M. CHRISTIANSEN CO., INC.

P.O. Box 100
PHELPS, WI 54554
TEL: (715) 545-2333
FAX: (715) 545-2334

ERIC R. CHRISTIANSEN
*PRESIDENT*
EMAIL: erc@execpc.com


February 26, 1999

Mr. Christopher A. Saari
Wisconsin Dept. of Natural Resources
Box 125
Brule, WI 54820-0125



Re: Your letter of January 22, 1999

Dear Mr. Saari:

This letter responds to your letter of January 22, 1999.

Item 1. *Schedule*. We acknowledge your concerns regarding schedule and remain committed to the schedule set forth in the Spill Response Agreement.

Item 2. *Waste Code Determination*. A copy of our letter to Mr. Miller is enclosed.

Item 3. *Groundwater Monitoring*. We propose to monitor groundwater for two years, with semi-annual sampling (baseline, plus three rounds).

Item 4. *RCL Determination*. We refer you to NRT's letter on this question, copy enclosed.

Item 5. *Public Notice*. We will proceed with appropriate public notice to meet the schedule requirements of the Spill Response Agreement.

Item 6. *WPDES Permit*. A copy is enclosed.

Item 7. *Groundwater Impact*. Your concerns are noted.

Item 8. *Close-Out Sampling of PAH Compounds*. This will be done as required by applicable rules, etc.

Item 9. *Notice to U.S. Army Corps of Engineers*. As NRT has discussed with you, we are hesitant to proceed without a contingency fill plan approved to be able to control the excavation if there is a storm or flooding or have concerns regarding the excavation with respect to its proximity to the Creek. We will continue to evaluate appropriate steps in relation to this action item.

Item 10. *Dust Control Measures*. An Addendum covering this item will be prepared and submitted prior to commencing remediation.

We trust this satisfies your concerns in a timely manner and look forward to final approval of the various Reports and Plans previously submitted.

Thank you for time. Please feel free to contact me should you have any additional questions or information requests.

Very truly yours,

C. M. CHRISTIANSEN CO., INC.

Eric Christiansen,
President

cc: Mr. P.C. Christiansen
Ms. Elizabeth Gamsky Rich
Ms. Laurie Parsons

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Tommy G. Thompson, Governor
George E. Meyer, Secretary
William H. Smith, Regional Director

Northern Region Headquarters
107 Sutliff Ave.
Rhinelander, Wisconsin 54501-0818
Telephone 715-365-8900
FAX 715-365-8932
TDD 715-365-8957

March 12, 1999

Mr. Eric Christiansen
CM Christiansen Co.
P.O. Box 100
Phelps, WI 54554

Subject: Waste Code Determination

Dear Mr. Christiansen:

Thank you for your letter of February 26, 1,999, making the determination that you will manage the remedial soils at your facility in Phelps as an F027 Wisconsin listed waste. By making this determination, the Department is now able to proceed reviewing and responding to your variance request of June 1998, to treat Pentachlorophenol contaminated soils at the site.

If there have been any changes in the dates, or other minor changes to the variance plan, please send me an addendum as soon as possible, but preferably not later than the end of March. I will then be able to incorporate the changes into my review and subsequent decision, which I hope to have to you by mid April.

You should not submit an entire new plan if there are no substantive changes. If you have any questions, please call me at 715/365-8980.

Sincerely,

Don Miller
Waste Management Specialist

c. Chris Saari, DNR, Brule
Dave Kafura, DNR, Spooner

# PHONE CONVERSATION RECORD

**DATE:** 3/17/99
**TIME:** 1541 hrs

**CONVERSED WITH:** Laurie Parsons
Natural Resource Technology
414/523-9000

**SUBJECT/PROJECT:** C.M. Christensen

**UNIQUE ID#.:** 02-64-000068

Parsons called with a project update.

Parsons said they were able to install all but one monitoring well; the one that couldn't be installed was the deep piezometer complement to PMW-11 (proposed PMW-15). The ground in this area was too soft, so Parsons said they will come back with the drill rig when the ground firms up. Parsons said she will send me an update with boring logs next week.

Parsons also asked whether I think Don Miller needs copies of recent correspondence from NRT re: RCL determinations. I told Parsons that I would send Miller copies of 10/21/98 and 2/26/99 correspondence, in case Miller needs this for the variance review.

Parsons then asked about the status of the sediment plan. I explained that I would try to get comments out soon. Parsons said they would wait to do sediment sampling until the summer, anyway.

Signature: Christopher Lehmann
(please write legibly)

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Tommy G. Thompson, Governor
George E. Meyer, Secretary
William H. Smith, Regional Director

6250 South Ranger Road
Brule, Wisconsin 54820
Telephone 715-372-4866
FAX 715-372-4836

April 6, 1999

FILE COPY

MR ERIC R CHRISTIANSEN
PRESIDENT
C M CHRISTIANSEN CO INC
PO BOX 100
PHELPS WI 54554

Subject: Conditional Approval of the Soil Remedial Action at the Former C.M. Christiansen Company Pole Treatment Facility (BRRTS #02-64-000068)

Dear Mr. Christiansen:

The Department has received correspondence from you dated February 26, 1999, regarding the proposed soil remedial actions at the above named site. The correspondence was generated in response to a letter from me dated January 22, 1999, containing comments on previous submittals and requesting further information on portions of the proposed remediation plans. These comments and requests were part of the Remediation and Redevelopment program's conditional approval of the soil remedial action.

The proposed remedial action consists of excavation of soil impacted with pentachlorophenol (PCP) and fuel oil. The excavated soil will be placed in a biological treatment cell. You will attempt to demonstrate through monitoring that this action will be protective of groundwater and surface water quality using a performance standard approach, per s. NR 720.19(2), Wis. Adm. Code. The direct contact risks posed by residual contaminated soil not excavated, and possibly by treated soil, will be addressed through capping and institutional controls, based on a residual contaminant level (RCL) calculated for PCP using assumptions of an industrial setting, pursuant to s. NR 720.19(5). The exact nature of the final engineering and institutional controls will need to be finalized after construction of the treatment cell and evaluation of the post-excavation confirmation sampling results. The Department understands that your consultant intends to submit an addendum to the soil remediation plan to address this issue.

Your February 26 letter indicates that an addendum covering dust control measures will be prepared and submitted prior to initiation of the remedial action. Also, we have agreed that requirements for closure sampling of the treatment cell will be finalized at a later date. In addition, you have indicated that the public notice requirements of ss. NR 714.07(5) and NR 722.09(2)(a)2., Wis. Adm. Code, will be met.

Your correspondence included a copy of the approved WPDES General Permit, dated September 1, 1999. This permit covers discharge of treated groundwater from excavation dewatering. Your correspondence also states that your consultant will work with the U.S. Army Corps of Engineers to establish a contingency plan for backfilling the excavation in the wetland area. Per previous submittals, the Department's Air Management program has also been properly notified of the proposed remedial action.

Based on my evaluation of the information submitted to date, the following conditions remain to be met as part of this approval:

1. As pointed out in my January 22 letter, you must still obtain the variance to hazardous waste treatment and licensing requirements in chs. NR 600 to 685, Wis. Adm. Code. It is my understanding that the Department's Waste Management program has completed much of its review of the variance request. Review of the variance request should be completed prior to June 1, 1999.

2. The RCL your consultant has presented for PCP is based on a commercial setting, using default exposure assumptions for an industrial site. Based on this RCL, the proposed remedial action is valid only if the site meets the land use classification criteria of s. NR 720.11(1)(b), Wis. Adm. Code. Pursuant to s. NR 720.11(1)(c), this will require the recording of a deed restriction which meets the requirements of s. NR 726.05(8), Wis. Adm. Code, within 30 days after initiation of the remedial action at the site. Documentation of this recording should then be forwarded to the Department.

As only Item 1 above needs to be completed prior to initiation of the soil remedial action, you should be able to proceed once the Waste Management program has issued an approval of the variance request. If you have any questions concerning this letter or the project in general, please do not hesitate to write or call me at 715/372-8539, extension 120.

Sincerely,

Christopher A. Saari

Christopher A. Saari
Hydrogeologist

cc: Laurie Parsons - NRT
Elizabeth Gamsky-Rich - Whyte Hirschboeck Dudek SC
Linda Meyer - LS/5
Michelle DeBrock-Owens - DNR Rhinelander
Gary Kulibert - DNR Rhinelander
Don Miller - DNR Rhinelander
Jim Hansen - DNR Park Falls
Robin Capen - DNR Rhinelander
Mike O'Keefe - USACOE

**Saari, Christopher A**

**From:** Miller, Donald L
**Sent:** Thursday, April 08, 1999 1:54 PM
**To:** Miller, Sandy J; Kafura, David J; Ferguson, Scott J; Saari, Christopher A; LeRoy, Gary L
**Cc:** Miller, Donald L
**Subject:** Draft Hazardous Waste Variance for CM Christiansen, Phelps

Attached are drafts of the variance and cover letter to treat penta contaminated soil in a containment structure at CMC. I have left a couple of parts open, (in purple) awaiting more information and design changes from CMC. The variance is otherwise complete, please review and comment. I will forward this to EPA once I get your comments incorporated. I would appreciate comments by April 16th, if you need more time let me know. Thanks, Don


cmccover.doc


Cmcvar.doc

E-mailed comments to Miller
4/23/99

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Tommy G. Thompson, Governor
George E. Meyer, Secretary
William H. Smith, Regional Director

Northern Region Headquarters
107 Sutliff Ave.
Rhinelander, Wisconsin 54501-0818
Telephone 715-365-8900
FAX 715-365-8932
TDD 715-365-8957

DRAFT

April 9, 1999

Mr. Eric Christiansen
CM Christiansen Company, Inc.
PO Box 100
Phelps, WI 54554

Subject: HAZARDOUS WASTE VARIANCE - SOIL REMEDIATION TREATMENT PROJECT

Dear Mr. Christiansen:

Department Waste Management program staff have completed our review of documents submitted on your behalf by Natural Resources Technologies for the above referenced project. CM Christiansen Company, Inc. (CMC) is requesting a variance to treat excavated F027 pentachlorophenol contaminated soil in a waste pile at the former CMC pole treating facility in Phelps, as a part of a remedial action consent agreement with the Department. We have determined that the submittal is complete under the provisions of ch. NR 680.50(3) Wis. Adm. Code. This review addresses only the hazardous waste management issues for this operation.

The submitted report dated June 12, 1998 propose to manage excavated contaminated soil by placing into a staging area to mix with proper nutrients, and sort large pieces our for chipping. The properly sized mix will then be placed into a containment structure for bio remediation. The remedial activities are expected to take at least 2 years to reach the recommended goals. Site specific Residual Contaminant Levels (RCLs) have been developed for the site. It is anticipated that treated soil will be returned to the site once it meets or exceeds the RCLs. Since the RCLs are above the hazardous waste Land Disposal Restriction (LDR) requirements for F027 waste in Wisconsin, CMC is required to obtain an LDR variance prior to redisposal on site.

The Department has received the proper fee from CMC for review of this variance request. You will have 30 days to review and comment on this decision for a 30 day period commencing with the date of this letter. The Department will review and consider any written comments received during the comment period and then issue the final variance.

This variance is only for the Department's licensing requirements and the specific items noted in the approval. The variance does not remove CMC of any other hazardous waste management requirements. Disposal of the soil will be in accordance with ch. NR 718 Wis. Adm. Code.

If you have any questions regarding this letter or the attached approval, please call me at 715/365-8980.

Sincerely,

Don Miller
Waste Management Specialist
Northern Region, Rhinelander

c. Sandy Miller, SER
Scott Ferguson, SER
Chris Saari, Brule
Gary LeRoy, Spooner
Dave Kafura, Spooner
Mark Stokstad, Rhinelander
Steve Ohm, Wastewater, Rhinelander
Susan Watson, Wastewater, Rhinelander
Jim Kreitlow, Rhinelander
US EPA Region V
Laurie Parsons, Natural Resources Technologies

DRAFT

BEFORE THE STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
CONDITIONAL VARIANCE APPROVAL
TREATMENT OF HAZARDOUS WASTE CONTAMINATED SOIL
IN A WASTE PILE CONTAINMENT STRUCTURE

C.M. CHRISTIANSEN COMPANY
4700 COUNTY HIGHWAY E
PO BOX 100
PHELPS, WI 54554
FID 764149980
US EPA ID # WIR000009787

| | |
|---|---|
| Owner/Operator: | C.M. Christiansen Company, Inc.<br>PO Box 100<br>Phelps, WI 54554 |
| Contact: | Mr. Eric Christiansen<br>President<br>(715)545-2333 |
| Location: | Part of Government Lot 3 and the NE1/4, SW1/4, all in Section 35, T42N, R11E, Vilas County, Wisconsin. |

C.M. Christiansen, Inc., (CMC) was a Pentachlorophenol (PCP) pole treating facility from the 1950s until the late 1970s. Wood poles were treated in dip tanks of heated #2 fuel oil mixed with a concentration of 5% PCP. The solution from the dip tanks was recirculated for heating and re-use through a boiler house. Treated poles were allowed to drip onto the ground at the site until they were shipped off site to customers. The facility stopped treating poles in the late 1970s.

In April of 1998, the Department and CMC entered into a consent agreement requiring certain actions be taken by CME to remediate the site to protect the environment and human health. Environmental sampling has shown elevated levels of PCP contamination in both soils and groundwater at the site. CMC agreed to submit a soil remediation system design and begin remediation within 60 days of the agreement.

Beginning in 1987, investigations indicated that there had been releases of PCP to the soil and this was possibly impacting groundwater. A preliminary assessment and site screening inspection was done by the Department in 1993. From 1995-1996, Coleman Engineering Company, on behalf of CMC submitted various correspondence and data regarding the site to the Department. Coleman submitted a Site Investigation Report to the Department in February of 1997. Natural Resource Technology (NRT) was hired to replace Coleman, and in February of 1998, a letter regarding test pit investigation and supplemental groundwater data was submitted. NRT submitted the Remedial

Action Options Report on May 15, 1998. On June 12, 1998, NRT submitted a "Variance Request for Soil Remediation Project", along with a Design Report and Plan of Operation, for treatment of soil at the CMC site.

CMC proposes to excavate approximately 2,500 cubic yards of contaminated soil at the site from four different 'hot spot' areas. Concentration of PCP ranges from 470 ppm to 82,000 ppm at these sites. Some of the sites are in known wetland areas, and one is in or near a creek. It is proposed to use controls to protect the wetlands and creek from further contamination during the project. A lined and bermed area will be used for staging the material prior to placing it in the final treatment cell for bioremediation. Large debris will be chipped prior to placement in the treatment cell. Soil will be mixed with a bulking agent consisting of wood chips, water if needed, and nutrients from commercial fertilizers to enhance the biological decay rates.

A seepage cell will be temporarily constructed for containing water drained from soil from the wetlands and creek areas. An oil/water separator tank, carbon adsorption vessels and filtration will be used as necessary to treat water on site, and then discharge to the seepage cell. A WPDES permit has been obtained to discharge water from the cell.

Soil samples will be taken in the staging area prior to construction. Follow up samples will again be taken after the cells is dismantled. Any contaminated soil above the RCL for the site will be placed in the treatment cell.

The bio pile will be designed to manage up to 4,300 cubic yards of soil, should additional bulking agents be necessary, or more soil is excavated than was originally planned for. The treatment cell will consist of a bermed 30 mil Polyethylene (PE) liner placed on 6" of sand, then covered with 12" of sand. (See condition # 13) Once the waste is placed, the pile will be covered with a 20 mil PE cover. The base of the cell will be sloped, with a collection point to monitor and re-circulate water, if present, back through the pile.

A sampling plan and inspection schedule for the treatment cell were submitted in the report. It is proposed to treat investigative wastes along with excavated soil in the treatment cell. Closure at the site will include dismantling pipes, berms and wind turbines. Soils are expected to be replaced on site. (See condition #4) Piping, cover materials, and the liner will be decontaminated and disposed as solid waste. Samples will be taken beneath the liner area to confirm impacts were not caused by the treatment cell operation.

## FINDINGS OF FACT

The Wisconsin Department of Natural Resources finds that:

1. C.M. Christiansen Company, Inc., has notified as a generator of hazardous waste, and been issued EPA ID # WIR000009787.
2. From the early 1950s until the late 1970s, CMC treated wooden poles with a solution of Pentachlorophenol and #2 fuel oil in dip tanks on site
3. In 1993, investigations by the Department indicated that there were elevated levels of PCP in the soil and groundwater at CMC's facility.
4. From 1995 through 1996, Coleman Engineering, on behalf of CMC submitted various data to the Department.

5. Natural Resource Technologies was hired in 1997 to replace Coleman, and submitted test pit investigation and supplemental groundwater data in February of 1998.
6. In April of 1998, the Department and CMC entered into a consent agreement requiring CMC to begin soil remediation at the site by June 1, 1998, unless they were unable to obtain approval of the soil remediation design system from the Department and obtain all permits, variances etc. required for the project.
7. In June of 1998, Coleman submitted a "Variance Request for Soil Remediation Project", and a Design Report and Plan of Operation.
8. A Variance plan review fee of $1200.00 was received along with the variance request and design report.
9. On July 9, 1998 the Department sent a letter to CMC requesting additional information along with a receipt for the variance review fee. The request asked CMC to provide a hazardous waste code for the waste to be generated during remedial activities, and for CMC to determine the Residual Contaminant Levels (RCLs) for this site in order for us to review and subsequently issue the variance.
10. On February 26, 1999, CMC submitted a letter stating that they have determined that the excavated PCP contaminated soils will be considered to be "F027 state only" hazardous wastes.
11. On March 12, 1999, the Department returned a letter to CMC stating that the variance request will now be reviewed for conditional approval, with a projected date of about mid-April.
12. Wisconsin, as an EPA authorized state, has the ability to establish site-specific treatment variances under 40CFR 268.44(h) and the subsequent guidance memo dated January 8, 1997 "Use of Site Specific Land Disposal Restriction Treatability Variances Under 40 CFR 268.44(h) During Cleanups".
13. Chapter NR 680.50 Wis. Adm. Code, provides the authorization to issue a variance from the requirements of chapters NR 600 through 699 and sections 291.23 or 291.25 Stats., if the application for, or compliance with the terms of or conditions of, any license required under chs. NR 600-699 would cause undue or unreasonable hardship to any person, and the variance would not result in undue harm to human health or the environment.
14. Failure to grant the variance request needed to operate a temporary hazardous waste treatment facility would likely result in CMC failing to meet the requirements of the consent order,. Not granting the variance could substantially increase the costs of the operation, as well as cause continuing harm to the environment. Failure to grant the variance would also cause unnecessary delays to the operation.

## CONCLUSIONS OF LAW

1. The Department has promulgated chapters NR 600 through 699, Wis. Adm. Code, establishing the minimum requirements for hazardous waste management under the authority of ss. 291.001 through 291.97 Wis. Statutes.
2. Under s. 291.37(2) stats., the Department may require the owner or operator of a facility to take corrective action for protecting human health or the environment from a release.
3. The Department has the authority under s. 291.31 stats., and ch. NR 680.50 Wis. Adm. Code, to issue variances from the requirements for any license required under s. 291.25, or from the requirements of chs. NR 600-699 if the application for or conditions of any such license would

cause undue or unreasonable hardship to an person. The issuance of the requested variances would not result in undue harm to human health or the environment.

4. C.M. Christiansen, Company, Inc., is a 'person' as defined by ch. NR 600.03(170), Wis. Adm. Code.
5. CMC has applied for a variance from the provision of ch. NR 645.06 to treat hazardous waste in a waste pile inside a containment structure.
6. CMC has demonstrated that obtaining a license to treat contaminated soil at this site would pose a 'hardship'.

## CONDITIONAL APPROVAL

1. Based on the above findings of fact and conclusions of law, the Department hereby grants to C. M. Christiansen, Company, Inc., variances under ch. NR 680.50, Wis. Adm. Code and s. 291.25 Wis. Stats., from the requirement to obtain an operating license under chs. 600-699, Wis. Adm. Code for the treatment of hazardous waste in a waste pile in a containment structure.. The variance is granted for a term of up to 5 years, or until the contaminated soil is treated to below the site specific RCLs and have been disposed of back on the site. It should be noted that a variance for the Land Disposal Restrictions will be necessary if the treated waste is not below the LDRs for pentachlorophenol F027 waste. This approval is subject to the following conditions and exemptions to certain requirements as specified below.

This variance is granted with the following conditions:

1. The hazardous waste treatment process shall be operated within the standards and requirements contained in ch. NR 600 - 699, Wis. Adm. Code and the conditions specified in ch. NR 630, 655, 670 and 680, Wis. Adm. Code.
2. Only soil removed from the four areas specified in the design report, and accumulated investigative waste from the site may be treated under this variance.
3. Department of Natural Resources employees and authorized representatives shall be allowed access to the facility and operating records at all reasonable times for inspection purposes as allowed under s. 291.91, Wis. Stats.
4. Any changes in the design of the treatment facility cells, waste handling processes, or the treatment processes which are not part of the approved plan will require a written plan modification and written approval from the Department prior to implementation.
5. All samples taken to determine closure and treatability certification must be performed by a Department approved laboratory under ch. NR 149, Wis. Adm. Code. The Department reserves the right to require split samples at any time during the project.
6. Closure sampling under the seepage cell and treatment cells shall include a minimum of 10 samples from each site.
7. All materials, equipment and vehicles which have come in contact with the contaminated soils shall be properly decontaminated before leaving the site. Records shall be kept and posted at the facility as proof vehicles leaving the site have been decontaminated.
8. Dust control measures must be taken to limit dust from the project to protect both workers and on site personnel. Releases of airborne contaminates are not acceptable, and will require immediate shutdown until dust control measures have been implemented.
9. The Residual Contaminant Levels (RCLs) for the site are above the hazardous waste Land Disposal Restriction (LDR) requirements. Therefore, treated waste cannot be placed back

onto the site until it is below both the RCLs and LDRs, *or* CMC has obtained a variance to the LDRs for redisposal on-site. [CMC may be requesting an LDR variance before final approval]

10. Construction and disassembly of the seepage cell and treatment unit shall include taking preventive measures to protect the nearby stream and wetlands.
11. CMC shall develop a project completion and closure report upon the termination of the hazardous waste treatment at this site detailing all the information stipulated in the submittals for this project and required as a part of this submittal.
12. CMC shall follow the procedures identified in the submitted plans for this project. The Department recognizes that, to some extent, the final process may be dependent on conditions encountered as the project progresses. Any changes from those contained in the submitted plans and this approval must be approved by the Department prior to implementation.
13. The proposed treatment cell does not have a means with which to contain and collect any leaks or perforations in the main cell liner. A design which allows leachate to be collected and sampled under the liner will have to be developed prior to final approval of this variance.

## NOTICE OF APPEAL RIGHTS

If you believe that you have a right to challenge this decision, you should know that Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions must be filed. For judicial review of a decision pursuant to sections 227.52 and 227.53, Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

This notice is provided pursuant to section 227.48(2), Stats.

Wisconsin Department of Natural Resources
For the Secretary

By _____
Gary LeRoy
Waste Program Team Supervisor
Northern Region

X



# Natural Resource Technology, Inc. TRANSMITTAL

| | | | |
|---|---|---|---|
| **To:** | Northern Region | **Date:** | **April 6, 1999** |
| | Wisc. Department of Natural Resources | **Project No:** | **1226** |
| | Highway 2, PO Box 125 | **From:** | **Spiro Fafalios** |
| | Brule, WI 54820 | | **Laurie Parsons** |
| **Attn:** | Mr. Chris Saari | **Re:** | **CMC Co, Inc. Site** |

☒ For Your Files ☐ As Requested ☐ For Review ☐ Approve and Return

| Copies: | Description |
|---|---|
| 4 | Soil Boring Log Forms (MW-17, PMW-17, MW-18, PMW-18) |
| 4 | Monitoring Well Construction Forms (MW-17, PMW-17, MW-18, PMW-18) |
| 3 | Monitoring Well Development Forms (MW-17, MW-18, PMW-18) |
| 1 | Monitoring Well Construction Summary Table |
| 1 | Site Plan with New Wells (1226-B11.DWG) |

**Comments:**

Enclosed is documentation of installation, construction and development of two water table monitoring wells and two piezometers at the C.M. Christiansen Co., Inc. property in Phelps, Wisconsin. A revised groundwater monitoring well construction summary and site plan are also included for your information. Due to mechanized failure of the drill rig prior to its installation, PMW-15 could not be completed. PMW-17 was not developed, because the groundwater elevation was very close to the surface, and froze. The remaining well installation is postponed, possibly until June when we are on-site for soil remediation work. Baseline groundwater sampling will be conducted in accordance with the Design Report and Plan of Operations (June 1998) and subsequent addendum (October 1998). On CMC's behalf we are soliciting price proposals from laboratories and local contractors for the sampling work and will update you as to schedule when the sampling work is contracted.

cc: Eric Christiansen, CMC Co., Inc.

23713 W. Paul Road, Pewaukee, WI 53072 ■ Phone 414/523-9000 ■ Fax 414/523-9001

WATER DIVERSION SWALE
SLOPE AT 1% MINIMUM IN
DIRECTION OF ARROWS
(SEE FIGURE 8 FOR DETAIL)

APPROXIMATE AREA OF
CONSTRUCTED SEEPAGE CELL
FOR TREATED GROUNDWATER
(SEE FIGURE 8 FOR DETAIL)

TREATMENT CELL
LOCATION
130 FT. x 130 FT.

MATERIAL
PROCESSING AND
SOIL STAGING AREA

AREA #1
6-14' DEPTH

AREA #2A
5' DEPTH

AREA #2B
1' DEPTH

AREA #3
2-5' DEPTH

AREA #4
4-6' DEPTH

AREA #5
1-3' DEPTH

FORMER BURN AREA

FORMER 30,000 GAL WOOD TREATMENT ABOVE GROUND STORAGE TANK

FORMER POLE DIPPING TANK

FORMER PUMP HOUSE

FORMER BOILER HOUSE

LOWER WETLANDS AREA

SMALL GROWTH

SILT FENCE

MILITARY CREEK

MILITARY CREEK REFERENCE POINT APPROX. LOCATION

STREAM FLOW

COUNTY "E"

GATE

REL. B.E. +2.5'

REL. B.E. +3'

REL. B.E. 0'

REL. B.E. +1.5'

## LEGEND

| | |
|---|---|
| | ESTIMATED EXCAVATION EXTENT |
| B-15 (0.14) | BORING WITH PCP RESULTS |
| MW-12 (0.005) | BORING/MONITORING WELL WITH PCP RESULTS |
| PMW-14 | PIEZOMETER WITH PCP RESULTS |
| PMW-15 | PROPOSED PIEZOMETER |
| HA-34 (0.77) | HAND AUGER BORING WITH PCP RESULTS |
| S-2 (79) | SURFACE SOIL SAMPLES WITH PCP RESULTS |
| TP-1 | TEST PIT (BY NRT) |
| PCP | PENTACHLOROPHENOL |
| REL. B.E. | RELATIVE BASE ELEVATION |

N

0 40 80 160

SCALE IN FEET

**SOURCE NOTE:**
THIS MAP WAS MODIFIED FROM DRAWING BY COLEMAN ENGINEERING COMPANY (CEC), IRON MOUNTAIN, MICHIGA DATED FEBRUARY 1997, JOB NO. 95042 A7 .

**NOTE:**
BASE MAP SURVEY COMPLETED BY CEC WITH ADDITIONAL INFORMATION OBTAINED FROM USDA-ASCS HISTORICAL AERIAL PHOTOGRAPHS, A 7/7/95 SITE VISIT WITH C M CHRISTIANSEN CO., AND A 5/21/96 FIELD INSPECTION.

DRAWN BY: TAS DATE: 03/30/99
CHECKED BY: SLF DATE: 04/06/99
APPROVED BY: LJP DATE: 04/06/99
AUTOCAD FILE: 1226-B11.DWG

# SITE PLAN WITH NEW WELLS
DESIGN REPORT AND PLAN OF OPERATION
C.M. CHRISTIANSEN COMPANY, INC.
FORMER POLE TREATMENT FACILITY
PHELPS, WISCONSIN

Natural Resource Technology

PROJECT NO. 1226-DR-4.2

DRAWING NO. 1226-B11

FIGURE NO. 2

State of Wisconsin
Department of Natural Resources

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☐ Other ☐ _____



| Facility/Project Name | License/Permit/Monitoring Number | Boring Number |
|---|---|---|
| CM CHRISTIANSEN | _ _ _ _ _ _ _ | MW-17 |

| Boring Drilled By: Name of crew chief (first, last) and Firm | Date Drilling Started | Date Drilling Completed | Drilling Method |
|---|---|---|---|
| First Name: JON Last Name: WEEKS<br>Firm: BOART LONGYEAR | 03/04/1999 | 03/04/1999 | HSA |

| WI Unique Well No. | DNR Well ID No. | Well Name | Final Static Water Level | Surface Elevation | Borehole Diameter |
|---|---|---|---|---|---|
| _ _ _ _ _ _ | _ _ _ | | _____ Feet MSL | _____ Feet MSL | _____ inches |

Local Grid Origin ☐ (estimated: ☐ ) or Boring Location ☐
State Plane _____ N, _____ E S/C/N
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N ☐ E
_____ Feet ☐ S _____ Feet ☐ W
_____ 1/4 of _____ 1/4 of Section _____, T _____ N, R _____ E/W

| Facility ID | County | County Code | Civil (Town)/City/ or Village |
|---|---|---|---|
| | VILAS | 64 | PHELPS |

| Sample Number and Type | Sample Length Att. & Recovered (in) | Blow Counts | Depth in Feet (Below ground surface) | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Drilled without sampling to 13'. Reference PMW-17 boring log for lithology. | | | | | | | | | | |

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Dan Monical Firm NATURAL RESOURCE TECHNOLOGY, INC.

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

Route To: Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other ☐

**MONITORING WELL CONSTRUCTION**
Form 4400-113A Rev. 6-97

| | | |
|---|---|---|
| Facility/Project Name: CM Christiansen Company | Local Grid Location of Well: ____ ft. ☐ N. ☐ S. ____ ft. ☐ E. ☐ W. | Well Name: MW-17 |
| Facility License, Permit or Monitoring No. | Grid Origin Location (Check if estimated: ☐) Lat. ° ' " Long. ° ' " or | Wis. Unique Well No. / DNR Well Number |
| Facility ID: 3410-9948 | St. Plane ____ ft. N. ____ ft. E. S/C/N | Date Well Installed: 03/04/1999 |
| Type of Well: Well Code 11/mw | Section Location of Waste/Source: ____ 1/4 of ____ 1/4 of Sec. ____ T. ____ N. R. ____ ☐ E ☐ W | Well Installed By: (Person's Name and Firm): Jon Weeks |
| Distance Well Is From Waste/Source Boundary ft. | Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known | Boart Longyear |

A. Protective pipe, top elevation ____ ft. MSL
B. Well casing, top elevation 3.00 ft. MSL
C. Land surface elevation ____ ft. MSL
D. Surface seal, bottom ____ ft. MSL or 0.0 ft.

12. USC classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

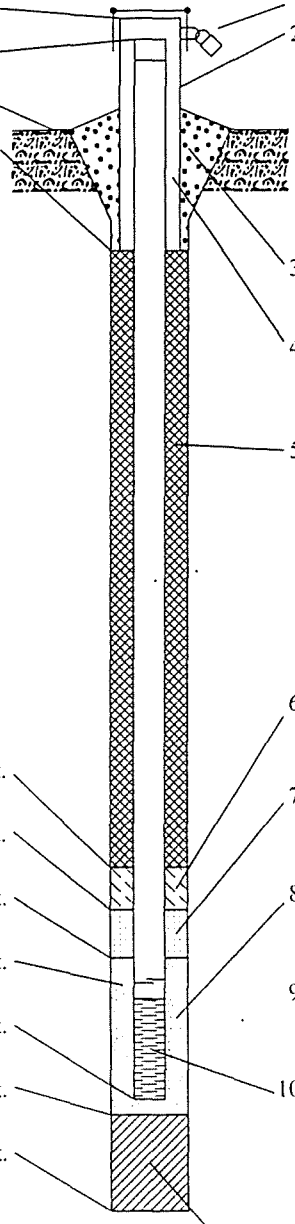
14. Drilling method used: Rotary ☐ 50
Hollow Stem Auger ☒ 41
____ Other ☐ __

15. Drilling fluid used: Water ☐ 02 Air ☐ 01
Drilling Mud ☐ 03 None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No
Describe ____

17. Source of water (attach analysis):
____

E. Bentonite seal, top ____ ft. MSL or 0.0 ft.
F. Fine sand, top ____ ft. MSL or ____ ft.
G. Filter pack, top ____ ft. MSL or 2.0 ft.
H. Screen joint, top ____ ft. MSL or 3.0 ft.
I. Well bottom ____ ft. MSL or 13.0 ft.
J. Filter pack, bottom ____ ft. MSL or 13.0 ft.
K. Borehole, bottom ____ ft. MSL or 15.0 ft.
L. Borehole, diameter 8.0 in.
M. O.D. well casing 2.37 in.
N. I.D. well casing 2.06 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 4.0 in.
b. Length: 7.0 ft.
c. Material: Steel ☒ 04
____ Other ☐ __
d. Additional protection? ☐ Yes ☒ No
If yes, describe: ____
3. Surface seal: Bentonite ☒ 30
Concrete ☐ 01
____ Other ☐ __
4. Material between well casing and protective pipe:
Bentonite ☐ 30
Sand Other ☒ __
5. Annular space seal: a. Granular Bentonite ☒ 33
b. ____Lbs/gal mud weight . Bentonite-sand slurry ☐ 35
c. ____Lbs/gal mud weight . . . Bentonite slurry ☐ 31
d. ____% Bentonite . . . Bentonite-cement grout ☐ 50
e. ____Ft³ volume added for any of the above
f. How installed: Tremie ☐ 01
Tremie pumped ☐ 02
Gravity ☒ 08
6. Bentonite seal: a. Bentonite granules ☒ 33
b. ☐ 1/4 in. ☐ 3/8 in. ☐ 1.2 in. Bentonite pellets ☐ 32
c. ____ Other ☐ __
7. Fine sand material: Manufacturer, product name and mesh size
a. ____ __
b. Volume added ____ ft³
8. Filter pack material: Manufacturer, product name and mesh size
a. #30 American Material __
b. Volume added ____ ft³
9. Well casing: Flush threaded PVC schedule 40 ☒ 23
Flush threaded PVC schedule 80 ☐ 24
____ Other ☐ __
10. Screen material: PVC __
a. Screen Type: Factory cut ☒ 11
Continuous slot ☐ 01
____ Other ☐ __
b. Manufacturer Boart Longyear
c. Slot size: 0.010 in.
d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒ 14
____ Other ☐ __

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: [signature] Firm: BOART LONGYEAR COMPANY
101 ALDERSON ST., P.O. BOX 109 SCHOFIELD, WI 54476
Tel: 715-359-7090 Fax: 715-355-5715

Please complete both Forms 4400-113A and 4400-113B and return to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

# MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 6-97

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

| Facility/Project Name | County | Well Name |
|---|---|---|
| CM Christiansen Company | Vilas | MW-17 |
| **Facility License, Permit or Monitoring Number** | **County Code** | **Wis. Unique Well Number** / **DNR Well Number** |
| | 64 | |

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method:

| | | |
|---|---|---|
| surged with bailer and bailed | ☐ | 41 |
| surged with bailer and pumped | ☐ | 61 |
| surged with block and bailed | ☐ | 42 |
| surged with block and pumped | ☐ | 62 |
| surged with block, bailed, and pumped | ☐ | 70 |
| compressed air | ☐ | 20 |
| bailed only | ☐ | 10 |
| pumped only | ☐ | 51 |
| pumped slowly | ☐ | 50 |
| other Whale Pump and Surged | ☒ | -- |

3. Time spent developing well 50 min.

4. Depth of well (from top of well casing) 15.9 ft.

5. Inside diameter of well 2.06 in.

6. Volume of water in filter pack and well casing 12.7 gal.

7. Volume of water removed from well 55.0 gal.

8. Volume of water added (if any) gal.

9. Source of water added _____

10. Analysis performed on water added? ☐ Yes ☐ No
(If yes, attach results)

| | Before Development | After Development |
|---|---|---|
| 11. Depth to Water (from top of well casing) a. | 3.25 ft. | 4.50 ft. |
| Date b. | 03/05/1999 | 03/05/1999 |
| Time c. | 09:40 am | 10:35 am |
| 12. Sediment in well bottom | 0.010 inches | 0.0 inches |
| 13. Water clarity | Clear ☐ 10 Turbid ☒ 15 | Clear ☒ 20 Turbid ☐ 25 |
| (Describe) | Gray | Clear |

Fill in if drilling fluids were used and well is at solid waste facility:

| | | |
|---|---|---|
| 14. Total suspended solids | mg/l | mg/l |
| 15. COD | mg/l | mg/l |

16. Well developed by: Person's Name and Firm
Jon Weeks
Boart Longyear - Schofield

17. Additional comments on development:

Facility Address or Owner/Responsible Party Address

Name: _____

Firm: _____

Street: _____

City/State/Zip: _____

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: _____

Print Name: Ron Thalacker

Firm: BOART LONGYEAR COMPANY

NOTE: See instructions for more information including a list of county codes and well type codes.

State of Wisconsin
Department of Natural Resources

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☐ Other ☐ _____



| Facility/Project Name | License/Permit/Monitoring Number | Boring Number |
|---|---|---|
| CM CHRISTIANSEN | _ _ _ _ _ _ _ _ | PMW-17 |

| Boring Drilled By: Name of crew chief (first, last) and Firm | Date Drilling Started | Date Drilling Completed | Drilling Method |
|---|---|---|---|
| First Name: JON Last Name: WEEKS<br>Firm: BOART LONGYEAR | 03/04/1999 (m m d d y y y y) | 03/04/1999 (m m d d y y y y) | HSA |

| WI Unique Well No. | DNR Well ID No. | Well Name | Final Static Water Level | Surface Elevation | Borehole Diameter |
|---|---|---|---|---|---|
| _ _ _ _ _ _ _ | _ _ _ _ _ | | _____ Feet MSL | _____ Feet MSL | _____ inches |

Local Grid Origin ☐ (estimated: ☐ ) or Boring Location ☐
State Plane _____ N, _____ E S/C/N
Lat ° ' "
Long ° ' "
_____ 1/4 of _____ 1/4 of Section _____, T _____ N, R _____ E/W
Local Grid Location ☐ N ☐ E _____ Feet ☐ S _____ Feet ☐ W

| Facility ID | County | County Code | Civil Town/City/ or Village |
|---|---|---|---|
| | VILAS | 6 4 | PHELPS |

| Sample Number and Type | Length Att. & Recovered (in) | Blow Counts | Depth in Feet (below ground surface) | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PMW-17 (6) | NR | 1 1<br>1 1 | 5 | ORGANIC MUCK/SILT, very soft, trace fine sand, saturated, gray/brown, highly plastic, semi-liquid. | | | | X | | | | | | |
| PMW-17 (11) | NR | 1 0<br>0 0 | 10 | | OL | | | X | | | | | | |
| PMW-17 (16) | 10 | 1 0<br>0 0 | 15 | | | | | 0.0 | | | | | | |
| PMW-17 (21) | 21 | 1 1<br>1 0 | 20 | | | | | 0.0 | | | | | | |
| PMW-17 (26) | 24 | 1 1<br>1 4 | 25 | same, becomes firmer | | | | 0.0 | | | | | | |
| | | | 30 | SAND, fine-grained poorly sorted (upper 5'); well-sorted below, wet | SP | | | | | | | | | |

I hereby certify that the information on this form is true and correct to the best of my knowledge.

| Signature | Firm |
|---|---|
| Dan Morrill | NATURAL RESOURCE TECHNOLOGY, INC. |

PMW-17



| Sample Number and Type | Sample Length Att. & Recovered (in) | Blow Counts | Depth in Feet | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PMW-17 (31) | 20 | 7 12<br>7 9 | | | | | | 0.2 | | | | | | |
| | | | | | SP | | | | | | | | | |
| PMW-17 (36) | 4 | 10 9<br>7 10 | 35 | | | | | 0.1 | | | | | | |
| | | | | END OF BORING AT 37! (sampled to 37', drilled to 35') | | | | | | | | | | |
| | | | 40 | | | | | | | | | | | |

State of Wisconsin
Department of Natural Resources Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

**MONITORING WELL CONSTRUCTION**
Form 4400-113A Rev. 6-97

| Facility/Project Name | Local Grid Location of Well | Well Name |
|---|---|---|
| CM Christiansen Company | ____ ft. ☐N. ☐S. ____ ft. ☐E. ☐W. | PMW-17 |
| **Facility License, Permit or Monitoring No.** | **Grid Origin Location** (Check if estimated: ☐) | **Wis. Unique Well No. / DNR Well Number** |
| | Lat. ° ' " Long. ° ' " or | |
| **Facility ID** | St. Plane ____ ft. N. ____ ft. E. S/C/N | **Date Well Installed** |
| 3410-9948 | **Section Location of Waste/Source** | 03/04/1999 |
| **Type of Well** | ____ 1/4 of ____ 1/4 of Sec. ____ T. ____ N. R. ____ ☐E ☐W | **Well Installed By: (Person's Name and Firm** |
| Well Code 11/mw | **Location of Well Relative to Waste/Source** | Jon Weeks |
| **Distance Well Is From Waste/Source Boundary** ft. | u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known | Boart Longyear |

A. Protective pipe, top elevation ____ ft. MSL
B. Well casing, top elevation 3.00 ft. MSL
C. Land surface elevation ____ ft. MSL
D. Surface seal, bottom ____ ft. MSL or 0.0 ft.

12. USC classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 5 0
Hollow Stem Auger ☒ 4 1
____ Other ☐ __

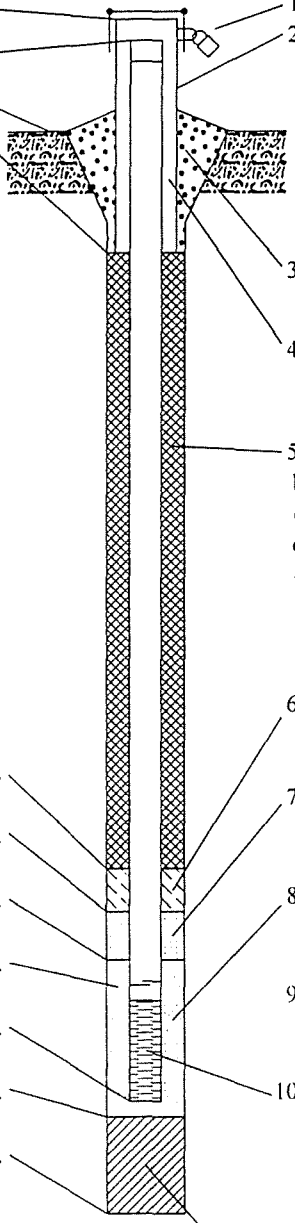
15. Drilling fluid used: Water ☐ 0 2 Air ☐ 0 1
Drilling Mud ☐ 0 3 None ☒ 9 9

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis):
____

E. Bentonite seal, top ____ ft. MSL or 0.0 ft.
F. Fine sand, top ____ ft. MSL or 26.0 ft.
G. Filter pack, top ____ ft. MSL or 28.0 ft.
H. Screen joint, top ____ ft. MSL or 35.0 ft.
I. Well bottom ____ ft. MSL or 35.0 ft.
J. Filter pack, bottom ____ ft. MSL or 35.0 ft.
K. Borehole, bottom ____ ft. MSL or 37.0 ft.
L. Borehole, diameter 8.0 in.
M. O.D. well casing 2.37 in.
N. I.D. well casing 2.06 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 4.0 in.
b. Length: 7.0 ft.
c. Material: Steel ☒ 0 4
____ Other ☐ __
d. Additional protection? ☐ Yes ☒ No
If yes, describe: ____
3. Surface seal: Bentonite ☒ 3 0
Concrete ☐ 0 1
____ Other ☐ __
4. Material between well casing and protective pipe:
Bentonite ☐ 3 0
#30 American Material Other ☒ __
5. Annular space seal: a. Granular Bentonite ☒ 3 3
b. ____ Lbs/gal mud weight . Bentonite-sand slurry ☐ 3 5
c. ____ Lbs/gal mud weight . . . Bentonite slurry ☐ 3 1
d. ____ % Bentonite . . . Bentonite-cement grout ☐ 5 0
e. ____ $Ft^3$ volume added for any of the above
f. How installed: Tremie ☐ 0 1
Tremie pumped ☐ 0 2
Gravity ☒ 0 8
6. Bentonite seal: a. Bentonite granules ☒ 3 3
b. ☐ 1/4 in. ☐ 3/8 in. ☐ 1/2 in. Bentonite pellets ☐ 3 2
c. ____ Other ☐ __
7. Fine sand material: Manufacturer, product name and mesh size
a. #7 Badger __
b. Volume added ____ $ft^3$
8. Filter pack material: Manufacturer, product name and mesh size
a. #30 American Material __
b. Volume added ____ $ft^3$
9. Well casing: Flush threaded PVC schedule 40 ☒ 2 3
Flush threaded PVC schedule 80 ☐ 2 4
____ Other ☐ __
10. Screen material: PVC __
a. Screen Type: Factory cut ☒ 1 1
Continuous slot ☐ 0 1
____ Other ☐ __
b. Manufacturer Boart Longyear
c. Slot size: 0.010 in.
d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☒ 1 4
____ Other ☐ __

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature [signature] Firm BOART LONGYEAR COMPANY
101 ALDERSON ST., P.O. BOX 109 SCHOFIELD, WI 54476
Tel: 715-359-7090 Fax: 715-355-5715

Please complete both Forms 4400-113A and 4400-113B and return to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and condut involved. Personnally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☐ Other ☐ _____

Page ___ of ___

| Facility/Project Name | License/Permit/Monitoring Number | Boring Number |
|---|---|---|
| CM CHRISTIANSEN | _ _ _ _ _ _ _ | MW-18 |

| Boring Drilled By: Name of crew chief (first, last) and Firm | Date Drilling Started | Date Drilling Completed | Drilling Method |
|---|---|---|---|
| First Name: JON Last Name: WEEKS<br>Firm: BOART LONGYEAR | 03/03/1999 (m m d d y y y y) | 03/03/1999 (m m d d y y y y) | HSA |

| WI Unique Well No. | DNR Well ID No. | Well Name | Final Static Water Level | Surface Elevation | Borehole Diameter |
|---|---|---|---|---|---|
| _ _ _ _ _ _ _ | _ _ _ | | _____ Feet MSL | _____ Feet MSL | _____ inches |

Local Grid Origin ☐ (estimated: ☐ ) or Boring Location ☐
State Plane _____ N, _____ E S/C/N
_____ 1/4 of _____ 1/4 of Section ____, T ____ N, R ____ E/W

Lat ___ ° ___ ' ___ "
Long ___ ° ___ ' ___ "

Local Grid Location
_____ Feet ☐ N ☐ S _____ Feet ☐ E ☐ W

| Facility ID | County | County Code | Civil Town/City/ or Village |
|---|---|---|---|
| | VILAS | 64 | PHELPS |

| Sample Number and Type | Sample Length Att. & Recovered (in) | Blow Counts | Depth in Feet (Below ground surface) | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Drilled without sampling to 13'. Reference PMW-18 boring log for lithology. | | | | | | | | | | |

I hereby certify that the information on this form is true and correct to the best of my knowledge.

| Signature | Firm |
|---|---|
| Dan Dornick | NATURAL RESOURCE TECHNOLOGY, INC. |

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources Route To: Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other ☐

**MONITORING WELL CONSTRUCTION**
Form 4400-113A Rev. 6-97

| | | |
|---|---|---|
| Facility/Project Name: CM Christiansen Company | Local Grid Location of Well: ____ft. ☐N. ☐S. ____ft. ☐E. ☐W. | Well Name: MW-18 |
| Facility License, Permit or Monitoring No. | Grid Origin Location (Check if estimated: ☐) Lat. ° ' " Long. ° ' " or St. Plane ____ ft. N. ____ ft. E. S/C/N | Wis. Unique Well No. / DNR Well Number |
| Facility ID: 3410-9948 | | Date Well Installed: 03/03/1999 |
| Type of Well: Well Code 11/mw | Section Location of Waste/Source: ____1/4 of ____1/4 of Sec. ____T. ____N. R. ____ ☐E ☐W | Well Installed By: (Person's Name and Firm): Jon Weeks |
| Distance Well Is From Waste/Source Boundary ft. | Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known | Boart Longyear |

A. Protective pipe, top elevation ____ ft. MSL
B. Well casing, top elevation 3.00 ft. MSL
C. Land surface elevation ____ ft. MSL
D. Surface seal, bottom ____ ft. MSL or 0.0 ft.

12. USC classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

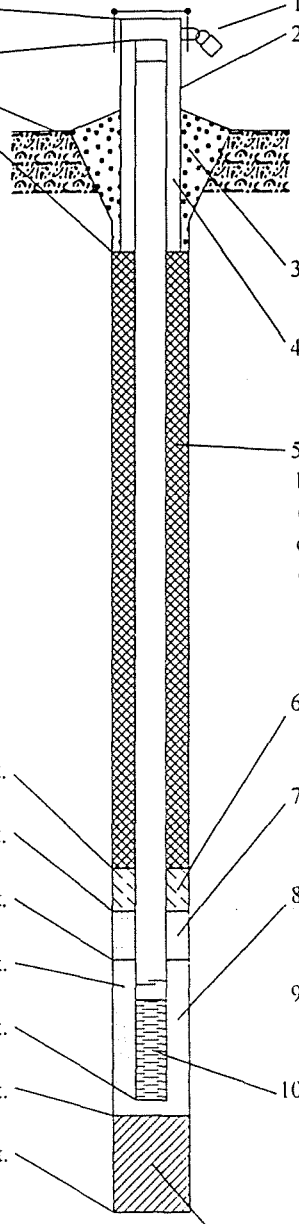
14. Drilling method used: Rotary ☐ 50
Hollow Stem Auger ☒ 41
____ Other ☐ __

15. Drilling fluid used: Water ☐ 02 Air ☐ 01
Drilling Mud ☐ 03 None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No
Describe ____

17. Source of water (attach analysis):
____

E. Bentonite seal, top ____ ft. MSL or 0.0 ft.
F. Fine sand, top ____ ft. MSL or ____ ft.
G. Filter pack, top ____ ft. MSL or 2.0 ft.
H. Screen joint, top ____ ft. MSL or 3.0 ft.
I. Well bottom ____ ft. MSL or 13.0 ft.
J. Filter pack, bottom ____ ft. MSL or 13.0 ft.
K. Borehole, bottom ____ ft. MSL or 15.0 ft.
L. Borehole, diameter 8.0 in.
M. O.D. well casing 2.37 in.
N. I.D. well casing 2.06 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 4.0 in.
b. Length: 7.0 ft.
c. Material: Steel ☒ 04
____ Other ☐ __
d. Additional protection? ☐ Yes ☒ No
If yes, describe: ____
3. Surface seal: Bentonite ☒ 30
Concrete ☐ 01
____ Other ☐ __
4. Material between well casing and protective pipe:
Bentonite ☐ 30
#30 American Material Other ☒ __
5. Annular space seal: a. Granular Bentonite ☒ 33
b. ____Lbs/gal mud weight . Bentonite-sand slurry ☐ 35
c. ____Lbs/gal mud weight . . . Bentonite slurry ☐ 31
d. ____% Bentonite . . . Bentonite-cement grout ☐ 50
e. ____$Ft^3$ volume added for any of the above
f. How installed: Tremie ☐ 01
Tremie pumped ☐ 02
Gravity ☒ 08
6. Bentonite seal: a. Bentonite granules ☒ 33
b. ☐ 1/4 in. ☐ 3/8 in. ☐ 1/2 in. Bentonite pellets ☐ 32
c. ____ Other ☐ __
7. Fine sand material: Manufacturer, product name and mesh size
a. #7 Badger __
b. Volume added ____ $ft^3$
8. Filter pack material: Manufacturer, product name and mesh size
a. #30 American Material __
b. Volume added ____ $ft^3$
9. Well casing: Flush threaded PVC schedule 40 ☒ 23
Flush threaded PVC schedule 80 ☐ 24
____ Other ☐ __
10. Screen material: PVC __
a. Screen Type: Factory cut ☒ 11
Continuous slot ☐ 01
____ Other ☐ __
b. Manufacturer Boart Longyear
c. Slot size: 0.010 in.
d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒ 14
____ Other ☐ __

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: [signature] Firm: BOART LONGYEAR COMPANY, 101 ALDERSON ST., P.O. BOX 109 SCHOFIELD, WI 54476 Tel: 715-359-7090 Fax: 715-355-5715

Please complete both Forms 4400-113A and 4400-113B and return to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and condut involved. Personnally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

# MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 6-97

Route To: Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other ☐

| Facility/Project Name | County | Well Name |
|---|---|---|
| CM Christiansen Company | Vilas | MW-18 |
| **Facility License, Permit or Monitoring Number** | **County Code** | **Wis. Unique Well Number** / **DNR Well Number** |
| | 64 | |

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method:

| | | |
|---|---|---|
| surged with bailer and bailed | ☐ | 41 |
| surged with bailer and pumped | ☐ | 61 |
| surged with block and bailed | ☐ | 42 |
| surged with block and pumped | ☐ | 62 |
| surged with block, bailed, and pumped | ☐ | 70 |
| compressed air | ☐ | 20 |
| bailed only | ☐ | 10 |
| pumped only | ☐ | 51 |
| pumped slowly | ☐ | 50 |
| other Whale pumped & Surged | ☒ | 80 |

3. Time spent developing well ____ min.

4. Depth of well (from top of well casing) 15.9 ft.

5. Inside diameter of well 2.06 in.

6. Volume of water in filter pack and well casing 4.4 gal.

7. Volume of water removed from well 40.0 gal.

8. Volume of water added (if any) ____ gal.

9. Source of water added ____

10. Analysis performed on water added? ☐ Yes ☐ No
(If yes, attach results)

| | Before Development | After Development |
|---|---|---|
| 11. Depth to Water (from top of well casing) a. | 6.89 ft. | 7.00 ft. |
| Date b. | 03/05/1999 | 03/05/1999 |
| Time c. | 11:55 am | 12:00 am |
| 12. Sediment in well bottom | 0.010 inches | 0.0 inches |
| 13. Water clarity | Clear ☐ 10 Turbid ☒ 15 (Describe) Dark Gray | Clear ☒ 20 Turbid ☐ 25 (Describe) Clear |

Fill in if drilling fluids were used and well is at solid waste facility:

| | | |
|---|---|---|
| 14. Total suspended solids | mg/l | mg/l |
| 15. COD | mg/l | mg/l |

16. Well developed by: Person's Name and Firm
Jon Weeks
Boart Longyear - Schofield

17. Additional comments on development:

Facility Address or Owner/Responsible Party Address

Name: ____

Firm: ____

Street: ____

City/State/Zip: ____

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: [signature]

Print Name: Ron Thalacker

Firm: BOART LONGYEAR COMPANY

NOTE: See instructions for more information including a list of county codes and well type codes.

State of Wisconsin
Department of Natural Resources

# SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☐ Other ☐ _____



| Facility/Project Name | License/Permit/Monitoring Number | Boring Number |
|---|---|---|
| CM CHRISTIANSEN | | PMW-18 |

| Boring Drilled By: Name of crew chief (first, last) and Firm | Date Drilling Started | Date Drilling Completed | Drilling Method |
|---|---|---|---|
| First Name: JON Last Name: WEEKS<br>Firm: BOART LONGYEAR | 03/03/1999 | 03/03/1999 | HSA |

| WI Unique Well No. | DNR Well ID No. | Well Name | Final Static Water Level | Surface Elevation | Borehole Diameter |
|---|---|---|---|---|---|
| | | | _____ Feet MSL | _____ Feet MSL | _____ inches |

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☐
State Plane _____ N, _____ E S/C/N
_____ 1/4 of _____ 1/4 of Section _____, T _____ N, R _____ E/W
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N ☐ E _____ Feet ☐ S _____ Feet ☐ W

| Facility ID | County | County Code | Civil Town/City/ or Village |
|---|---|---|---|
| | VILAS | 64 | PHELPS |

| Sample Number and Type | Length Att. & Recovered (in) | Blow Counts | Depth in Feet (below ground surface) | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PMW-18 (6) | 12 | 2 5<br>7 9 | 5 | PEAT; with wood and roots, v. soft, wet. | OL | | | 3.1 | | | | | | |
| PMW-18 (11) | 10 | 4 6<br>5 7 | 10 | SAND, fine-and medium-grained, trace coarse, trace silt, wet, no odor, gray. | SP | | | 1.3 | | | | | | |
| PMW-18 (16) | 22 | 2 3<br>8 7 | 15 | PEAT with wood and organics, black | OL | | | 4.8 | | | | | | |
| | | | | SAND as above | | | | | | | | | | |
| PMW-18 (21) | 24 | 7 12<br>13 10 | 20 | same, organics present 21.5-22. | SP | | | 4.6 | | | | | | |
| PMW-18 (26) | 24 | 8 7<br>13 15 | 25 | | | | | 3.0 | | | | | | |
| | | | 30 | | | | | | | | | | | |

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Dan Plomi | Firm: NATURAL RESOURCE TECHNOLOGY, INC.

PMW-18



| Sample Number and Type | Sample Length Att. & Recovered (in) | Blow Counts | Depth in Feet | Soil/Rock Description And Geologic Origin For Each Major Unit | USCS | Graphic Log | Well Diagram | PID/FID | Soil Properties: Compressive Strength | Moisture Content | Liquid Limit | Plasticity Index | P 200 | RQD/ Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PMW-18 (31) | 12 | 12 20 15 16 | | | | | | 1.6 | | | | | | |
| | | | 35 | | | | | | | | | | | |
| PMW-18 (36) | 16 | nr | | SILT, grey, trace sand, stiff | ML | | | 0.7 | | | | | | |
| | | | | SAND, as above but light brown | SP | | | | | | | | | |
| | | | | END OF BORING at 37' (sampled to 37', drilled to 35.') | | | | | | | | | | |
| | | | 40 | | | | | | | | | | | |

State of Wisconsin
Department of Natural Resources Route To: Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other ☐

**MONITORING WELL CONSTRUCTION**
Form 4400-113A Rev. 6-97

| | | |
|---|---|---|
| Facility/Project Name: CM Christiansen Company | Local Grid Location of Well: ____ ft. ☐ N. ☐ S. ____ ft. ☐ E. ☐ W. | Well Name: PMW-18 |
| Facility License, Permit or Monitoring No. | Grid Origin Location (Check if estimated: ☐ ) Lat. ° ' " Long. ° ' " or | Wis. Unique Well No. / DNR Well Number |
| Facility ID: 3410-9948 | St. Plane ____ ft. N. ____ ft. E. S/C/N | Date Well Installed: 03/03/1999 |
| Type of Well: Well Code 11/mw | Section Location of Waste/Source: ____ 1/4 of ____ 1/4 of Sec. ____ T. ____ N. R. ____ ☐ E ☐ W | Well Installed By: (Person's Name and Firm): Jon Weeks |
| Distance Well Is From Waste/Source Boundary ____ ft. | Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known | Boart Longyear |

A. Protective pipe, top elevation ____ ft. MSL
B. Well casing, top elevation 3.00 ft. MSL
C. Land surface elevation ____ ft. MSL
D. Surface seal, bottom ____ ft. MSL or 0.0 ft.

12. USC classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

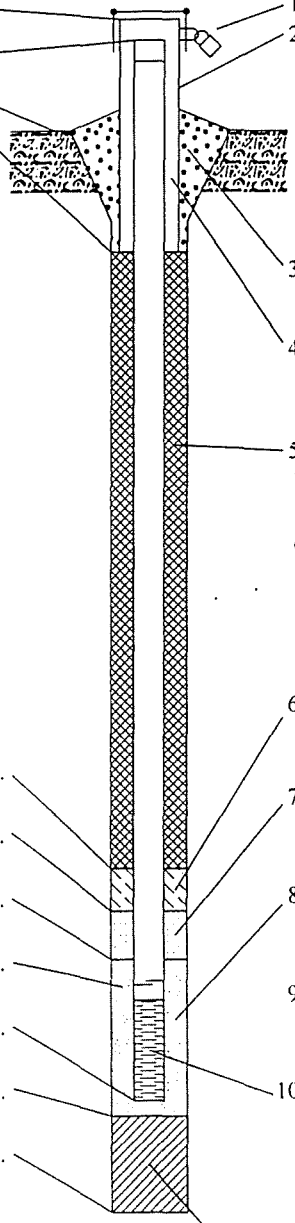
14. Drilling method used: Rotary ☐ 5 0
Hollow Stem Auger ☒ 4 1
____ Other ☐ __

15. Drilling fluid used: Water ☐ 0 2 Air ☐ 0 1
Drilling Mud ☐ 0 3 None ☒ 9 9

16. Drilling additives used? ☐ Yes ☒ No
Describe ____

17. Source of water (attach analysis): ____

E. Bentonite seal, top ____ ft. MSL or 0.0 ft.
F. Fine sand, top ____ ft. MSL or 26.0 ft.
G. Filter pack, top ____ ft. MSL or 28.0 ft.
H. Screen joint, top ____ ft. MSL or 30.0 ft.
I. Well bottom ____ ft. MSL or 35.0 ft.
J. Filter pack, bottom ____ ft. MSL or 35.0 ft.
K. Borehole, bottom ____ ft. MSL or 37.0 ft.
L. Borehole, diameter 8.0 in.
M. O.D. well casing 2.37 in.
N. I.D. well casing 2.06 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 4.0 in.
b. Length: 7.0 ft.
c. Material: Steel ☒ 0 4
____ Other ☐ __
d. Additional protection? ☐ Yes ☒ No
If yes, describe: ____
3. Surface seal: Bentonite ☒ 3 0
Concrete ☐ 0 1
____ Other ☐ __
4. Material between well casing and protective pipe:
Bentonite ☐ 3 0
#30 American Material Other ☒ __
5. Annular space seal: a. Granular Bentonite ☒ 3 3
b. ____ Lbs/gal mud weight . Bentonite-sand slurry ☐ 3 5
c. ____ Lbs/gal mud weight . . . Bentonite slurry ☐ 3 1
d. ____ % Bentonite . . . Bentonite-cement grout ☐ 5 0
e. ____ $Ft^3$ volume added for any of the above
f. How installed: Tremie ☐ 0 1
Tremie pumped ☐ 0 2
Gravity ☒ 0 8
6. Bentonite seal: a. Bentonite granules ☒ 3 3
b. ☐ 1/4 in. ☐ 3/8 in. ☐ 1/2 in. Bentonite pellets ☐ 3 2
c. ____ Other ☐ __
7. Fine sand material: Manufacturer, product name and mesh size
a. #7 Badger __
b. Volume added ____ $ft^3$
8. Filter pack material: Manufacturer, product name and mesh size
a. #30 American Material __
b. Volume added ____ $ft^3$
9. Well casing: Flush threaded PVC schedule 40 ☒ 2 3
Flush threaded PVC schedule 80 ☐ 2 4
____ Other ☐ __
10. Screen material: PVC __
a. Screen Type: Factory cut ☒ 1 1
Continuous slot ☐ 0 1
____ Other ☐ __
b. Manufacturer Boart Longyear
c. Slot size: 0.010 in.
d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☒ 1 4
____ Other ☐ __

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: [signature] Firm: BOART LONGYEAR COMPANY
101 ALDERSON ST., P.O. BOX 109 SCHOFIELD, WI 54476
Tel: 715-359-7090 Fax: 715-355-5715

Please complete both Forms 4400-113A and 4400-113B and return to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

# MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 6-97

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

| Facility/Project Name | County | Well Name |
|---|---|---|
| CM Christiansen Company | Vilas | PMW-18 |

| Facility License, Permit or Monitoring Number | County Code | Wis. Unique Well Number | DNR Well Number |
|---|---|---|---|
| | 64 | | |

1. Can this well be purged dry? ☒ Yes ☐ No

2. Well development method:

| | | |
|---|---|---|
| surged with bailer and bailed | ☐ | 41 |
| surged with bailer and pumped | ☐ | 61 |
| surged with block and bailed | ☐ | 42 |
| surged with block and pumped | ☐ | 62 |
| surged with block, bailed, and pumped | ☐ | 70 |
| compressed air | ☐ | 20 |
| bailed only | ☐ | 10 |
| pumped only | ☐ | 51 |
| pumped slowly | ☐ | 50 |
| other Whale Pumped & Surged | ☒ | -- |

3. Time spent developing well ____ min.

4. Depth of well (from top of well casing) 37.6 ft.

5. Inside diameter of well 2.06 in.

6. Volume of water in filter pack and well casing 30.9 gal.

7. Volume of water removed from well 15.0 gal.

8. Volume of water added (if any) ____ gal.

9. Source of water added ____

10. Analysis performed on water added? ☐ Yes ☐ No
(If yes, attach results)

| | | Before Development | After Development |
|---|---|---|---|
| 11. Depth to Water (from top of well casing) | a. | 6.73 ft. | ft. |
| Date | b. | 03/05/1999 | 03/05/1999 |
| Time | c. | 10:47 am | 11:55 am |
| 12. Sediment in well bottom | | 0.010 inches | 0.0 inches |
| 13. Water clarity | | Clear ☐ 10 Turbid ☒ 15 | Clear ☐ 20 Turbid ☒ 25 |
| (Describe) | | Dark Gray | Brown |

Fill in if drilling fluids were used and well is at solid waste facility:

| | | |
|---|---|---|
| 14. Total suspended solids | mg/l | mg/l |
| 15. COD | mg/l | mg/l |

16. Well developed by: Person's Name and Firm
Jon Weeks
Boart Longyear - Schofield

17. Additional comments on development:
Pumped Dry 3 Times

Facility Address or Owner/Responsible Party Address

Name: ____

Firm: ____

Street: ____

City/State/Zip: ____

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: [signature]

Print Name: Ron Thalacker

Firm: BOART LONGYEAR COMPANY

NOTE: See instructions for more information including a list of county codes and well type codes.

**Table 1 - Monitoring Well Construction Summary**
**CM Christiansen - Phelps, Wisconsin**

| Well Number | Ground Elevation (ft, NGVD) | Top of PVC Elevation (ft, NGVD) | Top of Screen Elevation | Bottom of Screen |
|---|---|---|---|---|
| MW-1 | 1688.1 | 1690.29 | 1680.1 | 1675.1 |
| MW-2 | 1712.7 | 1714.54 | 1687.1 | 1677.4 |
| MW-3 | 1690.8 | 1692.87 | 1682.8 | 1672.8 |
| MW-4 | 1687.8 | 1689.63 | 1682.8 | 1672.8 |
| MW-5 | 1693.5 | 1696.03 | 1689.5 | 1679.5 |
| MW-6 | 1689.2 | 1691.52 | 1686.7 | 1676.7 |
| MW-7 | 1698.5 | 1700.80 | 1688.5 | 1678.5 |
| MW-8 | 1700.5 | 1703.50 | 1690.0 | 1680.0 |
| MW-9 | 1704.2 | 1706.63 | 1689.1 | 1679.1 |
| MW-10 | 1686.4 | 1689.13 | 1683.9 | 1673.9 |
| PMW-11 | 1686.5 | 1689.25 | 1664.0 | 1659.0 |
| MW-12 | 1709.0 | 1711.09 | 1689.0 | 1679.0 |
| MW-13 | 1700.1 | 1703.06 | 1690.1 | 1680.1 |
| PMW-14 | 1709.5 | 1712.40 | 1670.0 | 1665.0 |
| MW-17 | 1684.8 | 1686.98 | 1681.1 | 1671.1 |
| PMW-17 | 1684.5 | 1686.68 | 1654.2 | 1649.2 |
| MW-18 | 1688.3 | 1690.74 | 1684.8 | 1674.8 |
| PMW-18 | 1688.1 | 1690.68 | 1658.1 | 1653.1 |

**Notes:**
Elevations are referenced to USGS datum.
Screen elevations for PMW-17 are estimated; to be confirmed next site visit.

by: JAM
checked by: DVP

# C.M. CHRISTIANSEN CO., INC.

P.O. BOX 100
PHELPS, WI 54554
TEL: (715) 545-2333
FAX: (715) 545-2334

ERIC R. CHRISTIANSEN
*PRESIDENT*
EMAIL: erc@execpc.com

May 11, 1999

Mr. Christopher A. Saari
Wisconsin Dept. of Natural Resources
Box 125
Brule, WI 54820-0125



Re: Your letter of April 6, 1999
Soil Remedial Action, former C.M. Christiansen Co. Poleyard
BRRTS #02-64-000068

Dear Mr. Saari:

This letter responds to your letter of April 6, 1999, copy attached, to inform you of the status of the project at this time.

As you noted, our consultant, NRT, is in the process of preparing an Addendum to the Soil Remediation Plan (SRP) to address certain of the issues raised in your letter and in previous correspondence. The Addendum will also address certain additional issues raised by Don Miller relating to his review and ultimate approval of the pending Variance Request. The Addendum will be filed with your office as soon as it can be completed. In the Addendum, we will likely be adjusting the location of the staging area and bio-pile on-site to accommodate aesthetic concerns and concerns of the local snowmobile club which has had use of the road on this property in the winter for quite a long time. This will require some re-surveying effort (currently in process) and another site visit, currently scheduled for May 14, 1999.

We have also initiated permit-requests covering the earth-moving components of this project. As you may be aware, WDNR requires a Grading Permit for grading more than 10,000 square feet on the unbroken slope of a navigable waterway. In addition, Vilas County has just (as of May 1, 1999) adopted a new shoreland zoning ordinance that has application to the site and may require us to obtain two separate County permits for grading and shoreline alteration relating to activities contemplated by the SRP. We are also mindful of applicable wetland issues.

In the interim, we are gearing up for the remediation effort. Our consultant has prepared specifications and solicited bids for the groundwater monitoring component of the remediation. Our consultant is currently preparing specifications for bidding the remediation itself, including site preparation, bio-pile construction and other related matters.

As you can appreciate, many of these tasks are interrelated – we cannot finalize work specifications without final approval of the exact nature of the work to be performed, which approval must take into account the terms and conditions of the necessary variance requests and permits. We continue to work diligently to adhere to the Spill Response Agreement (SRA) timetable and are still on-track to begin the remediation early this summer. However, we are quite certain at this point that a June 1 start will be impossible, and just wanted to alert you to that fact. The SRA requires us to commence remediation within 30 days of final grant of all necessary permits, and we see every reason to forecast compliance with that directive.

Regarding two specific points in your letter: (1) we enclose herewith our proposed public notice for your information; and (2) based on existing Vilas County zoning and the new Phelps Master Plan (currently being drafted – in fact, I am a member of the drafting committee), the poleyard site is, or is intended, to be zoned/characterized for non-residential use. Accordingly, as requested, we have drafted the enclosed deed restriction for the site and are forwarding it to you for your information.

Thank you for time. Please feel free to contact me should you have any additional questions or information requests.

Very truly yours,

C. M. CHRISTIANSEN CO., INC.

Eric Christiansen,
President

cc: Mr. P.C. Christiansen
Ms. Elizabeth Gamsky Rich
Ms. Laurie Parsons
Mr. Don Miller

DRAFT

Dated MAY 11 1999
For Discussion Only

*Proposed Form of Public Notice for the*
*Vilas County News & Review*
*To be published as a Class 1 Notice under Sec. 985, Stats.*

State of Wisconsin )
) s.s.
County of Vilas )

PUBLIC NOTICE OF REMEDIAL ACTION.

This Notice is published pursuant to Wis. Adm. Code NR 714.07(5) relating to a proposed action to address soil impacted with a wood-treating solution of pentachlorophenol and petroleum products. The name of the site is the former C.M. Christiansen Co. Poleyard and the site address is 4700 CTH E, P.O. Box 100, Phelps, Wisconsin 54554. The responsible party is C.M. Christiansen Co., Inc., and the contact person is Eric R. Christiansen, mailing address: C.M. Christiansen Co., Inc., P.O. Box 100, Phelps, WI 54554; telephone: (715) 545-2333.

The proposed performance standard selected pursuant to Wis. Adm. Code NR 720.19(2) consists of excavating the impacted soil, creating a bio-pile of treated, contaminated soil, and, ultimately, regrading the site and covering impacted areas with a barrier layer to address any impacted soil that may remain above the direct contact levels approved by the DNR for this site.

The Remedial Action Option Plan may be reviewed by the public at the offices of C.M. Christiansen Co., Inc., 1 Lake Street, Phelps, Wisconsin, between the hours of 10 a.m. and 4 p.m., weekdays, by appointment upon at least 24 hours advance notice to C.M. Christiansen Co., Inc., Attention: Corporate Secretary, P.O. Box 100, Phelps, WI 54554, telephone: (715) 545-2333; fax: (715) 545-2334.

DRAFT

Dated MAY 1 1 1999
For Discussion Only

In Re: a parcel of land located within the NE 1/4 SW 1/4 and Govt. Lot 3 of Section 35, Township 42 North, Range 11 East, Town of Phelps, Vilas County, State of Wisconsin, more completely described as set forth in Exhibit A, attached hereto and incorporated by reference herein.

This Instrument was drafted by and is returnable to:
Eric R. Christiansen
C.M. Christiansen Co., Inc.
P.O. Box 100
Phelps, WI 54554

Declaration of Restrictions

Tax Parcel No. _____

STATE OF WISCONSIN )
) ss
COUNTY OF VILAS )

WHEREAS, C.M. Christiansen Co., Inc., a Michigan corporation (the "Company"), is the owner of the above-referenced property (the "Property"), a map of which is attached as Exhibit B and incorporated by reference herein; and,

WHEREAS, the Company desires and intends to impose on the Property certain restrictions that will make it unnecessary to conduct additional soil or groundwater remediation activities on the Property at this time; and,

WHEREAS, soils impacted with pentachlorophenol exist on that portion of the Property identified on Exhibit B as being SUBJECT TO USE RESTRICTION (the "Use-Restricted Portions"); and

WHEREAS, on-site engineering controls will be utilized for the soils impacted with pentachlorophenol in those portions of the Property identified on Exhibit B as being SUBJECT TO ENGINEERING CONTROLS (the "Engineering Controls Portions").

NOW THEREFORE, the Company hereby declares that the Property shall be held, conveyed or encumbered, leased, rented, used, occupied and improved subject to the following limitation(s) and restriction(s):

1. The Use-Restricted Portions of the Property may not be used or developed for a residential use unless, at the time that the residential use is proposed, an investigation is conducted to determine the degree and extent of pentachlorophenol contamination that remains on the Use-Restricted Portions of the Property and, further, that remedial action is taken as necessary to meet all applicable residential soil cleanup standards.

2. Any excavating or grading activities performed in the Engineering Controls Portions of the Property must handle all soils in accordance with Wisconsin Administrative Code Chapter NR 718 and removal of any paved surface on such Portions must be replaced with either a paved surface or surface covered with asphalt, structures or other impervious materials. Any replacement of paved or unpaved surfaces on the Engineering Controls Portions of the Property with permeable materials shall require prior written approval of the DNR or its successors.

These restrictions are hereby declared to be a covenant running with the land and shall be fully binding upon all persons acquiring the Property whether by descent, devise, purchase or otherwise. These restrictions benefit and are enforceable by the Wisconsin Department of Natural Resources or its successors. The Wisconsin Department of Natural Resources or its successors, may initiate proceedings at law or in equity against any person or persons who violate or are proposing to violate this covenant, to prevent the proposed violation or to recover damages for such violation.

Any person who is or becomes owner of the Property may request that the Wisconsin Department of Natural Resources, or its successors, issue a determination that one or more of the restrictions set forth in this covenant is(are) no longer required. Upon receipt of such a request, the Wisconsin Department of

Natural Resources shall determine whether or not the restriction(s) contained herein can be extinguished. If the Wisconsin Department of Natural Resources determines that the restriction(s) can be extinguished, an affidavit can be recorded with a copy of the Wisconsin Department of Natural Resources' determination to give notice that the applicable restriction(s) is(are) no longer binding.

IN WITNESS WHEREOF, the Company, as owner of the Property, has executed this Declaration of Restrictions, this _____ day of _____, 1999.

DRAFT

Dated MAY 1 1 1999
For Discussion Only

C.M. CHRISTIANSEN CO., INC.

By: _____
Eric R. Christiansen, President

Attest: _____
Miriam Saucke, Secretary

Subscribed and sworn to before me
this _____ day of _____, 19___.

_____
Notary Public, State of Wisconsin
My commission: _____

EXHIBIT A TO DECLARATION OF RESTRICTIONS

*Legal Description*

A parcel of land being a part of Gov't. Lot 3 and the NE¼-SW¼, Section 35, T 42 N, R 11 E, Town of Phelps, Vilas County, Wisconsin, and being more particularly described as follows:

Commencing at the South ¼ corner of said Section 35 being marked by a U.S. Forest Service monument, thence N 0°-04'-39" E 2414.99 feet along the North-South ¼ line of said Section 35 to an iron pipe and the Place of Beginning, thence returning S 0°-04'-39" W 884.28 feet along the East line of said NE¼-SW¼ to an iron pipe on the Right Bank of Military Creek, thence meandering along said Creek Bank S 45°-02'-00" W 73.60 feet, S 73°-08'-00" W 102.50 feet, S 51°-33'-00" W 82.61 feet, N 61°-3l'-13" W 179.00 feet, S 55°-07'-00" W 166.00 feet, S 3°-32'-00" E 90.00 feet, S 34°-44'-00" E 77.44 feet and S 2°-29'-00" E 58.17 feet to the Northerly R/W line of County Trunk Hwy. E, thence along the Northerly R/W line of said Hwy. E Easterly 36 feet more or less along the arc of a 336.51 foot radius curve to the Right to the middle thread of said Military Creek, thence returning Westerly 36 feet more or less along the arc of said 336.51 foot radius curve to the Left to the aforementioned point, thence along the Northerly and Northeasterly R/W line of said Hwy. E as follows: Westerly 91.70 feet along the arc of said 336.51 foot radius curve to the Left (chord bearing S 89°-37'-40" W 91.42 feet) to the point of tangency of said curve, S 81°-49'-18" W 5.39 feet to the point of tangency of a 672.00 foot radius curve to the Right, Westerly l77.34 feet along the arc of said 672.00 foot radius curve to the Right (chord bearing S 89°-22'-54" W 176.82 feet) to the point of tangency of a 183.42 foot radius curve to the Right, Northwesterly 121.07 feet along the arc of said 183.42 foot radius curve to the Right (chord bearing N 64°-08'-56" W 118.88 feet) to the point of tangency of a 2952.00 foot radius curve to the Right, Northwesterly 310.80 feet along the arc of said 2952.00 foot radius curve to the Right (chord bearing N 42°-13'-23" W 310.66 feet) to the point of tangency of a 518.61 foot radius curve to the Right, Northwesterly 152.27 feet along the arc of said 518.61 foot radius curve to the Right (chord bearing N 30°-47'-44" W 151.72 feet) to the point of tangency of said curve and N 22°-23'-04" W 285.74 feet to an iron pipe which lies 800.00 feet South of the North line of said NW¼-SW¼, thence leaving said R/W line S 89°-33'-15" E 568.19 feet parallel with and 800.00 feet South of the North line of said NE¼-SW¼ to an iron pipe, thence N 0°-01'-30" E 575.00 feet parallel with the West line of said NE¼-SW¼ to an iron pipe, thence S 89°-33'-15" E 664.78 feet parallel with the North line of said NE¼-SW¼ and back to the Place of Beginning, including all lands lying between the meander line and the lateral lot lines extended to the middle thread of said Military Creek, and including all riparian rights; the same being approximately 22.50 acres, more or less.

DRAFT

Dated MAY 1 1 1999

For Discussion Only

EXHIBIT B TO DECLARATION OF RESTRICTIONS

*[map]*

A parcel of land being a part of Gov't. Lot 3 and the NE¼-SW¼, Section 35, T 42 N, R 11 E, Town of Phelps, Vilas County, Wisconsin

DRAFT

Dated MAY 1 1 1999
For Discussion Only

**Natural Resource Technology, Inc.**

N R T

May 24, 1999
(1226/4.1)



Vilas County Zoning Committee
c/o Mr. Fred Hegeman, P.E.
Zoning Administrator
Vilas County Zoning Planning & Pollution Control
330 Court Street
Eagle River, WI 54521

RE: Request for Permits
C.M. Christiansen Company, Former Wood Treatment Site, Phelps, Wisconsin
Ref: WID998639035, BRR Case # 02-64-000068

Dear Mr. Hegeman:

Natural Resource Technology Inc. is requesting several permits on behalf of C.M. Christiansen (CMC) Co., Inc. for proposed work involving remediation of contaminated soil at the above referenced former wood pole treatment facility in Phelps, Wisconsin (shown on Figure 1). Remediation is subject to approval by the Wisconsin Department of Natural Resources (WDNR) and is being undertaken under Wisconsin Administrative Code Chapters NR 600 and NR 700. Remediation activities will consist of excavation and on-site treatment of pentachlorophenol-contaminated soil in a constructed biological treatment cell. The proposed remediation schedule is summarized in an attached Gantt chart.

The attached documents are submitted as you requested in our May 14, 1999 meeting at the site to fulfill Vilas County permit application requirements. A summary of past and planned environmental restoration activities is attached, entitled "Summary of Poleyard Remediation Project" to provide you with additional information for reviewing these permit requests. It is our understanding that the following specific activities which are planned as part of the remedial action will require permits:

- **Tree-Cutting, within 150 feet of Military Creek, including removal of all tag alders and other brush within the proposed excavation areas.** *Vilas County Shoreland Zoning Ordinance, Article VIII.* The first attached shoreland alteration permit application is for removal of vegetation at and near the edge of Military Creek. This is needed to prepare for excavation. Please reference the excavation shoreland alteration permit application for a description of restoration activities. Activities described in the attached Erosion Control Plan will be performed in accordance with *Wisconsin Best Management Practices for Construction Site Erosion Control.* Mr. Mike O'Keefe of the U.S. Army Corps of Engineers (USACOE) has been involved in the planning of restoration activities, and has said USACOE does not require a permit for excavation or restoration of excavated wetland areas here.
- **Shoreland Alternation, land disturbance activities (excavation)within 35 to 300 feet of Military Creek.** *Vilas County Shoreland Zoning Ordinance, Article IX.* The second

attached shoreland alteration permit application is for excavation of Areas 1, 2, and 3, shown on Plate 1 (mailed separately), with a total volume of approximately 2,200 cubic yards (see Table 1 for estimated surface area, depth and calculated volumes and for each excavation area). Cross-sections A-A' and B-B' are enclosed, and refer to cross section lines shown on Plate 1. The ordinary high water mark (OHWM) is estimated to be at the edge of Military Creek as shown in Plate 1, although no OHWM has been formally established for this area.

The excavation and treatment of soil containing pentachlorophenol has been conditionally approved by the WDNR. Excavation and related erosion control practices are discussed in the attached Erosion Control Plan. Excavated soil will be processed with admixtures to enhance the biological decay of residual pentachlorophenol. The processed material will be placed in a lined and covered biological treatment cell to be located as shown on Plate 1. Construction details of the biological treatment cell are provided as attachments to this correspondence, as Figures 4 and 5. Erosion control components of the treatment cell include a sloped base and drainage swale to divert and collect run-on. Excavation areas have been marked at the site with orange surveyor's tape. Excavation areas within wetland zones have been further marked with the pink and black surveyor's tape. The treatment cell location has been marked with yellow surveyor's tape.

- **Zoning Permit**. We understand that a zoning permit is required to construct the biological treatment cell. We anticipate this permit will also include approval for a perimeter fence to safeguard the treatment cell and to protect the public from injury to themselves.
- **Shoreland-Wetland District, Permitted Uses.** We understand this remedial action should be allowed under Article X of the Shoreland Zoning Ordinance, because the remedial activity is temporary (the wetland will remain wetland) and because the property is intended for public use in the long term. See the attachment entitled "C.M. Christansen Logging Museum-A Concept Document."
- **Other Permits/Site Activities.** Two additional permits and two hazardous waste variances have also been, or are in the process of being obtained from WDNR for the proposed remedial action. A general Wisconsin Pollution Discharge Elimination System permit has been obtained for the purpose of treating and discharging treated groundwater on a short term basis. A Waterway Alteration Permit application was sent to Ms. Liesa Nesta, WDNR Woodruff Office (she indicated a copy of the application would be forwarded to you). Also, Mr. Don Miller of the WDNR Rhinelander Office is in the process of approving this site for a hazardous waste treatment and storage variance, as required by Wisconsin Administrative Code, Chapter NR 600. This permit is for temporary storage of the pentachlorophenol-impacted soil during the biological treatment process.

Mr. Eric Christiansen expects to attend the Vilas County Zoning Committee Meeting on Thursday, June 3, 1999 at 9:00 AM, at the Vilas County Courthouse. Please call either Mr. Christiansen or NRT if you have any questions or require additional documentation prior to the meeting. Thank you in advance for your cooperation in this environmental restoration project.

Sincerely,

NATURAL RESOURCE TECHNOLOGY, INC.

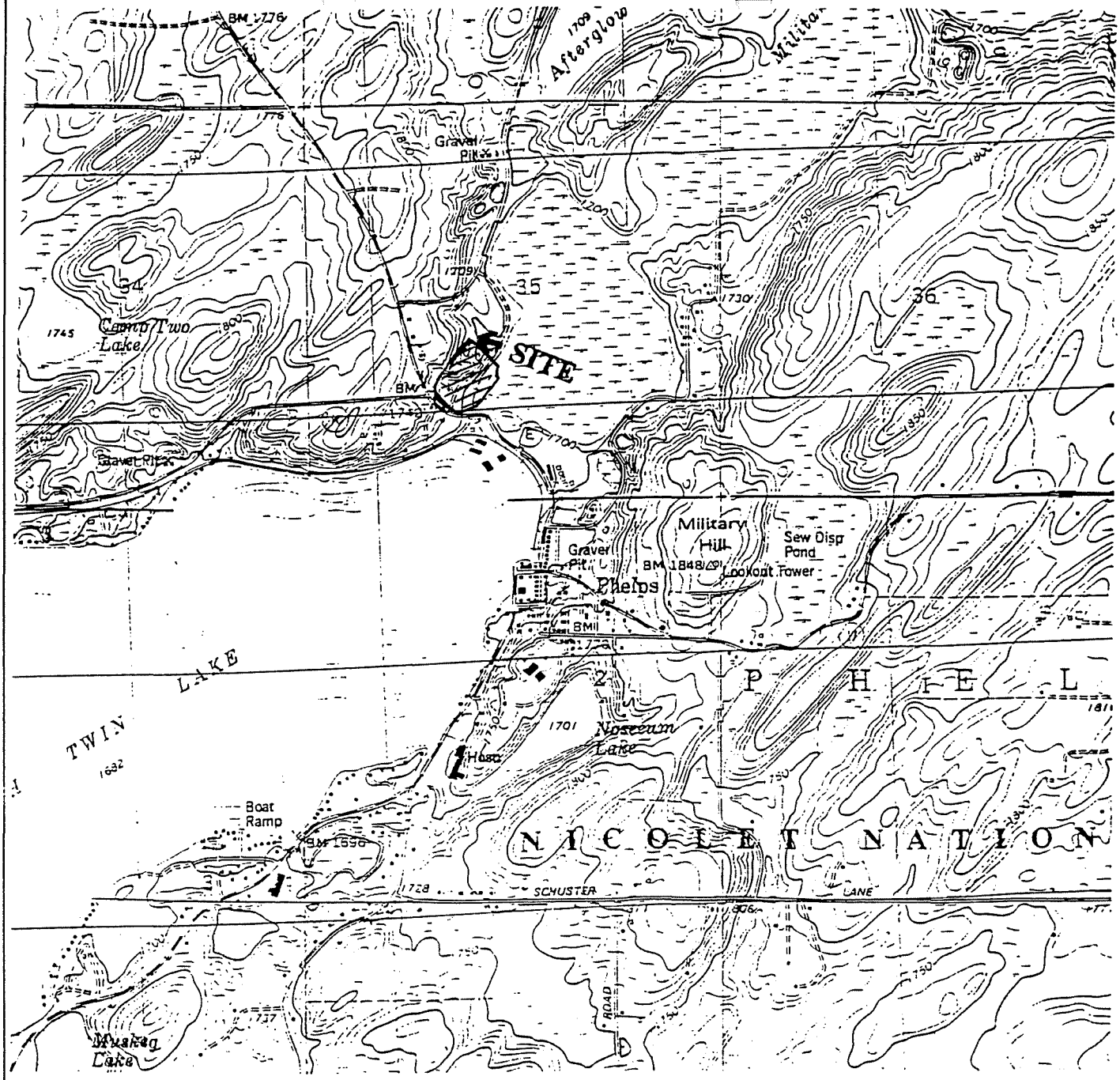
Spiros L. Fafalios, P.E.
Environmental Engineer

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

Encl: Figure 1 - Site Location Map (USGS Phelps Quadrangle, 1981)
Proposed Project Schedule
Summary of Poleyard Remediation Project
Shoreland Alteration Permit application - Tree Cutting
Erosion Control Plan
Shoreland Alteration Permit application - Wetlands Excavation and Restoration
Table 1 - Excavation Soil Volume Estimate
Cross-Sections A-A' and B-B'
Figures 4 and 5
C.M. Christiansen Logging Museum - A Concept Document
Permit Review Fee ($100)

cc: Mr. Chris Saari, Wisconsin Department of Natural Resources, Brule Office
Ms. Elizabeth Gamsky Rich, Whyte Hirschboeck Dudek, S.C.
Mr. Eric Christiansen, C. M. Christiansen Company, Inc. (2 copies)

w:\soil\1226 Grading Permit Cov.ltr




SOURCE: USGS 7.5 MINUTE QUADRANGLE, PHELPS. DATED 1981.


QUADRANGLE LOCATION

N

0 2000 4000

SCALE IN FEET

CONTOUR INTERVAL 10 FEET

Natural Resource Technology

N R T

# SITE LOCATION MAP

C.M. CHRISTIANSEN COMPANY, INC.
FORMER POLE TREATMENT FACILITY
PHELPS, WISCONSIN

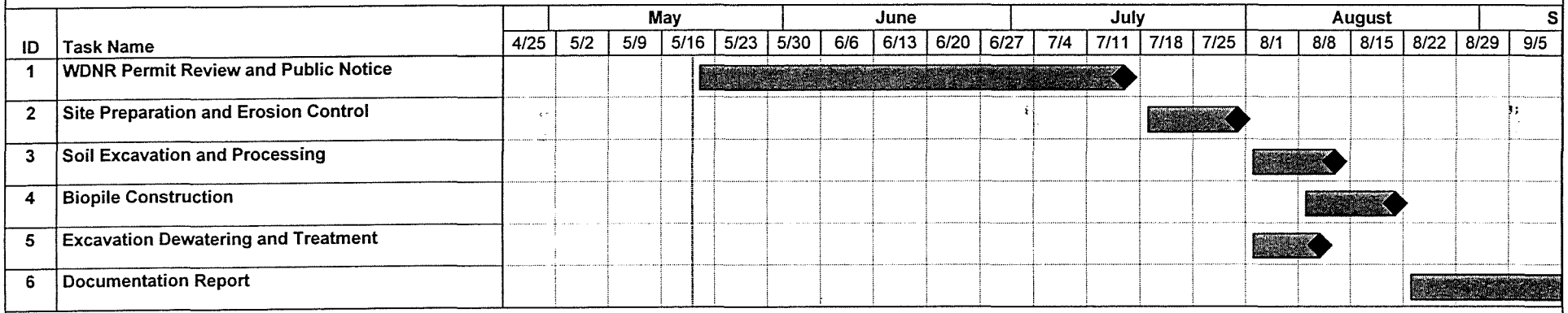
DRAWN BY: TAS APPROVED BY: LJP DATE: 5/15/98

PROJECT NO. 1226-SR

DRAWING NO. 1226-A01

FIGURE NO. 1

PROPOSED PROJECT SCHEDULE




Project: 1226 CM Christiansen
Date: 5/20/99

Task Progress Milestone

C.M. CHRISTIANSEN CO., INC.

**Summary of Poleyard Remediation Project**

**May 20, 1999**

C.M. Christiansen Co., a lumber manufacturing and forest products company, was founded as the Hackley-Phelps-Bonnell Company in 1902. In addition to its sawmill operations, CMC Co. treated wood poles and posts, primarily for use by telephone and electric power utility companies, from the early 1950's until late 1970's/early 1980's. The approximately 22-acre treatment site is known as the Poleyard and is located in Phelps, north of Vilas County Highway E and north and west of the CTH E intersection with Military Creek. The thermal (as opposed to pressure) treatment process employed a wood preservative solution of 95% No. 2 fuel oil mixed with 5% pentachlorophenol, or PCP. Its purpose was to preserve the poles according to the specifications required by the Company's utility company customers. The Company conducted all pole treatment operations according to all rules and regulations applicable at the time.

Although the Company's pole-treatment operation has long-since been closed, and all of its equipment and storage tanks have been dismantled and removed, the Poleyard site remains impacted by residue from the treatment process. C.M. Christiansen Co., Inc., has been working with Wisconsin DNR (WDNR) for several years to effect a remediation of this residue, chiefly the fuel oil and PCP treatment solution. The total cost to-date, just for investigation and preparatory work, is close to $500,000. There has to-date been absolutely no federal, state, county or local government funding of any of this expense.

This summer, CMC Co., Inc., expects to commence soil remediation operations at the Poleyard, excavating roughly 3,800 tons of PCP-impacted soil from several locations on the site. Current plans, subject to final approval by WDNR, anticipated momentarily, are to construct a bio-pile at the site by mixing the impacted soil with material imported from elsewhere (bark, fertilizer, etc.) and letting bacteria and natural processes clean up the PCP to the WDNR-approved limits. The bio-degradation process is anticipated to last several years (currently estimating 5 years, although other similar sites have been issued closure letters in shorter timeframes).

As a significant and essential step in preparing to begin remediation this summer, C.M. Christiansen Co., Inc., is applying to Vilas County and WDNR for the permits that will be required to execute the plan submitted to WDNR.

TREE CUTTING

**SHORELAND ALTERATION PERMIT**
**OFFICE OF THE**
**VILAS COUNTY ZONING, PLANNING**
**& POLLUTION CONTROL**
**P.O. Box 369-Courthouse**
**Eagle River, WI 54521**
**(715)479-3620**

**OFFICE USE ONLY**

**NOTE: PERMIT VALID FOR ONE YEAR FROM THE DATE OF ISSUANCE.**

(PRINT)Name of Property Owner C.M. Christiansen Co., Inc.

Address P.O. Box 100 Home Phone

Town Phelps State WI Zip Code 54554 Business Phone (715) 545-2333

Directions to property from Town Road or Highway; Town Fire Number

Property is on E. side of CTY HWY E, approximately 1/2 mile north of intersection with HWY 17 in Phelps.

| Name of Waterway | Govt.Lot | 1/4 -1/4 | Section | Town # | Range # | Township of: |
|---|---|---|---|---|---|---|
| Military Creek | 3 | NE-SW | 35 | 24N | 11E | Phelps |

Describe Reason(s) For Altering Shoreland:

CLEAR-CUTTING TREES & SHRUBS WITHIN 300FT OF MILITARY CREEK.

Name of Contractor - Environ. Consultant: Natural Resource Technology

Address: 23713 W. Paul Rd.

Town: Pewaukee State: WI Zip Code: 53072 Telephone Number: (414) 523-9000

I Have Applied for And Received Permits from the Following Agencies:

____ Corps of Engineers ✓ Wis.DNR ____ County ____ Municipal

Have the Alterations Been Started? ____ Yes ✓ No

If Yes, When Was It Started? Date:

Anticipated Starting Date: July 1999

Completion Date: August 1999

Applicant's Signature: Spiros L. Fatsios

Date Signed: 5/21/99

Spiros L. Fatsios, P.E.
N.R.T.

**LEAVE BLANK - TO BE USED BY RECEIVING AGENCY ONLY**

| RECEIVED BY: | FEE: $100.00 | CHECK #: | DATE RECEIVED: |
|---|---|---|---|
| | | | |

# VILAS COUNTY EROSION CONTROL PLAN

Name: C. M. Christiansen Co., Inc.
Address: P.O. Box 100, Phelps, WI 54554
Legal Description NE 1/4 of SE 1/4, S 35 T24N, R 11E
Computer No. _____ Site Address: County E (see Figure 1)

**Base Sketch** shall include: (1) Boundaries of the property; (2) Location of existing structures, & proposed new structures/additions; (3) the ordinary high water mark (OHWM) of the water body; (4) North Arrow; (5) scale or measurements of buildings to property boundaries; (6) scale or measurements of buildings to OHWM.
**Overlay Sketch** shall show: Areas of potential erosion, remedies for temporary erosion, remedies for permanent erosion, cross sections if necessary, stock pile locations.

**NOTE:** Base Sketch and Overlay Sketch shall contrast and clearly delineate erosion control activities.

see Plate 1

Project Detail: see attachment, Erosion Control Plan

Signed: _____ Date: 21 MAY 98

Spiros L. Tafalios, P.E
Natural Resource Technology

EROSION.xls

# EROSION CONTROL PLAN
# C.M. CHRISTIANSEN FORMER POLE TREATMENT FACILITY

## Overview

This document is a supplement to the *Grading in Excess of 10,000 Square Feet Information Requirements* for construction activities at the C.M. Christiansen Former Pole Treatment Facility in Phelps, Wisconsin. The site location is shown on attached Figure 1. The purpose of this supplemental plan is to address erosion control measures for excavation, grading, and backfilling to occur during remedial construction at the site. Contaminated soil will be excavated from five areas of the site, as shown on Plate 1. Three of these areas, including Area 1, 2 and 3 are located on the unbroken slope of a navigable waterway, Military Creek. Excavated soil is planned for stockpiling and on-site treatment in a constructed biological treatment pile. Activities described herein will be performed in accordance with *Wisconsin Best Management Practices for Construction Site Erosion Control.*

## Temporary Erosion Control Practices

The proposed schedule for this project is to begin grading activities, depending upon timely permit approval, in July 1999. Prior to the commencement of soil excavation, the following site preparation activities will be conducted:

- Silt fence will be placed on the down slope side of each excavation area for erosion control purposes as shown on Plan Plate 1. In addition, silt fence will be placed on the down slope side of the soil staging/material processing area and the above-ground treatment cell.
- A run-on control system will be constructed on three sides of the treatment cell. A diversion swale will be constructed along the northern, western and southern sides of the treatment cell which is capable of preventing flow onto the cell from a 24-hour, 25-year storm. The swale will divert run-on water around the cell in an easterly direction toward the creek. Calculations for determining the dimensions of the swale are contained in Appendix D and a typical cross section is shown on Figure 8. The swale will have 1:1 side slopes, with a width of 1 foot at the base, 3 feet at the top and 1 foot in depth with an average slope of 2 percent (1% minimum).
- A soil staging/material processing area will be constructed in accordance with NR 718.05 (3).

Installation methods and maintenance procedures for erosion control silt fences and straw bale fences will follow best management practices. Trucks, grading equipment, and other construction vehicles will use the gravel access roads as much as possible to minimize tracking. Temporary mulching may be used to reduce erosion and promote establishment of vegetative cover. Bare soils shall be temporarily mulched if additional grading or final cover placement will be delayed for over four weeks. Suitable mulching material includes straw, wood chips, or wood fiber. Erosion control nets and mats may also be used.

### Maintenance Activities

Over the duration of construction activities the primary construction manager will be responsible for implementing the erosion control plan. The construction manager or other designated contractor will conduct site inspections to: 1) document the conditions of silt fences; 2) document sediment accumulation amounts adjacent to fences; 3) evaluate eroded or potentially unstable soils; and 4) determine whether additional mulching/seeding is needed. Inspections will be made on a weekly basis and within 24-hours after significant rainfall events in accordance with the Wisconsin Construction Site Best Management Practice Handbook. Maintenance activities may include removal of sediment from fences, fence repair as needed, and mulching/seeding, if needed.

### Permanent Erosion Control Practices

Excavation areas disturbed by filling and grading will ultimately be covered by a compacted cap, topsoiled, and vegetated with grass. Routine inspection of the biological treatment cell and other areas will be conducted following construction, including checking that the run-on swale is properly diverting water away from the cell, monitoring the growth of seeded areas, and identification of potential erosion pathways.

WETLANDS EXCAVATION AND RESTORATION

**SHORELAND ALTERATION PERMIT**
**OFFICE OF THE**
**VILAS COUNTY ZONING, PLANNING**
**& POLLUTION CONTROL**
**P.O. Box 369-Courthouse**
**Eagle River, WI 54521**
**(715)479-3620**

**OFFICE USE ONLY**

**NOTE: PERMIT VALID FOR ONE YEAR FROM THE DATE OF ISSUANCE.**

(PRINT)Name of Property Owner C.M. Christiansen Co., Inc.

Address P.O. Box 100 Home Phone

Town Phelps State WI Zip Code 54554 Business Phone (715) 545-2333

Directions to property from Town Road or Highway; Town Fire Number

Property is on E. side of CTY HWY E, approximately 1/2 mile north of intersection with HWY 17 in Phelps.

| Name of Waterway | Govt.Lot | 1/4 -1/4 | Section | Town # | Range # | Township of: |
|---|---|---|---|---|---|---|
| Military Creek | 3 | NE-SW | 35 | 24N | 11E | Phelps |

Describe Reason(s) For Altering Shoreland:

EXCAVATION OF CONTAMINATED SOIL & RESTORATION WITHIN 300 FEET OF MILITARY CREEK.

Name of Contractor - Environ. Consultant: Natural Resource Technology

Address: 23713 W. Paul Rd.

| Town | State | Zip Code | Telephone Number |
|---|---|---|---|
| Pewaukee | WI | 53072 | (414) 523-9000 |

I Have Applied for And Received Permits from the Following Agencies:

____ Corps of Engineers ✓ Wis.DNR ____ County ____ Municipal

Have the Alterations Been Started? ____ Yes ✓ No

If Yes, When Was It Started? Date:

Anticipated Starting Date: July 1999

Completion Date: August 1999

Applicant's Signature: Spiros L. Fotinos

Date Signed: 5/21/99

Spiros L. Fotinos, P.E.
N.R.T.

**LEAVE BLANK - TO BE USED BY RECEIVING AGENCY ONLY**

| RECEIVED BY: | FEE: $100.00 | CHECK #: | DATE RECEIVED: |
|---|---|---|---|
| | | | |

**Table 1 - Excavation Soil Volume Estimate (revised)**
*Design Report and Plan of Operation*
*C.M. Christiansen Co., Inc. Former Pole Treatment Facility*
*Phelps, Wisconsin*

NRT PROJ. NO.: 1226
BY: JAZ
CHKD BY: LJP
DATE: 10/21/98
FILE: Table 1 ExcSoilVol

| Area | Location | Soil Sample | Max PCP Concentration | Estimated Surface Area | Max. Depth | Min. Depth | Average Depth | Estimated Volume[1] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Former AST Area | B-4 | 1,300 ppm | 3,183 ft2 | 14 ft | 6 ft | 10 ft | 1179 cy | Higher volume corresponds to removal of MW-7 below water table. |
| 2A | Former Boiler Area | HA-2/S-1 | 1,700 ppm | 1450 ft2 | 5 ft | 5 ft | 5 ft | 269 cy | Max. depth of 5 ft confirmed during sampling at test pit TP-4. |
| 2B | Creek Area | HA-27/28 | 470 ppm | 4296 ft2 | 1 ft | 1 ft | 1 ft | 159 cy | Excavation of this area depends on approval from WDNR due to wetland |
| 3 | Lower Wetland Area | HA-17/19 | 82,000 ppm | 5,093 ft2 | 5 ft | 2 ft | 3 ft | 566 cy | Max. depth of 5 ft confirmed during sampling at test pit TP-1. |
| 4 | Upper Wetland Area | HA-7/MW-13 | 44,000 ppm | 1,793 ft2 | 6 ft | 4 ft | 5 ft | 332 cy | |
| 5 | Western Tree-line | B-12/MW-8 | 340 ppm | 707 ft2 | 3 ft | 1 ft | 2 ft | 52 cy | |

**Total Estimated Volume[1] 2,560 cy**
**Total Estimated Tonnage[2] 3840 tons**

[1]Estimated soil volume, based on performance-based standard of 200 mg/kg for pentachlorophenol (PCP).

[2]Tonnage estimated at 1.5 tons per cubic yard of soil

BY: OVP DATE: 5/6/99 CLIENT CM CHRISTENSEN

CHKD. BY: SLF DATE: 5/20/99 PROJECT/TASK 1226/4.1

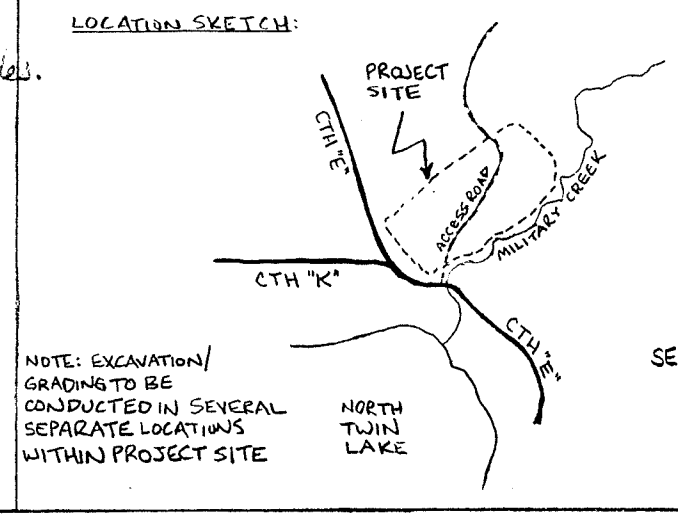
Natural Resource Technology

SUBJECT: GRADING PERMIT: LOCATION SKETCH & CROSS-SECTION A-A' PAGE: 1 OF: 2

PROPOSED MATERIALS:

Erosion control with silt fence/bales. Excavated areas will be backfilled with clean material, graded, topsoiled, mulched, and seeded with a grass mixture. Soil staging and treatment areas will be graded, topsoiled (following project), mulched, and grass-seeded.

LOCATION SKETCH:



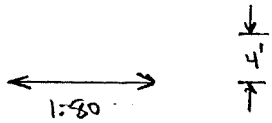

NOTE: EXCAVATION/ GRADING TO BE CONDUCTED IN SEVERAL SEPARATE LOCATIONS WITHIN PROJECT SITE

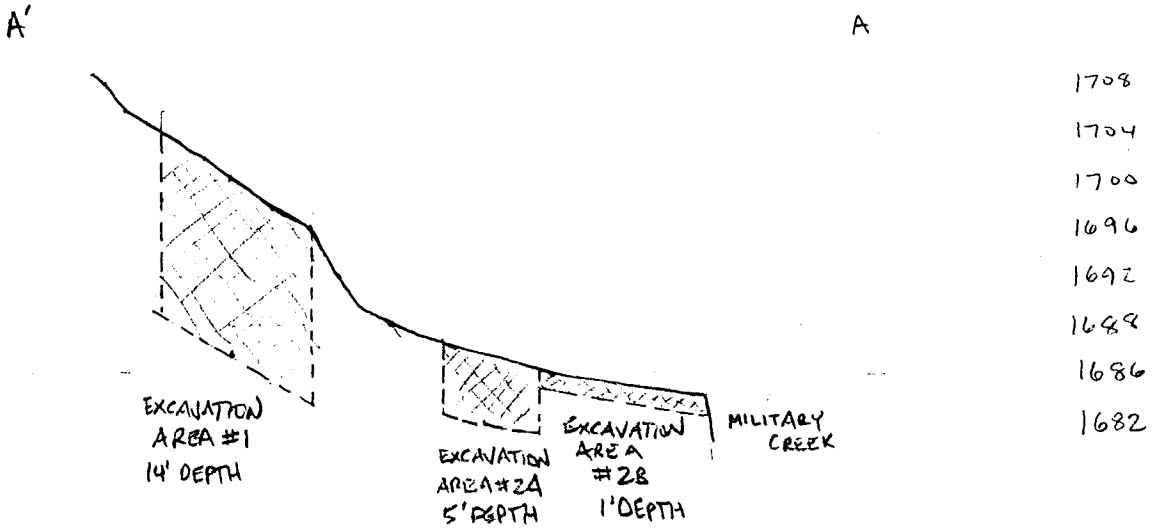
SCALE 1:2000

SE¼ AND SW¼, SEC 35 T42N, R11E

SITE PLAN AND SECTIONS

SEE ATTACHED SITE PLAN FOR SECTION LOCATIONS



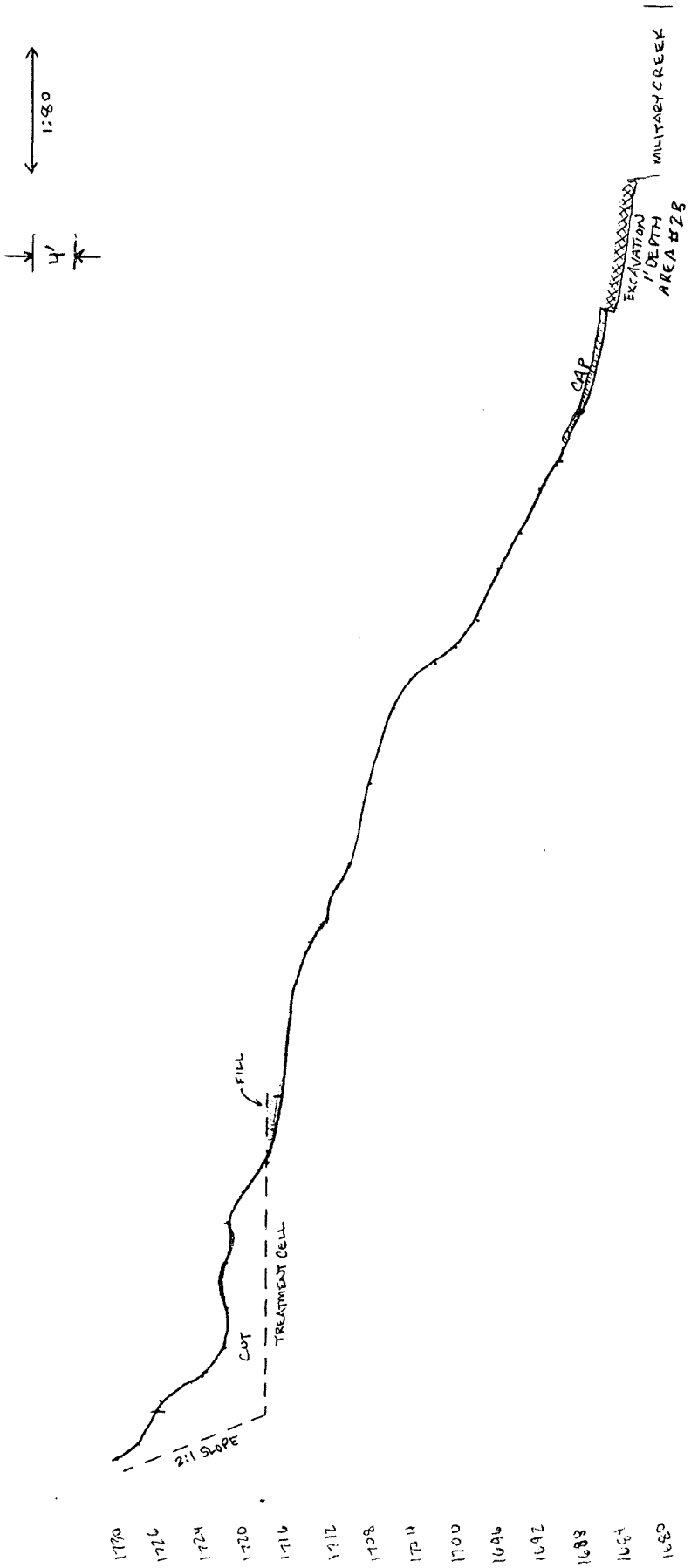



BY: DVP DATE: 5/6/99 CLIENT CMCHRISTENSEN

CHKD. BY: SLF DATE: 5/20/99 PROJECT/TASK 1226/4.1

Natural Resource Technology

SUBJECT: GRADING PERMIT : CROSS SECTION B-B' PAGE: 2 OF: 2



130'-0"

6" SAND BASE 7.5' SOIL ELEV. +3'

ELEV. +2.5' 6" SAND BASE 7.5' SOIL

130'-0"

+11'

+10.5'

5' MIN.

5' MIN.

NOTES:
1. CAP ENDS OF ALL DRAINAGE PIPES, BOTH AIR VENTS AND WATER COLLECTION.

1:1 SLOPE, TO BE FIELD VERIFIED AND APPROVED BY ENGINEER

OUTLINE OF TOP COVER

3" SOLID DRAINAGE PIPE

PERFORATED END CAP (AIR INLET)

3" PERFORATED DRAINAGE PIPE (AIR INLET)

BASE

3" SOLID PVC (SCHED 40)

3" PERF. PLASTIC DRAINAGE PIPE (AIR VENT)

6" PVC EXHAUST STACK WITH 8" WIND DRIVEN TURBINE

5.5' ABOVE TOP OF SAND (TYP.)

3.5' ABOVE TOP OF SAND (TYP.)

1.0' ABOVE TOP OF SAND (TYP.)

+9.5'

+8.5'

2' DIA. SLOTTED PVC SUMP

A

A'

3" PERFORATED PLASTIC DRAINAGE PIPE WATER COLLECTION (SLOPED TOWARD SUMP)

6" SAND BASE 7.5' SOIL ELEV. +1.5'

ELEV. 0' 12" SAND BASE 7.5' SOIL

LEGEND

| | |
|---|---|
| DIA | DIAMETER |
| ELEV | ELEVATION |
| MIN | MINIMUM |
| PVC | POLYVINYL CHLORIDE |
| PERF | PERFORATED |
| SCHED | SCHEDULE |
| TYP | TYPICAL |
| | SLOPE |

N

0 15 30

SCALE IN FEET

TREATMENT CELL PLAN VIEW WITH BASE AND COVER ELEVATIONS AND AERATION PIPING
DESIGN REPORT AND PLAN OF OPERATION
C.M. CHRISTIANSEN COMPANY, INC.
FORMER POLE TREATMENT FACILITY
PHELPS, WISCONSIN

DRAWN BY: TAS DATE: 6/12/98

CHECKED BY: JMC DATE: 6/12/98

APPROVED BY: LJP DATE: 6/12/98

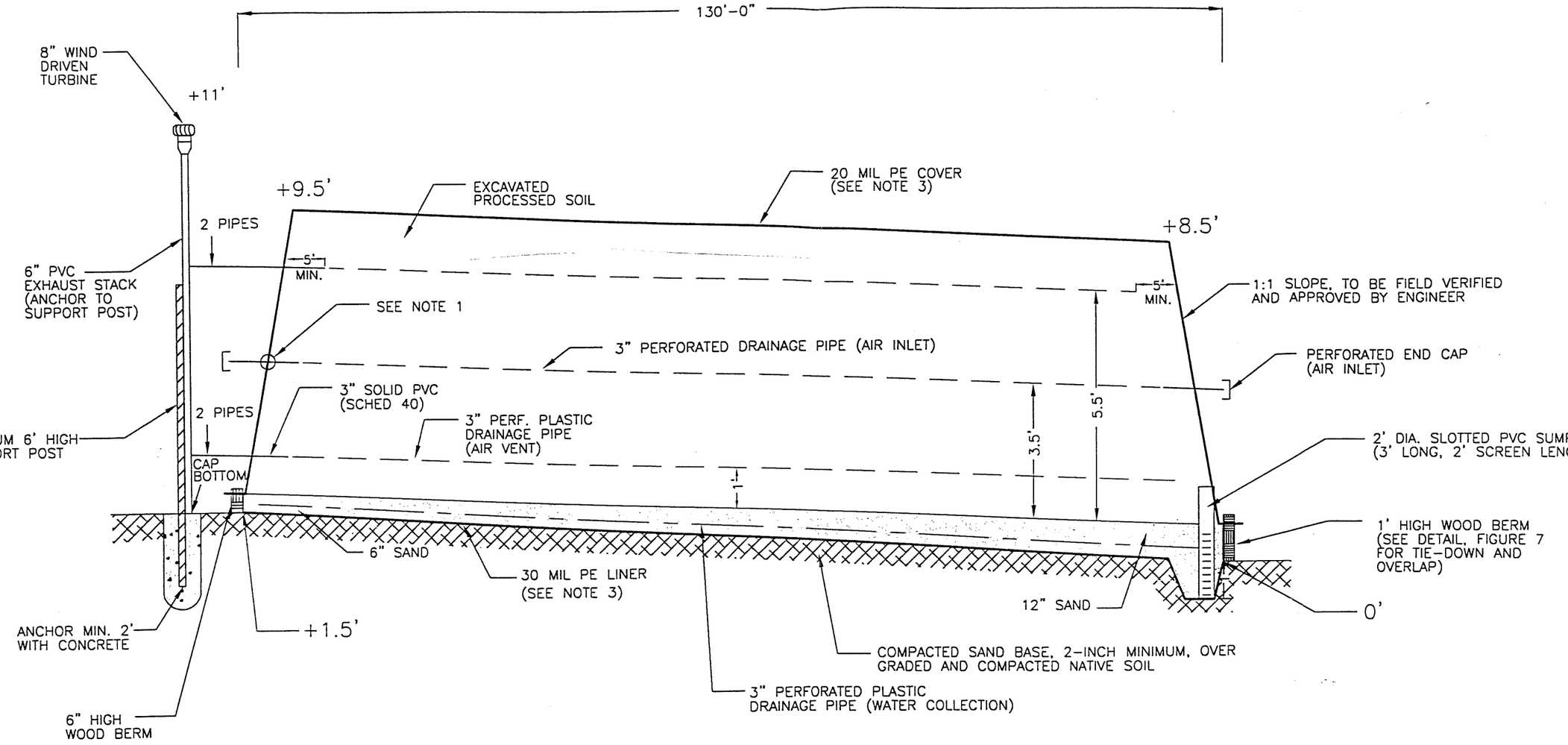
AUTOCAD FILE: 1226-B03.DWG

Natural Resource Technology

PROJECT NO. 1226-DR-3.5

DRAWING NO. 1226-B03

FIGURE NO. 4




| LEGEND | |
|---|---|
| DIA | DIAMETER |
| PE | POLYETHYLENE |
| PVC | POLYVINYL CHLORIDE |
| PERF | PERFORATED |
| SCHED | SCHEDULE |
| MIN | MINIMUM |

NOTE:
1. SEAL PIPE PENETRATIONS THROUGH COVER WITH BOOT CONNECTION AND ADHESIVE TAPE OR EQUIVALENT.

2. CAP ENDS OF ALL DRAINAGE PIPES, BOTH AIR VENTS AND WATER COLLECTION.

3. PLACE LINER AND COVER IN ONE SHEET (SEAMED AT FACTORY) OR SEAM IN FIELD PER MANUFACTURER SPECIFICATIONS.

# SECTION A-A'

VERTICAL SCALE IN FEET: 3
HORIZONTAL SCALE IN FEET: 15
VERTICAL EXAGGERATION = 5

DRAWN BY: TAS | DATE: 6/12/98
CHECKED BY: JHG | DATE: 6/12/98
APPROVED BY: LJP | DATE: 6/12/98
AUTOCAD FILE: 1226-B04.DWG

TREATMENT CELL
CROSS-SECTIONAL VIEW
DESIGN REPORT AND PLAN OF OPERATION
C.M. CHRISTIANSEN COMPANY, INC.
FORMER POLE TREATMENT FACILITY
PHELPS, WISCONSIN

Natural Resource Technology

PROJECT NO. 1226/3.5

DRAWING NO. 1226-B04

FIGURE NO. 5

# PHONE CONVERSATION RECORD

**DATE:** 5/27/99
**TIME:** 0914 hrs.

**CONVERSED WITH:** Laurie Parsons
NRT
414/523-9000

**SUBJECT/PROJECT:** C.M. Christiansen

**UNIQUE ID#.:** 02-64-000068

Parsons called to give me a project update. Parsons said permitting has turned into a "major deal" (i.e. County permits for tree cutting). Parsons also said the grading permit requires a 30-day public comment period, which will further delay the remediation start.

Parsons said additional sampling information and a response to Don Miller's requirement for a double liner on the treatment cell will be sent to Miller, cc'ed to me.

Parsons also said dust control measures will be addressed in the addendum, as will changes to the location of the treatment cell (further away from the road and back into the hill) and the seepage cell. The proposed areas for capping will be shown on the new plan sheets.

Parsons also said they are considering discharging future purge water from wells through carbon to the seepage cell. Parsons wanted my opinion on this before running it by Jim Hansen for modifying the WPDES permit. I said it made sense to me as long as Hansen approved.

Signature: Christopher A. Saari
(please write legibly)

-over-

I then mentioned to Parsons the conversations I've had with Chuck Fitzgerald, DEQ Rhinelander, regarding written concerns about the site. I said that it sounded like Fitzgerald had handled these concerns, but we may want some follow-up potable well sampling. Parsons said she would discuss this with Eric Christiansen; she thought Christiansen may want to be proactive. I also mentioned possible access problems (ie, horseback riders).

We also briefly discussed a possible public meeting prior to the beginning of the soil remediation. Parsons said she would talk to Christiansen about this as well.

WISCONSIN
DEPT. OF NATURAL RESOURCES

**State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES**

Tommy G. Thompson, Governor
George E. Meyer, Secretary
William H. Smith, Regional Director

Northern Region Headquarters
107 Sutliff Ave.
Rhinelander, Wisconsin 54501-0818
Telephone 715-365-8900
FAX 715-365-8932
TDD 715-365-8957

May 27, 1999

3300
WUWID: HY012

Mr. Dwayne Fredrickson
4745 Coveyville Road
Phelps, Wisconsin 54554

Subject: Water Supply Assessment

Dear Mr. Fredrickson:

You recently inquired regarding the potential of your water supply being impacted by the ongoing environmental contamination situation existing at the old Christiansen facility southwest of your property. Your well is located at 4745 Coveyville Road in the NE¼ SE¼, Section 35, T42N, R11E, Town of Phelps, Vilas County, Wisconsin.

The Department of Natural Resources is presently continuing its activities in regard to this contamination situation. As part of these activities, a groundwater monitoring system has been established to determine the level of contamination and the groundwater flow pattern in the area. The monitoring system installed has indicated the contamination coming from this area is travelling toward Military Creek and/or the northern shore of North Twin Lake.

As your water supply well is located northeast of this facility and on the other side of Military Creek, the potential for contamination from the Christiansen situation impacting your water supply well is extremely remote. Military Creek is a groundwater discharge stream and contamination emanating from the Christiansen situation is entering Military Creek and would not travel to the other side of Military Creek or to the properties located east of Military Creek such as yours.

In conclusion, I do not believe there is any potential for the water supply well on your property to be impacted by the contamination situation existing at the Christensen facility. Should you have any questions regarding this, please feel free to contact me at the Regional Office in Rhinelander at (715)365-8920.

Sincerely,

Charles J. Fitzgerald, R.S.
Drinking and Groundwater Specialist

CJF:da
cc: Connie Lefebrve, Woodrff
Private Water Supply, DG/2
Chris Saari, Brule
Dave Herrick, Spooner

**Well Construction Report For**
***WISCONSIN UNIQUE WELL NUM*** ? **HY012**

Property Owner: FREDRICKSON, DUANE
Telephone Number: 715 – 545 – 2286

Mailing Address: 4745 COREYVILLE LN
City: PHELPS
State: WI
Zip Code: 54554
County of Well Location: VILAS
Co. Well Permit No.:
Well Completion Date: November 19, 1996

Cnty: 64
Well Constructor (Business Name): RICHARD E HEDBERG
License #: 0490
Dist: 7
Address: 3908 CHICAGO AVE
City: CONOVER
State: WI
Zip Code: 54519

P — M=Munic. O=OTM N=NonCom P=Priv Z=Other X=Non-Pot. A=Anode L-Loop H=Drillhole

2. Dates: 01/29/97 Rc'd; 05/01/97; 12/16/98 Create; 10/31/97 Last FM

1. Well Location — Flag
T — T=Town C=City V=Village
of PHELPS
Fire # (If avail.): 4745
Grid or Street Address or Road Name and Number: COREYVILLE LN
Subdivision Name: Lot #: Block #:
Gov't Lot # ____ or NE 1/4 of SE 1/4 of
Section 35, T 42 N; R 11 E (E/W)

3. Well Type — Flag
1 (1 = New 2 = Replacement 3 = Reconstruction)
of previous unique well # ____ constructed in 19 0
Reason for new, replaced or reconstructed well?

4. Well serves 0001 # of homes and or
Flag
(Ex: barn, restaurant, church, school, industry, etc.)

High Capacity:
Well? N
Property? N

1 (1 = Drilled 2 = Driven Point 3 = Jetted 4 = Other)

5. Well located on highest point of property, consistent with the general layout and surroundings?
Well located in floodplain? N

Distance in Feet From Well To Nearest:
1. Landfill
8 2. Building Overhang
3. Septic or Holding Tank (circle one)
4. Sewage Absorption Unit
5. Nonconforming Pit
6. Buried Home Heating Oil Tank
7. Buried Petroleum Tank
8. Shoreline/Swimming Pool
9. Downspout/Yard Hydrant Y
10. Privy
11. Foundation Drain to Clearwater
12. Foundation Drain to Sewer
24 13. Building Drain 1 (1 = Cast Iron or Plastic 2 = Other)
0 14. Building Sewer 1 (1=Gravity 2=Pressure; 1 = Cast Iron or Plastic 2 = Other)
30 15. Collector or Street Sewer
16. Clearwater Sump
17. Wastewater Sump
18. Paved Animal Barn Pen — Flag R
19. Animal Yard or Shelter
20. Silo - Type
21. Barn Gutter
22. Manure Pipe (1=Gravity 2=Pressure; 1 = Cast Iron or Plastic 2 = Other)
23. Other Manure Storage
Other NR 112 Waste Source
24.

6. Drillhole Dimensions

| Dia. (in.) | From (ft.) | To (ft.) |
|---|---|---|
| 8.0 | surface | 15 |
| 6.0 | 15 | 64 |
| | | |
| | | |

Method of constructing upper enlarged drillhole only.
1. Rotary - Mud Circulation
2. Rotary - Air
3. Rotary - Foam
4. Reverse Rotary
X 5. Cable-tool Bit 8 in. dia.
X 6. Temp. Outer Casing 8 in. dia.
Removed? Y
7. Other

7. Flag — Casing, Liner, Screen

| Dia. (in.) | Material, Weight, Specification, Manufacturer & Method of Assembly | From (ft.) | To (ft.) |
|---|---|---|---|
| 6.0 | STEEL BLACK 1897# A53 93AB SAWHILL WELDED | surface | 64 |
| | | | 0 |
| | | | 0 |
| | | | 0 |
| Dia. (in.) | screen type, material & slot size: NO SCREEN | From | To 0 |

8. Grout or Other Sealing Material — Flag

| Method / Kind of Sealing Material | From (ft.) | To (ft.) | # Sacks Cement |
|---|---|---|---|
| POURING / BENTONITE | surface | 15.0 | 0003. |
| | | | |

| DNR USE ONLY | 9. Geology — Type, Caving/Noncaving, Color, Hardness, Etc. — Flag | From (ft.) | To (ft.) |
|---|---|---|---|
| G | GRAVEL ROCKS | Surface | 18 |
| G | GRAVEL | 18 | 30 |
| P | HARDPAN | 30 | 42 |
| WS | WATER SAND DIRTY | 42 | 55 |
| AG | COARSE WATER GRAVEL | 55 | 64 |
| | | | 0 |
| | | | 0 |
| | | | 0 |
| | | | 0 |
| | | | 0 |
| | | | 0 |
| | | | 0 |
| | | | 0 |
| | | | 0 |
| | | | 0 |

10. Static Water Level — Flag
38.0 ft. B ground surface
A=Above B=Below

11. Pump Test — Flag
Pumping Level 40.0 ft. below ground surface
Pumping at 12.0 GPM M 3.00 hrs

12. Well Is: — Flag
15 in. A Grade
A=Above B=Below
Developed? Y
Disinfected? Y
Capped? Y
Depth (feet) 0064.00

13. Did you permanently seal all unused, noncomplying, or unsafe wells?
If no, explain — Flag

14. Signature of Point Driver or Licensed Supervisory Driller — Flag — RH — Date Signed 1/24/97
Signature of Drill Rig Operator (Mandatory unless same as above) — Date Signed

Additional Comments? Y
More Geo? Owner Sent Label? Y

0.0
0.0

Natural
Resource
Technology, Inc.

N R T



May 28, 1999
(1226/4.1)

Ms. Liesa Nesta
Water Management Specialist
Wisconsin Department of Natural Resources
8770 Hwy J
Woodruff, WI 54568

RE: Supplemental Wetland Information for Grading Permit Application
C.M. Christiansen Company, Former Wood Treatment Site, Phelps, Wisconsin
Ref: WID998639035, BRR Case # 02-64-000068

Dear Ms. Nesta:

Enclosed are the photographs and the completed Practicable Alternatives Analysis Form you requested for the above referenced project. Based on our telephone conversation on May 28, we trust this submittal completes the requirements for processing the application. We understand a public notice period of 30 days is required after your review is complete and any effort to expedite this process is appreciated. Thank you for your assistance with this project.

Sincerely,

NATURAL RESOURCE TECHNOLOGY, INC.

Spiros L. Fafalios, P.E.
Environmental Engineer

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

Encl: Project Area Photographs
Practicable Alternatives Analysis
Vilas County Permit Application Package

cc: Mr. Chris Saari, Wisconsin Department of Natural Resources, Brule Office (w/o photos)
Ms. Elizabeth Gamsky Rich, Whyte Hirschboeck Dudek, S.C. (w/o photos)
Mr. Eric Christiansen, C. M. Christiansen Company, Inc. (w/o photos)
Mr. Mike O'Keefe, U.S. Army Corps of Engineers (w/o photos)

w:\1226\permits\1226 LNesta 99.05.28.ltr

INFORMATION REQUIREMENTS )R PRACTICABLE ALTERNATIVES / .LYSIS UNDER NR 103

All of the questions must be answered in detail and supported with documentation.

I. Background/Description of Project

A. Describe the purpose and need for the project. (Attach additional sheets if needed).

**A description of the purpose and need for the project was provided in the original permit application package dated May 21, 1999. Additional information is included in the attached request for permits to Vilas County.**

B. Is your project an expansion of existing work or is it new construction? Explain. (Attach additional sheets if needed).

**New construction, for purposes of environmental remediation.**

C. When did you start to develop a plan for your project?

**Preliminary plans in 1998. Final plans submitted for DNR review in July 1998. Conditional approval received in April 1999. Final approvals are pending.**

D. Explain why the project must be located in or adjacent to wetlands.

**Impacts from former wood treatment operations extend to areas adjacent to and within small sections of the wetland as shown on the project plans (see Plate 1 - Remedial Construction Plan, included in grading permit application package).**

II. Alternatives (your analysis should address the following questions).

A. How could you redesign or reduce your project to avoid the wetland, and still meet your basic project purpose?

**The wetland can not be avoided to meet the project goal of mitigating environmental impact since impacts occur within the wetland. The scope of the project with respect to wetlands has already been reduced to include only areas with greatest potential risk to human health or the environment .**

B. Other sites - **Not Applicable.**

1. What geographical area(s) was searched for alternative sites?

2. Were other sites considered?

3. Have you sold any lands in recent years that are located within the vicinity of the project? If so, why were they unsuitable for the project?

C. For each of the alternatives you identified, explain why you eliminated the alternative from consideration (include cost comparisons, logistical, technological, and any other reasons).

**Other means for remediating soil impacts in-situ were considered but deemed impractical due to the close proximity to Military Creek and contaminant type. A remedial alternatives analysis was completed and submitted to DNR in 1997 and updated in 1998. Both in-situ and excavation methods would affect the wetland. The best practical approach is to minimize wetland disturbance by limiting the area and duration of the project as described in the project plans.**

D. What are the consequences of not building the project? (include social and economic consequences):

**Environmental - Impacts remain in wetland, ultimate affect on Military Creek is not known.**
**Social - Adverse public perception of the site.**
**Economic - positive in the short term (remediation projects are costly).**
**Legal - Remediation is required by the DNR and signed Spill Agreement.**

If you have chosen an alternative that would result in wetland impacts: (attach additional sheets if needed)

E. Summarize why your alternative was selected.
**Removal of soil from the wetland area is part of a remediation approach for the entire site focused on source contaminant removal from sensitive areas. Selected as the most efficient course of action in this circumstance to achieve remediation goals.**

F. Explain what you plan to do to minimize adverse effects on the wetlands during your project (e.g. erosion control, best management practices, setbacks, etc.).
**Erosion control as described in the Erosion Control Plan. Contingency Plan in place through discussion with ACOE to protect the bank/Creek from interacting with the excavation area (eg. sand bags/ berm/boom). Project planning and execution to minimize duration of time in the wetland zone. Also see additional discussion in the attached county permit applications.**

**PHOTOGRAPHIC LOG AND WETLAND DESCRIPTION**
**CMC Co., Inc, Former Wood Treating Site Remediation Project**

The attached photographs were taken May 14, 1999. Areas referenced correspond to the areas mapped on Plate 1 - Remedial Construction Plan. Monitoring wells are labeled for reference to scale and direction.

The wetland area affected by the project is less than 0.25 acres in size and is part of a larger 120 acre wetland area along this segment of Military Creek. Military Creek flows through and provides drainage from the wetland and is designated a trout stream in upstream segments. Military Creek flows into North Twin Lake. Soils in the mapped wetlands adjacent to Military Creek are classified as Seelyeville and Markey Mucks. The wetland consists of mixed stands of tag elder and scrub/shrub communities in the project area. No substantial open water areas are present within the wetland, except Military Creek. The cover type classes on the Wisconsin Wetlands Inventory Maps indicates the surrounding larger wetlands (outside the project zone) contain tamaracks, willows and alder shrubs, and coniferous shrubs/scrub habitat for typical spruce-tamarack lowland forest habitat (WDNR 1995). The functional significance of wetland values is summarized below:

- *Flood Storage and Attenuation* - The wetlands receive surface runoff from western slopes adjacent to the project area. Upland slopes are steep but vegetated and the potential for surface erosion in the water shed is limited based on current land use. The large area of wetland within the watershed provides significant storage capacity resulting in moderate water level fluctuations. Military Creek along this segment has fairly constant flow with velocity on the order of 1to 2 ft/sec. The wetland likely provides shoreline anchoring and dissipation of erosive water forces in some segments.

- *Groundwater Discharge* - Topographic and available hydrogeologic data indicate the wetland serves as a groundwater discharge area.

- *Fish and Wildlife Habitat* - Observations of wildlife have been limited, although the wetland appears to have sufficient area and habitat to support a diversity of wildlife species. Open water habitat occurs primarily within Military Creek.

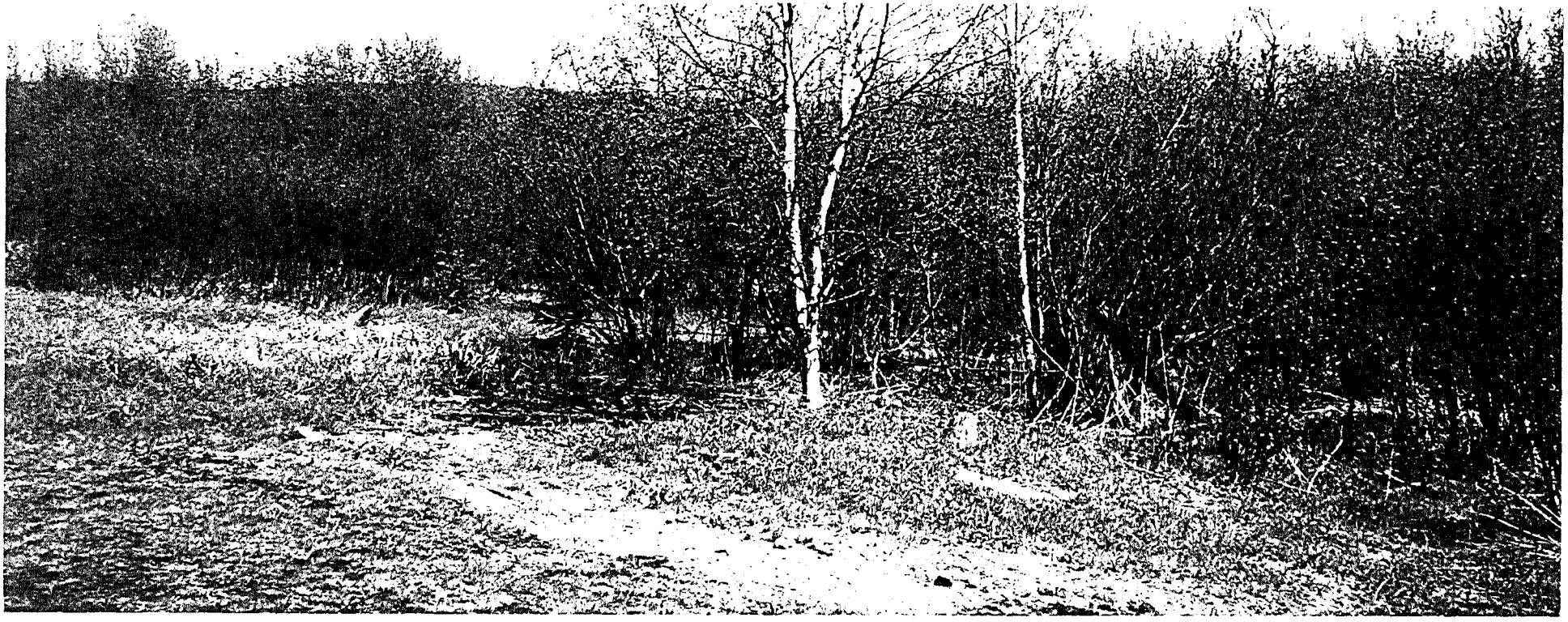
- *Aesthetics/Scenic Beauty*- The wetland is visible from adjacent Highway E and has natural and aesthetic beauty. Refer to additional description of the area and potential future uses described in attachments to the county permit application.

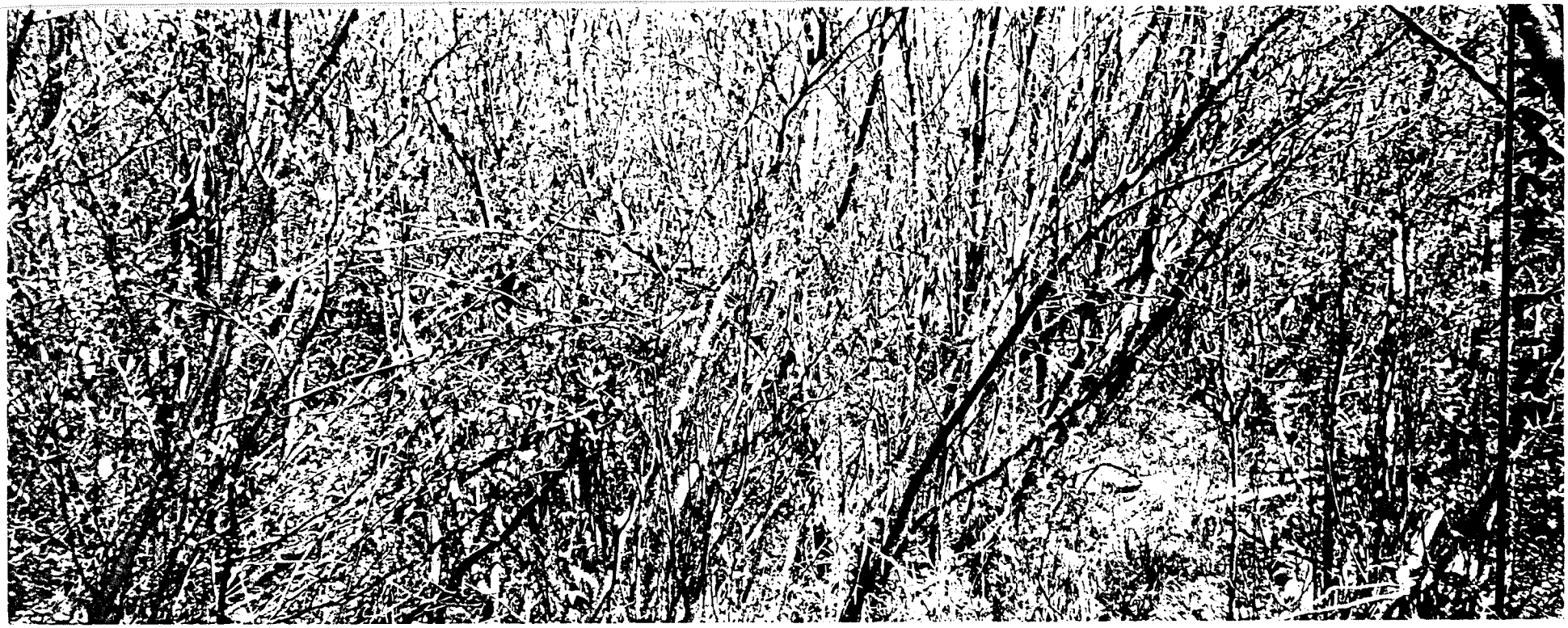
CMC
Remedial Excavation
Area 1 and Vicinity

CMC

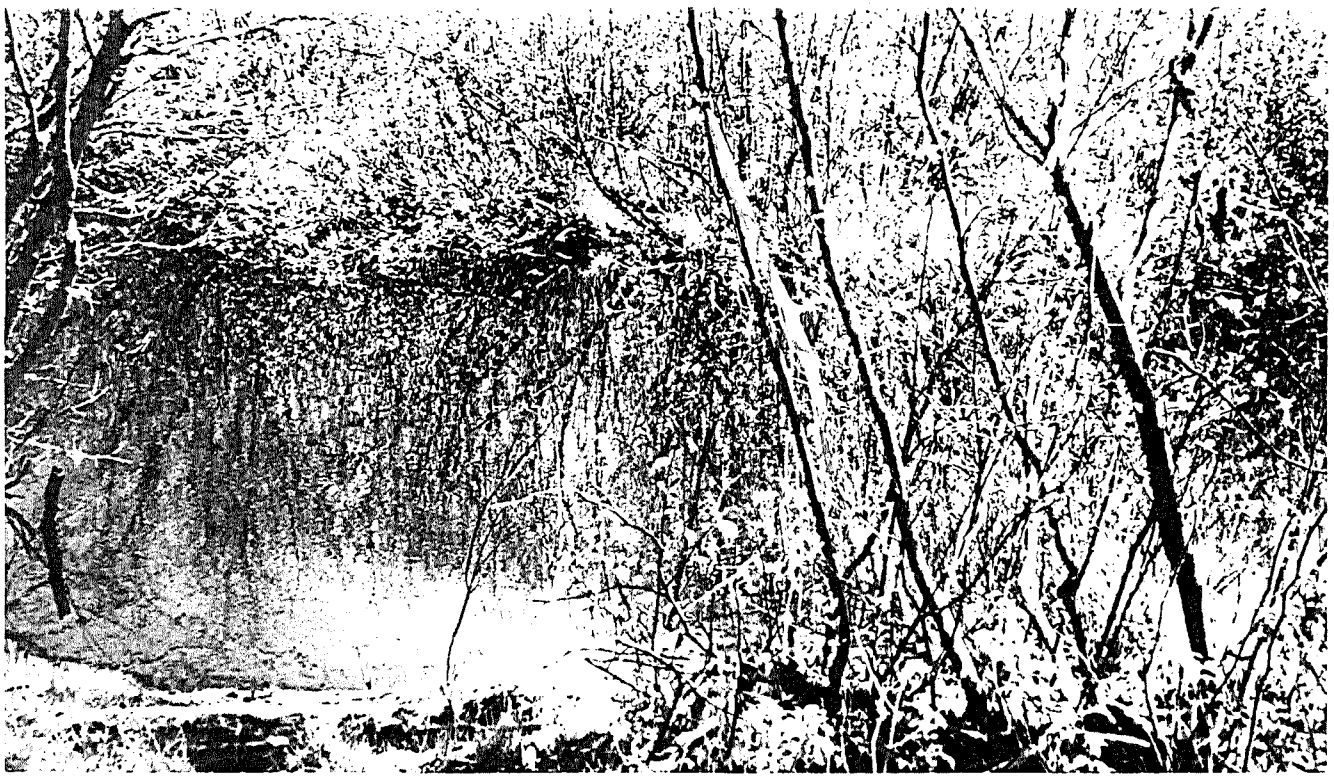
Remedial Excavation

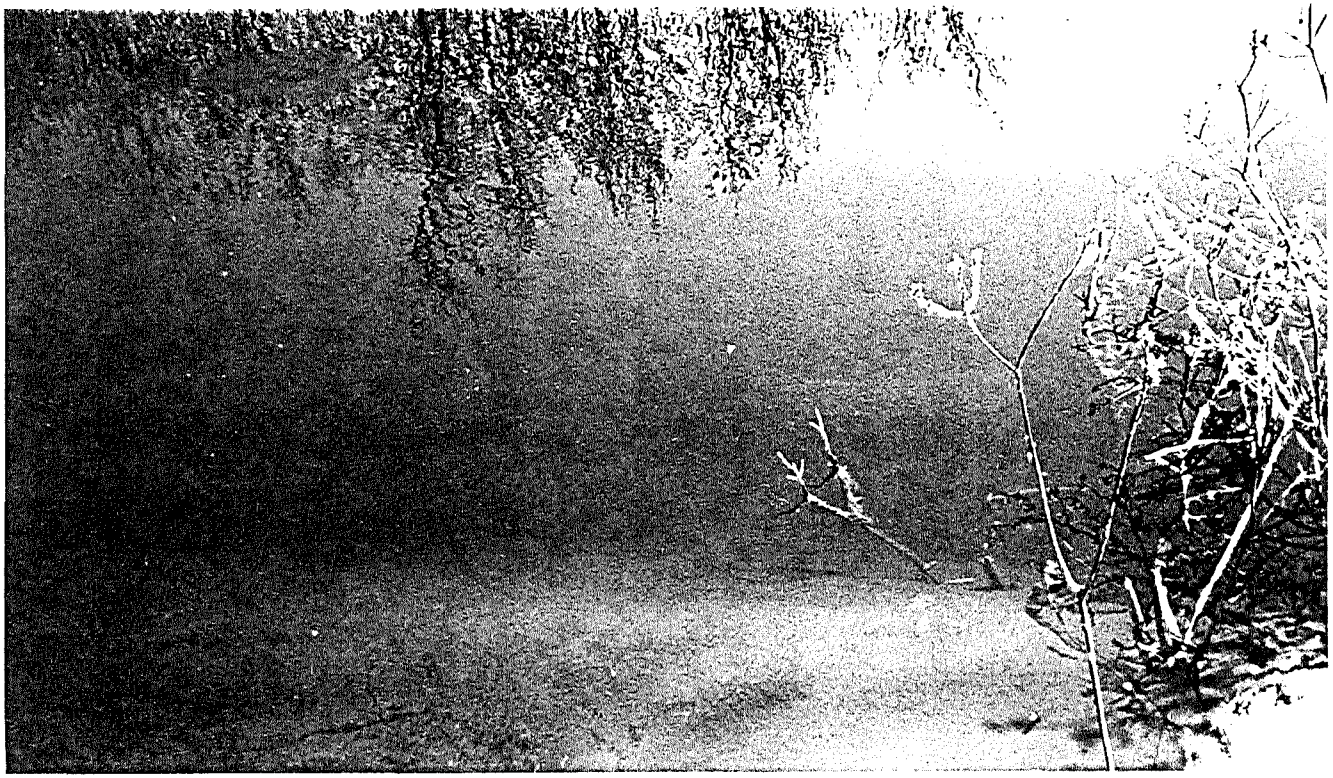
Area 2 and Vicinity



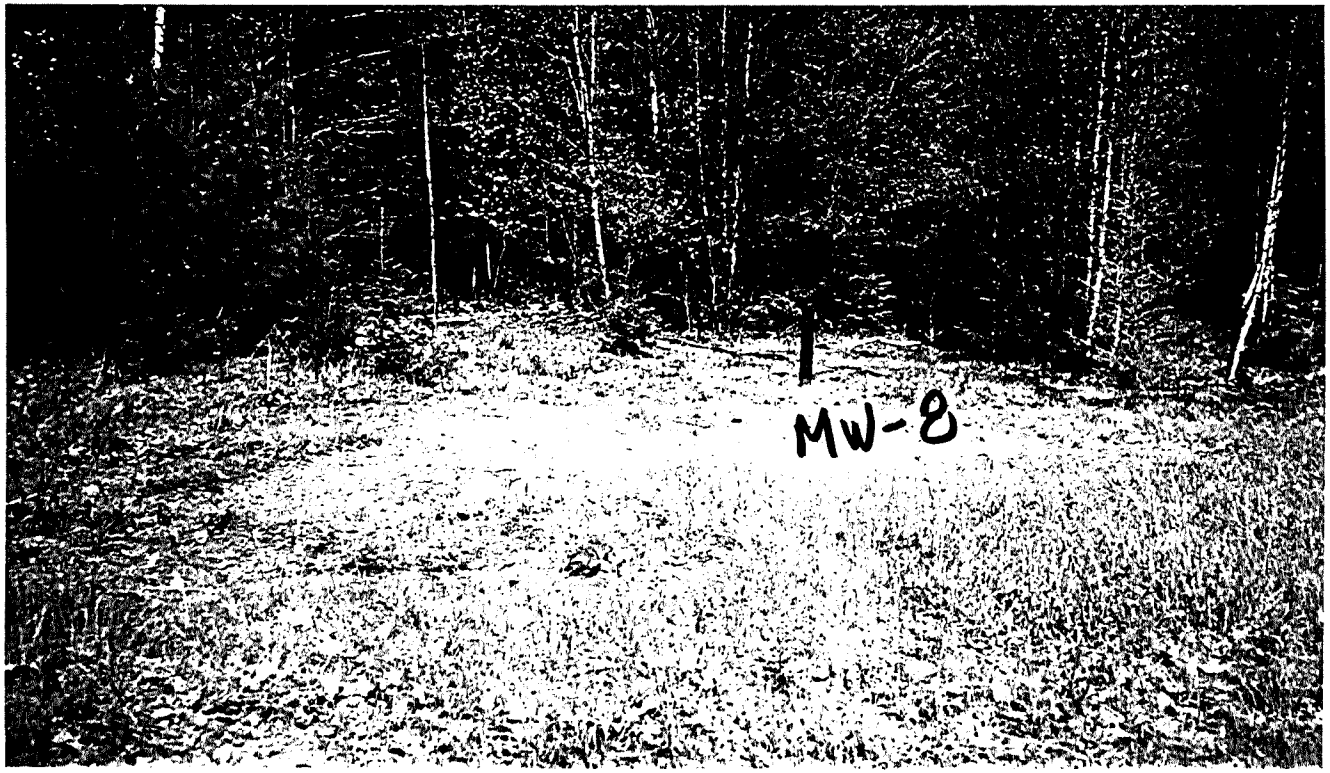

CMC
Remedial Excavation
Area 2
Showing Vegetation
in Area of Excavation





CMC Remedial Excavation Area 2 - where meets military Creek and close-up of Creek at that Location

CMC
Remedial Excavation
Area 3 and Vicinity


CMC
Remedial Excavation
Areas 4 and 5
and Vicinity

Natural
Resource
Technology, Inc.
N R T



May 28, 1999
(1226)

Mr. Don Miller
Wisconsin Department of Natural Resources
107 Sutliff Avenue
P.O. Box 818
Rhinelander, WI 54501-0818

RE: **Addendum to the Design Report and Variance Request**
C.M. Christiansen Co., Inc., Former Wood Treatment Site, Phelps, Wisconsin
Case #02-64-000068; Ref: WID998639035

Dear Mr. Miller:

On behalf of C.M. Christiansen Co., Inc. (CMC), we are submitting an addendum to the Design Report and Variance Request for the former wood treatment site in Phelps, Wisconsin. Specifically, this addendum addresses the treatment pile design and monitoring requirements in accordance with NR 655.07 and 655.08 and a revised sampling plan for material processing, seepage cell, and treatment pile locations.

The following documents which pertain to this addendum include:

- *Design Report and Plan of Operation*, dated June 12, 1998.
- *Variance Request for Soil Remediation Project* correspondence, dated June 12, 1998.

You asked that the variance request encompass both a treatment and storage variance, since both activities are co-occurring in the treatment pile, and as such, "waste pile" requirements under Wisc. Admin. Code Ch. NR 655 would apply. Under NR 600.03, both definitions may apply; although, the primary purpose of constructing this "waste pile" is for treatment, and not simply storage. However, as you requested, we hereby clarify the variance request to include both storage and treatment. Because the intent of this remedial action is not "storage", we request that the fee for a storage variance be waived.

**Treatment Pile Design and Monitoring**

The following paragraphs address the applicable design requirements of NR 655.07 and monitoring requirements of NR 655.08. The proposed location of the treatment pile and staging areas have been moved to reduce the visibility of the pile from County Highway E, as shown on attached Plate 1. The pile will have a run-on control system as described in the Design Report and Plan of Operations.

As indicated in previous correspondence to Chris Saari dated October 21, 1998, a fifth area of excavation was added to address his comments. Area 5 is shown on Plate 1 and includes about 50 cubic yards of additional soil to be treated (Table 1).

The pile design has been modified to include a leak detection system to monitor the integrity of the primary liner and prevent migration, should a failure occur. A sand blanket and secondary liner will be added below the primary liner. Both the primary and secondary liner material will be Permalon® X-210, 20 mil high-density polyethelene, as described in the attached product literature. The design will otherwise be the same as previously described in the Design Report, with a sloped base and addition of a monitoring point within the sand layer at the downslope end for purposes of leak detection.

A weatherproof cover, consisting of similar geomembrane material as the liner, will be used to protect the pile from precipitation and wind dispersal. The cover material will be Griffolyn® TX-1200 temporary landfill cover, also described in the attached product literature. The Griffolyn® geomembrane is rated for up to 48 months temporary landfill exposure as a cover material. If UV breakdown of the cover occurs, it will be replaced or repaired, as necessary. A report will be provided to the WDNR in accordance with the Spill Response Agreement schedule which documents construction of the pile and other site remediation activities.

Inspection of the liner system will be accomplished, per NR 655.08(1) and results will be included in the Remedial Action Documentation Report. The waste pile will be inspected monthly for integrity, or after major storms. Monthly inspection will include the cover, leak detection monitoring below the primary liner, and leachate monitoring in the primary sump. Results of visual inspection, including breeches in the integrity of the liner system, detection of leaks and quantities of leachate in sump will be recorded in a log book that will be available for review. If any leachate is generated on the primary liner it will be recirculated to the extent possible.

**Dust Control Measures**

Dust control measures will be implemented to prevent fugitive dust emissions from the excavation and soil staging areas. Fugitive dust from excavation and staging areas will be controlled by spraying water on the soil or by covering the stockpile with temporary plastic sheeting. In addition, construction traffic routes will be wetted, as needed, to minimize fugitive dust emissions.

**Pre-Remedial Sampling Plan**

As discussed in previous correspondence with NRT, you wanted the Plan of Operations to identify the number of samples anticipated for pre- and post-remedial sampling of material storage and processing areas, including:

- Treatment cell;
- Material Processing and Soil Staging Area; and,
- Constructed Seepage Cell.

This sampling will serve to document the quality of soil in these areas before and after remediation activities. Quantities and analytical parameters of samples to be collected in each area are shown on the revised Table 2 - Soil Sampling Plan (Revision 2), attached.

**Investigative Wastes**

The drums of investigative waste are still located in the covered shed near the site. These drums were originally to be addressed by June, however, since the variance approval and other permits are pending, the wastes cannot be processed yet. We will maintain the wastes in the current location until excavation commences this summer. For your information, we will also be looking into extending the temporary WPDES permit to cover continued treatment and discharge of well purge water from future groundwater monitoring events to eliminate the need to store drums at the site.

Please do not hesitate to call should you need further information or have any questions on this Addendum.

Sincerely,

NATURAL RESOURCE TECHNOLOGY, INC.

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

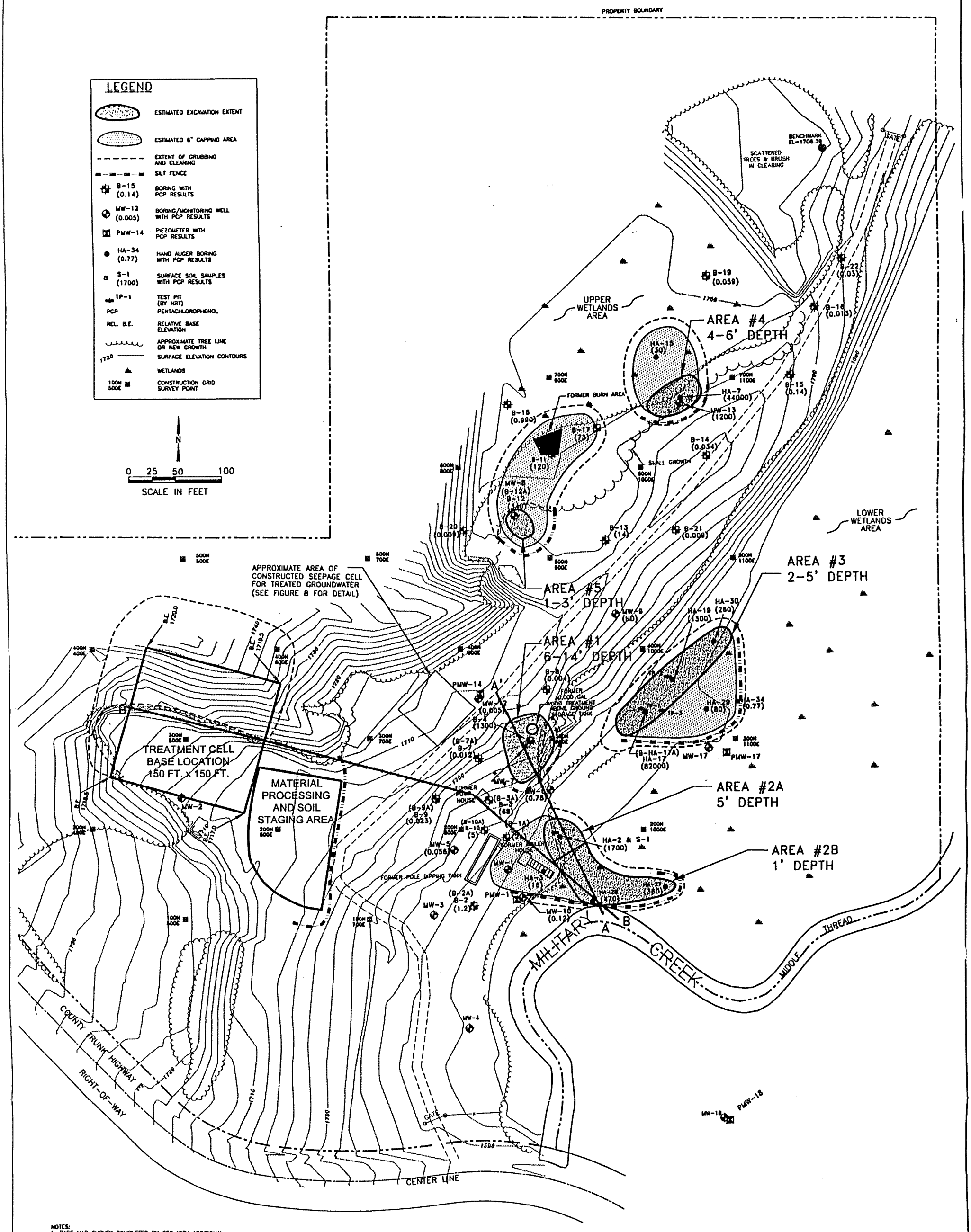
Spiros L. Fafalios, P.E.
Environmental Engineer

Attachments: Plate 1 - Remedial Construction Plan (1226-D01)
Table 1 - Excavation Soil Volume Estimate (revised)
Table 2 - Soil Sampling Plan (Revision 2)
Attachment A - Liner and Cover Material Specifications

cc Ms. Elizabeth Rich, Whyte Hirschboeck Dudek, S.C
Mr. Eric Christiansen, C. M. Christiansen Company, Inc.
Mr. Chris Saari, WDNR Northern Region

[projects, 1226, soil remed. plans1226 cmc plan addendum]

Natural Resource Technology
N R T




NOTES:
1. BASE MAP SURVEY COMPLETED BY CEC WITH ADDITIONAL INFORMATION OBTAINED FROM USDA-ASCS HISTORICAL AERIAL PHOTOGRAPHS, A 7/7/93 SITE VISIT WITH C M CHRISTIANSEN CO., AND A 5/21/98 FIELD INSPECTION. HAND AUGER BORINGS AND SURFACE SOIL SAMPLES OUTSIDE AREAS OF ESTIMATED EXCAVATION NOT SHOWN.
2. WETLAND AREA APPROXIMATELY INTERPRETED FROM WISCONSIN WETLAND INVENTORY MAP AND IS NOT FIELD VERIFIED.
3. CAPPING AREAS ARE APPROXIMATE AND WILL BE CONFIRMED DURING REMEDIATION ACTIVITIES.
4. CONSTRUCTION GRID SURVEY POINTS WITH ORIGIN AT SW 1/16 SECTION CORNER, IRON PIPE LOCATION BASED ON EAGLE LANDMARK SURVEY.

SOURCE NOTES:
THIS MAP WAS MODIFIED FROM DRAWING BY COLEMAN ENGINEERING COMPANY (CEC), IRON MOUNTAIN, MICHIGAN, DATED FEBRUARY 1997, JOB NO. 85042 A7, AND A SURVEY BY EAGLE LANDMARK SURVEYING, INC., EAGLE RIVER, WISCONSIN, DWG. NO. E1292, DATED 1-08-98, REVISED ON 5-13-99.

Natural Resource Technology
N R T

# REMEDIAL CONSTRUCTION PLAN

DESIGN REPORT ADDENDUM
C.M. CHRISTIANSEN COMPANY, INC.
FORMER POLE TREATMENT FACILITY, PHELPS, WISCONSIN

| DRAWN BY: TAS | CHECKED BY: SLF | APPROVED BY: LJP |
|---|---|---|
| DATE: 05/20/99 | DATE: 05/20/99 | DATE: 05/20/99 |

PROJECT NO. 1226/4.1
DRAWING NO. 1226-D01
PLATE 1

| | | |
|---|---|---|
| **Table 2 - Soil Sampling Plan (Revision 2)** | NRT PROJ. NO.: | 1226 |
| *Design Report and Plan of Operation* | BY: | SLF |
| *C.M. Christiansen Co., Inc. Former Pole Treatment Facility* | CHKD BY: | LJP |
| *Phelps, Wisconsin* | DATE: | 4/5/99 |
| | | FILE: Table 2 Soil Sampling Plan Rev - 2 |

| *Sampling Location* | *Type* | *Frequency* | *Parameters (Method)* |
|---|---|---|---|
| Excavation Limits | Discreet | 30-35 ft-side, 1,000 ft2-base | PCP (8270) |
| | | 25% (approx.) of total | PVOC/VOC * (8260) |
| | | 50 % (approx.) of total | PAHs (8270) |
| | | 1 per excav. area (approx.) | TOC (St. Meth. 9060) |
| Treatment Cell Area | Discreet (0-1 ft) | 5 representative samples before operation and after decommissioning in surface soil below treatment cell | PCP (8270) |
| Material Processing and Soil Staging Area | Discreet (0-1 ft) | 5 representative samples before operation and after decommissioning in surface soil below staging area. | PCP (8270) |
| Constructed Seepage Cell | Composite (0-1 ft) | 1 representative sample before operation and after decommissioning in surface soil below infiltration basin | PCP (8270) |
| Baseline Treatment Cell | Discreet | one time before cover placement, 1,000 ft2 grid, varying depths | PCP (8270) |
| | | as needed | Biodegradation indicator parameters eg. moisture content, TOC, nutrients, soil gas: oxygen, CO2 and methane |
| Treatment Cell Performance | Discreet | annually, 2,000 ft2 grid, varying depths | PCP (8270) |
| | | as needed | Biodegradation indicator parameters eg. moisture content, TOC, nutrients, soil gas: oxygen, CO2 and methane |
| Treatment Cell Closeout | Discreet | 1,000 ft2 grid, varying depths representative number of samples | PCP (8270) dioxins/furans |

*VOCs to be performed in MW-8 excavation area. PVOCs to be performed in all other excavation areas.

PERMALON®
DIVISION OF REEF INDUSTRIES, INC.

COPY

**Reef Industries, Inc.**
PO Box 750250
Houston, TX 77275-0250
(713) 507-4200
(800) 231-6074 *U S A TOLL FREE*
(713) 507-4295 Fax
e-mail lciolli@reefindustries.com

**To:** Spiro Fafalios **From:** Lynn Ciolli

**Fax:** 1-414-523-9001 **Pages:** -1-

**Company:** National Resource Technology **Date:** 05/07/99

Permalon Ply X-210 is a multi-layered, multi-axially oriented polyethylene We have reviewed the information you provided concerning the intended use of our product in your application as a separation/barrier membrane underneath and protective cover above soils contaminated with 1000 ppm pentachlorophenol and fuel oil.

We also understand that the expected project life is 5 years. Permalon Ply X-210 is suitable for the described application, both as the liner and cover. The product can be expected to provide the barrier properties, chemical resistance and UV resistance necessary to perform as required.

Thank you,

Lynn Ciolli

# PRODUCT INFORMATION

## PERMALON® PLY X-210®

- High density, cross-laminated polyethylene resists punctures and tears.
- UV stabilized to withstand prolonged exposure to sunlight.
- Ply X-210 is not prone to environmental stress-cracking (ESC) so it can endure repeated thermal expansion & contraction cycles.
- Meets ASTM standard D-3083 Soil Burial test performance requirements.

### PHYSICAL PROPERTIES AND TYPICAL VALUES

| PROPERTY | | ASTM TEST METHOD | US VALUE | METRIC VALUE |
|---|---|---|---|---|
| THICKNESS | | D-4801 | 20 MIL | .50 MM |
| WEIGHT | | D-3776 | 68 LB/1000 FT² | 33 KG/100 M² |
| | | | 9.9 OZ/YD² | 335 GM/M² |
| TENSILE STRENGTH | MD | D-882 | 66 LBF | 294 N |
| | PSI | | 3660 PSI | 25.2 MPA |
| | TD | | 58 LBF | 258 N |
| | PSI | | 3170 PSI | 21.9 MPA |
| TENSILE ELONGATION | MD | D-882 | 700 % | 700 % |
| | TD | | 400 % | 400 % |
| TONGUE TEAR | MD | D-7518 | 37.5 LBF | 167 N |
| | TD | | 31.5 LBF | 140 N |
| PPT RESISTANCE | MD | D-2582 | 48.2 LBF | 214 N |
| | TD | | 44.3 LBF | 197 N |
| TRAPEZOIDAL TEAR | MD | D-4533 | 62 LBF | 276 N |
| | TD | | 77.3 LBF | 344 N |
| DART IMPACT STRENGTH | | D-1709 | 3.01 LBS | 1.36 KG |
| PUNCTURE RESISTANCE | | D-4833 | 42.4 LBS | 189 N |
| COLD IMPACT STRENGTH | | D-1709MOD | -80°F | -60°C |
| CARBON BLACK CONTENT | | D-1603 | >2.0 % | >2.0 % |



PERMALON®
DIVISION OF REEF INDUSTRIES, INC.
Call today for technical assistance or to place your order.
800/231-6074
P.O. Box 750250
Houston, Texas 77275-0250
713/507-4200
713/507-4295 FAX

# FABRICATION AND INSTALLATION GUIDELINES FOR PERMALON® CONTAINMENT LINERS

## FACTORY SEAMS

All factory seams are made using a thermal/pressure fusion technique performed under controlled conditions. Seams are subjected to inspection and testing by Quality Control personnel. This seaming method produces a two inch wide seam that is watertight and comparable in strength to the parent material.

## FIELD SEAMS

Field Seaming is greatly minimized due to Reef's ability to prefabricate customized and large liners. When necessary, multiple large liners can be seamed in the field using hand-held extrusion welders. Extrusion welding is performed using a welding rod material identical in composition to the base liner material.

## SUBGRADE

It is common practice to install the liner over a two inch layer of sand (or equivalent) or over a layer of geotextile. In addition to protecting the liner, the geotextile helps stabilize the slope subgrade. Liners installed over a subgrade which contains any sharp rocks, roots or other protrusions are subject to puncturing. Any rocks that are not smooth and are greater than ¼ inch in diameter should be removed before installing the liner.

## INSTALLATION

Permalon liners are specially folded at the factory to make deployment easier. Liners are accordion folded providing easy removal and placement along the edge of the pond area with a minimum of labor. The liner is then pulled across the pond where it is positioned and secured. Sufficient slack should remain after the liner is secured to allow for thermal cycling. The deployment process is repeated when multiple liner sections are required.

## ANCHORING METHODS

The recommended anchoring method is to dig an anchor trench, insert the perimeter of the liner material into the trench and anchor it by backfilling the trench (See attached "Backfill Instructions"). This is the preferred method because it completely prevents the ingress of water and wind under the liner. Water under the liner can erode the subgrade and undermine the liner support–leading to liner failure. If wind gets under an open edge, it can quickly convert the liner into a sail.

## PIPE PENETRATIONS

Pipes and other penetrations through the liner can be sealed by using a pipe boot. This is a flanged tube fabricated at the factory using the liner material. The tube fits over the pipe and the flange is sealed to the liner with Fab tape. If required, the open end of the tube may be sealed with Fab tape or gasketed and mechanically sealed.

## FAB TAPE

Fab tape is an asphaltic mastic used to form a durable water tight seal around penetrations through the liner.



PERMALON®
DIVISION OF REEF INDUSTRIES, INC.
Call today for technical assistance or to place your order.
800/231-6074
P.O. Box 750250
Houston,
Texas 77275-0250
713/507-4200
713/507-4295 FAX

# PERMALON® PERMEABILITY PERFORMANCE

## WATER VAPOR PERMEABILITY

| MATERIAL | PERMEANCE (PERMS*) | WVTR** GM/HR/M² | WVTR** GRAINS/HR/FT² | WVTR CM/SEC |
|---|---|---|---|---|
| PERMALON X-150 | 0.0636 | 0.0184 | 0.0264 | $1.23 \times 10^{-5}$ |
| PERMALON X-210 | 0.0310 | 0.00884 | 0.0127 | $6.0 \times 10^{-6}$ |
| VAPORGUARD | 0.0142 | 0.0041 | 0.0059 | $2.74 \times 10^{-6}$ |
| VAPORGUARD FR | 0.0142 | 0.0041 | 0.0059 | $2.74 \times 10^{-6}$ |

*perms= grains/hr/ft² in. Hg

**Environment 73 +/- 3°F 50% Relative Humidity (ASTM E-96)

## METHANE PERMEANCE

| | PERMEANCE# |
|---|---|
| PERMALON X 150 | 1.09 X 103 |
| PERMALON X 210 | .710 X 103 |

#ASTM D-1434 AT 25°C (ML/M² DAY)

## RADON PROTECTION

| | THICKNESS CM (INCHES) | RADON DIFFUSION COEFFICIENT | % REDUCTION IN RADON FLUX THRU SLAB† |
|---|---|---|---|
| PERMALON X 150 | 0.021(.0085) | $4.5 \times 10^{-7}$ | 47 |
| PERMALON X 210 | 0.044 (.018) | $4.2 \times 10^{-7}$ | 67 |

† 10 cm slab with 1 x 10-3 cm²/s radon diffusion coefficient

grains/hr ft² x 0.696 = gm/hr m²
gm/hr m² x 6.45 x10-2 = gm/hr 100 in²
gm/hr 100in² x 24 = gm/24 hr 100 in²
1 gram = 15.44 grains
1 in Hg = .491 psi
1 m² = 10.76 ft²



PERMALON®
DIVISION OF REEF INDUSTRIES, INC.

Call today for technical assistance or to place your order.
800/231-6074
P.O. Box 750250
Houston,
Texas 77275-0250
713/507-4200
713/507-4295 FAX

# SOIL BURIAL TEST

## PERMALON® X-150®, X-210® AND X-210G®

Permalon X-150, X-210 and X-210G materials were subjected to a 30 day soil burial test following standards and procedures as outlined in ASTM D-3083, Section 9.5. Results of this test are outlined below.

**PERMALON X-150**

| TEST METHOD | | INITIAL VALUE | AFTER BURIAL TEST | % DECREASE |
|---|---|---|---|---|
| TENSILE @YIELD | MD | 39 LBS | 39 LBS | - |
| | TD | 52 LBS | 52 LB | - |
| TENSILE @BREAK | MD | 67 LBS | 64.5 LBS | 3.7 % |
| | TD | 83 LBS | 83.5 LBS | - |
| ELONGATION | MD | 900 % | 900 % | - |
| | TD | 810 % | 810 % | - |

**PERMALON X-210**

| PROPERTY | | INITIAL VALUE | AFTER BURIAL TEST | % DECREASE |
|---|---|---|---|---|
| TENSILE @YIELD | MD | 85 LBS | 98 LBS | - |
| | TD | 95 LBS | 101 LBS | - |
| TENSILE @BREAK | MD | 131 LBS | 123 LBS | 6 % |
| | TD | 143 LBS | 138 LBS | 3.5 % |
| ELONGATION | MD | 900 % | 900 % | - |
| | TD | 740 % | 750 % | - |

**PERMALON X-210G**

| PROPERTY | | INITIAL VALUE | AFTER BURIAL TEST | % DECREASE |
|---|---|---|---|---|
| TENSILE @YIELD | MD | 290 LBS | 290 LBS | - |
| | TD | 259 LBS | 260 LBS | - |
| TENSILE @BREAK | MD | 156 LBS | 142 LBS | 9 % |
| | TD | 155 LBS | 140 LBS | 9 % |
| ELONGATION | | 900 % | 900 % | - |



PERMALON®
DIVISION OF REEF INDUSTRIES, INC.

Call today for technical assistance or to place your order.
800/231-6074
P.O. Box 750250
Houston,
Texas 77275-0250
713/507-4200
713/507-4295 FAX

# Field Installation Guidelines

Contents





## Section I

### Site evaluation and preparation

To ensure that the liner installation proceeds smoothly and the liner will perform as required after installation a thorough site review is required. Items to be considered are substrate, fill and drain lines, utilities that may travel over, under or through the area, debris that may be present or accumulate in the lined area and access to the pond area by personnel or animals.

One of the most important steps in protecting a liner is correct site preparation. Insufficient effort in this area may cause short and long term problems with the liner's performance.

Subgrade preparation is the most important part of the site work. The surface the liner will come in contact with must be smooth and free of rocks, debris and old vegetation. Ideally, the liner should be placed on a 4" – 6" sand base. In some cases, compacting existing subgrade materials and correction of any erosion damage that may exist will provide an adequate surface. Chunks of clay or dirt should be leveled or removed. Material such as crushed rock is not an acceptable surface for the liner.

Vegetation removal is also important. Dry weed stalks or brush become brittle and when broken may cause punctures. Tree roots or stumps should be completely removed or covered with 6" layer of fill dirt. Underground utilities in the area should be marked prior to liner installation.

The site should be well drained and the pond area allowed to dry and surface prepped prior to installation.

Areas around pipe intrusions such as drain, fill and overflow lines should be smooth. Rip-rap around storm drains should be removed or covered. At least 1.5' –2' of pipe needs to be exposed to allow for pipeboot installation.

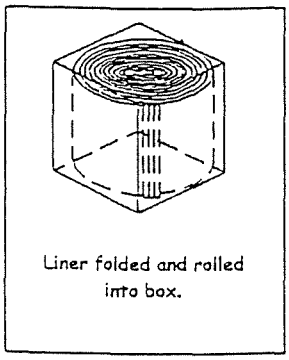
The anchor trench can be mechanically or manually dug and is normally 5" –8" wide and 12"-18" deep. The trench should be located far enough back from the filled elevation of the pond to prevent the trench from being washed out. Dirt should be placed to the outside of the trench for easy backfilling. The anchor trench can be dug just prior to placement or during liner installation. Trenches dug too early may fill with dirt requiring the trench be cleaned out during the liner installation.

This document provides information related to the installation of liner systems. Included in this document is information to assist in assessing the site, provide guidance on site preparation, estimating staffing and support necessary for the installation and finally, information on installing the liner.
This document does not attempt to address all aspects of an installation for all applications. The information presented is general [illegible] the individual with the overall scope of the project. Specific site criteria should be addressed

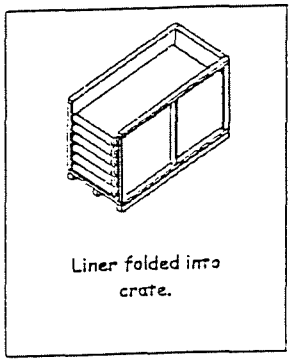
# Section 4

## Uncrating and positioning of liner systems

A deployment area must be designated for each site and sufficient access for crate positioning and an area along the side of the pond area for the liner. A roadway may be used if sufficiently prepared to prevent liner damage. A recommended width for the deployment is 20-30 feet. Smaller liners will be accordion folded, then rolled and placed into cardboard boxes. Larger liners are accordion folded ant then accordion folded into wooden crates. Instructions will be attached to the shipping container on how your specific liner has been packaged. Removal from the container and installation directions are also included.



Liner folded and rolled into box.

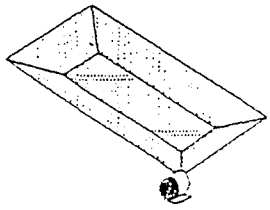


Liner folded into crate.

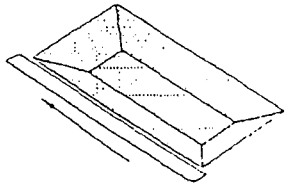
*Rolled liners in cardboard boxes*

Smaller liners are packaged to allow them to be unrolled at the pond site. As a general rule, liners of 15,000 square feet or less or accordion folded and then rolled. Rolled liners are packaged and shipped in cardboard boxes. The roll of material is tipped on its end to fit into the box, therefore the liner must be turned and positioned correctly at the site for deployment.

The liner package should be positioned at one corner of the deployment area. To determine how the package should be positioned and in which direction to turn the liner, the top should be removed. Once this position has been established the sides of the box should be opened. The liner should be rotated and oriented so that the end of the liner faces the deployment end of the pond. The liner can then be unrolled along the side of the pond.



Boxed liner in place to begin.

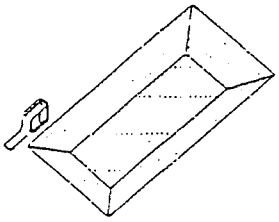


Extended liner along side of pond area.

Boxed liners

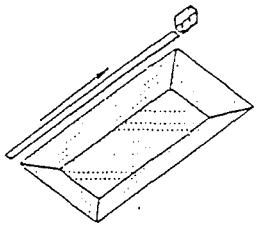
*Accordion folded liners in crates*

Larger liners are shipped in wooden crates, both to protect the liner during shipment and to provide a workable package for moving the liner around the work site and to the final pond site. The crates are built of standard construction lumber. A liner is accordion folded across the width of the panel and then accordion folded into the crate. One end of the crate will be marked as "Open this end". here are two ways to remove the liner from the crate. The method chosen determines the starting location for the crate. The first method requires the crate to be positioned at one corner of the area to be lined. The liner is then pulled from the crate parallel to the long side of the pond. The second method again positions the crate at a corner of the area to be lined; the leading edge is then pulled from the crate and the crate is pulled backwards, allowing the liner to be deployed as the crate is moved.



Crated liner in place to begin.

Deployment of liner from crate.



Crated liners

The second method is preferred as 1) Potential for damage to the liner is minimized, and 2) Heavy equipment can be used to aid in the removal of the liner from the crate.

The top and marked end should be removed from the crate first. Pry bars and hammers are sufficient for opening the crate. Caution should be used while removing the wooden panels to insure that nails or wood splinters do not damage the liner. Exposed edges should be inspected to insure all nails, wood splinters or other sharp objects have been removed. The liner is now accessible and ready for removal. The leading edge of the liner should be pulled from the crate.

On some occasions the leading edge has been folded under the top fold or flap. To expose the leading edge, the top flap should be folded forward starting at the rear of the crate.

Several personnel may be required to perform this task.

Approximately 20' of material should be removed from the crate. If the liner will be pulled along the long side of the pond with heavy equipment, a nylon sling should be wrapped around the liner bundle about 10' from the end and attached to the equipment. Chain or cable should not be used on the liner for pulling.

# Section 6

## Field extrusion welding

Permalon material used for liner applications is fabricated in the largest panels practical to reduce or eliminate field seams. For those projects where it is impractical to make the cover in a single sheet, multiple panels are used which require field seams.

One method of joining adjacent panels of Permalon liner material is through the use of field extrusion welding equipment. The process involves applying a hot bead or extrudate over the overlapped panel sections. The extrudate provides a permanent bond between the two panels and consists of materials similar to those used in manufacturing the liner material. The weld has the same chemical, UV, and moisture resistance as the base liner material. If properly performed, this seaming method produces a watertight seam.

Subgrade: General considerations for subgrades are given in Section II. Considerations for subgrade condition that are of primary importance for a liner that is to be field seamed include:
1) Degree of compaction,
2) smoothness, and
3) dryness.

Soft subgrades will allow the extrusion welder to bog down, thus making seaming difficult and inconsistent. Rough or irregular subgrades cause irregular seams due to difficulties in maintaining the correct contact angle between welder and liner. Wet subgrades cause two problems: 1) water softens the subgrade, and 2) water acts as a heat sink, drawing heat out of the seam and causing a weak seam.

Preparation: The surfaces to be welded must be clean.
If field extrusion welding is required on a particular project, a technician can be supplied. It is critical that the individual responsible for the liner installation communicates with the Reef Industries technician and/or sales staff for proper planning. Weather conditions, site conditions, and availability of personnel and equipment must be worked out in advance.

**IMPORTANT NOTE!!!**

**The following equipment will be required onsite for projects requiring extrusion welding:**

- Portable Generator - 3.5 kW minimum, 220 VAC single phase @50/60 Hz.
- Preferred outlet - Hubbel twist-lok, 250V 20A or 30A
- Rags, mops, paper towels - Sandbags
- Hammers and pry bars for opening crates.
- Screwdrivers and basic hand tools.

# Section 7

## Working with Fab Tape/Permatape

Fab Tape is a double sided bituminous tape which is applied between overlapping panels for field seaming (this is not the recommended method for making long panel seams), field repairs and installation of pipe boots.

Permatape, a 5" wide pressure sensitive tape made from Permalon, is used to secure the exposed edge of the top panel to the second panel after bonding with Fab Tape.
The surfaces that will receive the tape should be clean and dry. Dirty or wet surfaces should be completely cleaned with water, paper towels, dry rags or other materials that will prepare the surface for the tape.

Both of the tape products obtain the optimum adhesion when the surfaces to be bonded are warm. The surfaces should be at least 60°F to insure an acceptable bond. In order to obtain a bond at lower temperatures, external heat may be required. The use of an industrial style hot air blower is one recommended method. Extra care should be taken when attempting to place Fab Tape at temperatures below 32°F.

To install Fab Tape, the overlapping top panel edge should be pulled back approximately one foot. A row of Fab Tape should be placed about 2"- 3"away from the edge of the bottom panel. The tape should be applied as straight and as uniformly as possible. The tape should be allowed to follow the contours of the panel and should not be stretched tight. If foldovers exist in the material, they should be smoothed prior to placement of the tape. Applying firm pressure ensures that the tape is sealed to the material. Once the first row of tape is installed, place a second row of tape approximately 2" away from the first row, following the same steps as or the first row.

After the second row of Fab Tape has been installed, the release paper should be removed from both rows of tape and the top panel secured to the bottom. Again, do not pull the material tight during the securing process as excess tension will eventually result in numerous wrinkles that are difficult to seal. All voids and wrinkles should be sealed with Fab Tape. The exposed edge of the panel can now be secured to the bottom sheet with a layer of pressure sensitive tape. Apply the tape so that half is on one panel and half on the second panel. Press into place and insure that the tape is secure.

After completion, the seams should be inspected to insure that sufficient adhesion has been obtained in all areas. If the tape has not adhered, the tape should be resealed. If the tape has become contaminated with dirt or other foreign substances it should be replaced.The liner should be positioned as necessary to insure that during operation the liner/liner seam will not be under tension.

# FIELD PERSONNEL HANDOUT

➢ *This handout should be provided to all field personnel who will be handling the liner material.*

The following information should familiarize you with the liner installation process.

*SAFETY - The information provided in this handout does not replace or supersede any standard or required safety procedures or information. The activities associated with the liner placement may be a new experience for many or all of the personnel. Remember to work in a method that will not place yourself or others working with you in danger. If you see someone who may be placing himself or herself in a hazardous or dangerous position, please inform your supervisor or warn the person immediately of the potential danger.*

**Soft-soled shoes should be worn to protect the liner from damage when walking on the liner. Cowboy boots or other hard-soled shoes are not allowed.**

*Gloves are also recommended. The liner is pulled into place by hand and gloves will protect the hands during this portion of the operation as well as protect the hands from the material during hot weather. (The liner temperature can reach 140-160 degrees Fahrenheit.) Personnel should also be aware that exposed skin might be burned if it comes in direct contact with the heated material.*

WEATHER - Liner installation must be coordinated with the weather. If rain or snow is predicted and the liner cannot be installed prior to the start of the inclement weather, installation should be postponed. Once moisture has accumulated on the liner, the ponded water must be removed before the liner can be moved or shifted. Additionally, wet surroundings create a muddy environment from which mud and rocks can be more easily tracked onto the liner. Mud or dirt will not affect the performance of the liner, however in areas where field seams or welding is required the quality of the seam can be adversely affected by their presence.The most unpredictable component is wind. Light breezes are not a major factor in liner installation, however, when winds approach or exceed 10 mph, placement and anchoring the liner becomes a serious issue. At this point, wind conditions are critical. Liners should not be installed during windy or strong breeze conditions. If excessive wind is allowed under the liner during deployment, the liner will act as a sail and personnel will not be able to control or retain the liner. If the wind is too strong to allow deployment, sandbags or other ballast should be used to secure the liner.

FINAL SITE REVIEW - Personnel working in the area where the liner is to be placed should be aware of any potential items that could damage the liner. Examples are rocks, rough surfaces, large clumps of dried mud, steel debris, wire, brick, wood, etc. All items should be removed prior to placement of the liner. If during the installation of the liner, these items are discovered in the area where the liner is to be placed, they should be removed and/or brought to the attention of the supervisor. It is much easier to move an item before t

TOOLS - A variety of tools are used during the installation process such as hammers, pry bars, rakes, shovels, etc. A central point for these items should be maintained which allow personnel to keep track of their location to insure they are not covered with the liner. If you have been provided with pull grips, keep track of its location so that it is available the next time it is required. Also, none of these items should be dropped on the liner or thrown next to the liner. They may bounce onto the liner and cause damage.

OPENING THE CRATE - Most liners are shipped in wooden crates which protect the liner during shipment and at the job site. Portions of the crate must be removed prior to placement of the liner. In most cases, the top and one end is removed. Since all sections of the crate have been nailed together, lumber removed from the crate will contain nails. All sections removed should be stored or positioned in such a fashion that does not create a hazard for other personnel. Nails should be removed or boards should be stacked with the nails pointing down. NOTE: *DO NOT THROW LUMBER OR OTHER MATERIALS ONTO ANY PORTION OF THE LINER.* Nails may remain in areas where lumber is removed. All nails in these areas should be removed before any portion of the liner is removed from the crate.

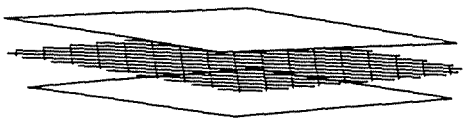
REMOVING THE LINER FROM THE CRATE - Liners are accordion folded and then accordion folded again into the box. To remove and place the liner, the operation needs to be reversed. The last fold into the box must be the first fold out. The original packing and shipping will have compressed the liner into the crate which means that normally as personnel are pulling the liner out of the crate, one or more personnel is needed in the crate to assist with the deployment. The liner material can be stiff and heavy therefore sufficient personnel should be available. All personnel should pull uniformly and steadily.

Teamwork provides the best results.

TECHNICAL INFORMATION ON

# GRIFFOLYN® TX-1200®

Griffolyn TX-1200 is a 3-ply laminate combining two layers of linear low density polyethylene and a high-strength cord grid.



*Griffolyn TX-1200 is specifically engineered to provide high strength and durability in a lightweight material.*

## FEATURES

- Multiple layers and cord reinforcement resist punctures and tears.
- UV stabilization protects the material from degradation during extended exposure to sunlight.
- Cold-crack resistance eliminates failures in extremely cold temperatures.
- Low permeability greatly inhibits moisture transmission.
- Flexibility and light weight allow for easy handling and quick installation.
- Custom fabrication is available to meet your exact specifications.
- Long life expectancy allows for significant cost savings through reuse and fewer replacements.

## SUGGESTED APPLICATIONS

- Pallet, cable reel and drum covers for outside storage.
- Temporary walls, plant dividers, building enclosures and containment tents.
- Shipping container covers and liners.
- Floor covers, dust partitions and cleanroom enclosures.
- Soil covers to control leachate for stockpiles and landfills.
- Agricultural storage systems, hay covers and windbreaks.
- Athletic field and equipment covers.


GRIFFOLYN®
DIVISION OF REEF INDUSTRIES, INC.

Call today for technical assistance or to place your order.
800/231-6074

P.O. Box 750250
Houston,
Texas 77275-0250
713/507-4200
713/507-4295 FAX

# PRODUCT TESTING DATA TX-1200

## PHYSICAL PROPERTIES AND TYPICAL VALUES

| PROPERTY | | ASTM TEST | US VALUE | METRIC VALUE |
|---|---|---|---|---|
| Standard Weight | | D-2103 | 37 lbs/1000ft² | 18 kg/100m² |
| 3"Tensile Strength @ Yield | MD | D-882 | 95 lbf | 423 N |
| | TD | | 90 lbf | 400 N |
| 3" Tensile Strength @ Break | MD | D-882 | 52 lbf | 231 N |
| | PSI | | 2475 psi | 17 Mpa |
| | TD | | 46 lbf | 205 N |
| | PSI | | 2190 psi | 15.1 Mpa |
| Elongation | MD | D-882 | 800 % | 800 % |
| | TD | | 850 % | 850 % |
| Tongue Tear | MD | D-2261 | 23 lbf | 102 N |
| | TD | | 25 lbf | 111 N |
| PPT Resistance | MD | D-2582 | 22 lbf | 98 N |
| | TD | | 23 lbf | 102 N |
| Trapezoidal Tear | MD | D-4533 | 30 lbf | 133 N |
| | TD | | 30 lbf | 133 N |
| Dart Impact Strength | | D-1709 | 1.7 lbs | 0.77 kg |
| Cold Impact Strength | | D-1709 mod. | -45°F | -42°C |
| Puncture Strength | | D-4833 | 31 lbs | 138 N |

## ORDERING INFORMATION

### AVAILABLE COLORS

Black, White, Blue, Clear

### SIZES

Standard rolls from 4' x 100' to 40' x 100' in increments of 4' widths are available for immediate shipment. Standard length and width tolerances are ±1% (minimum 2").

Custom sizes up to 200' x 300' and custom fabrication are available to meet your exact specifications.

### OUTDOOR EXPOSURE

Under normal continuous exposure the average life expectancy ranges from 30 to 48 months, depending on color.

### USABLE TEMPERATURE RANGE

Minimum -45°F -42°C
Maximum 170°F 77°C



REEF INDUSTRIES, INC.

Griffolyn®

Reef Industries, Inc.
P.O. Box 730250
Houston, TX 77273-0250
Tel: 713-943-0070
Toll Free: 1-800-231-6074
Fax: 713-947-2053

Reef Industries, Inc.
Product Testing Lab
08/16/1993

TX 1200 Black - Physical Properties (Four Years Exposure)

| Property | ASTM | Unit | New (1989) | Exposed -1993 |
|---|---|---|---|---|
| 3 in. Ten. Strength (MD) | D-882 mod. | lbf | 60 | 74 |
| 3 in. Ten. Elongation (MD) | D-882 mod | % | 650 | 676 |
| Tongue Tear 3in. x 8in. | D-2261 | lbf | 9 | 20.4 |
| PPT* Resistance | D-2582 | lbf | 23 | 25 |
| Seam Shear Strength | D-882 mod. | lbf | 54 | 70 |
| Seam Peel Strength | D-1876 | lbf | 30 | 28 |

* PPT - Puncture Propagation and Tear.

The sample after four years of exposure was compared to minimum specifications for material used in 1989. TX 1200 (black) shows no decrease in its tensile properties after four years of outdoor exposure. The increase in the tongue tear or brittleness is due to the slight oxidation (degradation) of the material from UV exposure. Seam strengths also maintain their original seam and shear strength. The material shows no significant departure from its original properties even after four years of outdoor use

Site : Daishowa-Lawson Landfill - August'1989.

Griffolyn®

Reef Industries, Inc.
P.O. Box 750250
Houston, TX 77275-0250
Tel: (713) 943-0070
Toll Free: 1-800-231-6074
Fax: (713) 947-2053

Product Development Group
09/11/1993

# Physical Properties of TX1200 (Three Year Exposure)

| Property | ASTM | Unit | New (1990) | Exposed (1993) |
|---|---|---|---|---|
| Standard Weight | D-2103 | lbs/msf | 34 | 37 |
| 3" Tensile Strength | D-882 | lbf | 60 | 71 |
| 3" Elongation | D-882 | % | 650 | 630 |
| PPT* Tear Strength | D-2582 | lbf | 23 | 26 |
| 3x8" Tongue Tear | D-2261 | lbf | 9 | 17 |
| Drop Impact Strength | D-1209 | g | 900 | 779 |
| Seam Shear Strength | | lbf/in | 18 | 22 |

- Increase could be due to residual sand
* PPT - Puncture Propagation and Tear

TX1200 (Black) was used as a cover for low-level contaminated earth (October 1990, new). A sample of the material was removed (July 1993, exposed) and tested by Reef Industries, Inc. (September 1993). The exposed material shows not significant drift in its physical properties, after 3 years of exposure. The small drop in the elongation and impact strength could be attributed to brittleness from UV degradation.
Site: Portland, Oregon.

N.B. All testing performed to ASTM standards. This data is believed to be accurate and reliable but presented without any guaranty.

WISCONSIN
DEPT. OF NATURAL RESOURCES

**State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES**

Tommy G. Thompson, Governor
George E. Meyer, Secretary
William H. Smith, Regional Director

Woodruff Service Center
8770 Highway J
Woodruff, Wisconsin 54568
Telephone 715-358-9214
FAX 715-358-2352

June 15, 1999

3-NO-99-64019UW

C.M. Christiansen Co, Inc.
P.O. Box 100
Phelps, WI 54554

Dear Sir :

The enclosed document is a "Notice of Proposed Grading" for your proposed soil remediation project at a former wood pole treatment facility in Phelps. This permit is required due to the amount of grading and its proximity to Military Creek. Wisconsin law requires that the public be allowed an opportunity to comment on projects like yours. The enclosed notice is provided to help you meet this requirement.

Before I can proceed in processing your application, state law requires that you:

- publish this as a Class I Notice, at your expense, in the Vilas County News & Review.

- obtain, and send to me, an affidavit from the newspaper providing proof that the notice has been published.

Please send me the affidavit at the address listed above. Please write or call me at 715-358-9214 if you have any questions.

Sincerely,

Liesa Nesta

Liesa Nesta
Water Management Specialist

c: Town of Phelps
Vilas County Zoning
Mike O'Keefe, U.S. Army Corps of Engineers
USDA Forest Service, Eagle River
North and South Twin Lakes Riparian Association
Chris Saari, DNR-Brule
Spiros Fafalios, Natural Resource Technology Inc.

NOTICE OF PROPOSED GRADING

C.M. Christiansen Co, Inc., P.O. Box 100, Phelps, WI 54554 has applied to the Department of Natural Resources for a permit to conduct grading more than 10,000 square feet on the bank of Military Creek. The property is located along County Highway E, across from its intersection with County Highway K. The purpose of the project is to conduct a soil remediation project, by excavating and restoring soils impacted by a former power pole treatment operation.

The project is located in the Town of Phelps, Vilas County in government lot 3 Section 35, Township 42 North, Range 11 East.

The Department has made a preliminary determination that the proposed project is not expected to cause significant adverse environmental effects. For this reason, an Environmental Assessment or Environmental Impact Statement is not required.

If you would like to know more about this project or would like to see the application, plans, and applicable legal standards, contact Liesa Nesta, 8770 Highway J, Woodruff, WI 54568, phone number 715-358-9214.

Reasonable accommodation, including the provision of informational material in an alternative format, will be provided for qualified individuals with disabilities upon request.

If you feel the permit should not be granted, write to Liesa Nesta within 30 days of the publication of this notice explaining your objections.

If you object to this proposal **and** would like to request a public hearing, your objection must specify:

1. Why the proposed project violates the legal standards found under Section 30.19(1)(c), Wisconsin Statutes; and

2. That you or your representative will appear at the hearing and present information supporting your objection.

If no objections are received which request a hearing, the Department may issue its decision without a hearing.

Docket Number: 3-NO-99-64019UW

**WISCONSIN DEPARTMENT OF NATURAL RESOURCES**
For the Secretary

Liesa Nesta

Liesa Nesta, Water Management Specialist

June 15, 1999
Date

# PHONE CONVERSATION RECORD

**DATE:** 6/17/99
**TIME:** 1124 hrs

**CONVERSED WITH:** Laurie Parsons
NRT
414/523-9000

**SUBJECT/PROJECT:** C.M. Christiansen

**UNIQUE ID#.:** 02-64-00068

Parsons called to find out if I'd heard from Don Miller regarding the hazardous waste variance. I explained that Miller had sent me an e-mail indicating that EPA was taking a very long time to review the draft variance. Miller's e-mail also said that Miller would be going on vacation, and likely wouldn't be able to finalize the variance before leaving.

Parsons said they have recently been speaking with Waste Management about disposal of the charcoal filters from the groundwater treatment system. Waste Management also offered a "competitive" price for disposing of F027 soil at their landfill in Ontonagon, MI. Parsons said CMC is now considering landfilling rather than biopiling.

Parsons said they may still need to build a small biopile for soil which fails 50 ppm TCLP, which is the limit that Parsons believed MI DEQ set for landfilling. Parsons said NRT is working on a composite sampling plan for MI DEQ for all 5 excavation areas.

Signature: Christopher A. Saari
(please write legibly)

-over-

I told Parsons I didn't have a problem with the landfill concept. I said I'd call Miller to bring up the subject with Miller. Parsons asked me to have Miller call her, since NRT wants the variance process to continue.

Parsons then mentioned that all of the county permits were approved by the Vilas County Board on 6/7/99.

Finally, Parsons said she would send me a copy of the MT DEQ sampling plan.

# C.M. CHRISTIANSEN CO., INC.

P.O. Box 100
PHELPS, WI 54554
TEL: (715) 545-2333
FAX: (715) 545-2334

ERIC R. CHRISTIANSEN
*PRESIDENT*
EMAIL: erc@execpc.com



June 21, 1999

Mr. Christopher A. Saari
Wisconsin Dept. of Natural Resources
Box 125
Brule, WI 54820-0125

Re: Soil Remedial Action, former C.M. Christiansen Co. Poleyard
BRRTS #02-64-000068

Dear Mr. Saari:

Enclosed for your information is a letter being sent to the residents of Phelps who own property near the Poleyard on County E. This relates to the Annual Meeting of the North & South Twin Lakes Riparian Association this next Sunday, June 27. I will be addressing the meeting to update the Association (and these additional non-member property owners, if they should choose to attend) regarding our anticipated remediation activities this summer.

Please don't hesitate to contact me if you have any questions or concerns.

Very truly yours,

C. M. CHRISTIANSEN CO., INC.

Eric Christiansen,
President

cc: Mr. P.C. Christiansen
Ms. Elizabeth Gamsky Rich
Ms. Laurie Parsons

# NORTH & SOUTH TWIN LAKES
RIPARIAN ASSOCIATION

# NEWSLETTER

VOL. 4, No. 4 | P.O. BOX 163 • PHELPS, WI 54554 | SPRING 1998


## President's Message

Most of you are aware that the Governor did it to us again. Yep, that's right - we're back to 2-bag limit for walleyes. He even made an agreement with the Tribes. Lac du Flambeau band agreed to keep a 3 walleye bag limit on all those lakes they declare. However, Lac du Flambeau no longer spears our lakes and instead gave their claim over to the Mole Lake band. This began last year, which explains why some people on the lake reported Indians spearing right behind a boat that was boom-shocking. The group that was taking a fish census was the Great Lakes Indian Fish and Wildlife Commission. The Mole Lake Tribe, allegedly those who speared, comes from Crandon and are not obligated to follow the rules and regs set up with the Flambeau Tribe and the Governor. Another way to get around the rules and rape our lakes, because the Governor and the DNR gave in again this time around. We have requested Rep. Joe Handrick to join us at our Annual Meeting and discuss with us what our options are. Joe has really been supportive of our Northwoods in this matter. See a copy of a well written letter on this subject by our Tom Hickson, addressed to the Mole Lake Tribe on page 5.

Our Annual Meeting is very important for all members because it permits us to get reacquainted with our neighbors on the lakes and to discuss matters of mutual importance in maintaining our quality of life and the lake assets we enjoy so much. This year, as always, we hope to have information presented that is of great interest to you. Also, very importantly, we again will be electing six Members of the Board of Directors, from which your Officers are elected and who subsequently select committee chairpersons. All this is critical to the success of NSTLRA.

The Lake Planning Grant that was initiated in 1996 through the DNR is in the final stages and will be wrapped up this summer. We were chosen to put together a Model Lake Management Plan that other lakes throughout Vilas County could follow. It will become a "recipe" for Lake Direction that can be used to give our Association direction, even when board members change.

We have had correspondence with the folks at Long Lake in Phelps. They are in their second year as a lake association. We exchange newsletters so that we may have a line of communication with each other and compare notes on mutual issues. We received a letter from Drury Davis, editor of their newsletter named *Long Lake Loon*, inquiring as to our interest, as a membership, to a "senior and junior" 16" softball game challenge. Under and over 45 has been suggested as a distinguishing age cut off for each category. They are looking for a friendly competition with perhaps a brat/corn bar-b-que attached. The date would be determined by a positive response, most likely during the last two weeks of July to the first two weeks of August. Sounds like lots of fun, and a chance to meet people like us with a common interest in the health of our lakes. Look for more info at our Annual Meeting Sunday, June 27th at the Phelps School Commons from 1 – 4 p.m.

---

ANNUAL MEETING JUNE 27, 1999
PHELPS SCHOOL
COMMONS 1— 4 PM.

Picnic Potluck Please bring the following:
A - G bring Veggies or Salad;
H - N Desserts;
O-Z Meat Dish or Casserole.

The Association will provide rolls and butter; coffee and soda and all paper and plasticware.

Carol Schuster, Social Chair, has asked for help in setting up. Please call her at 479-2206 to tell her you will help.

Besides our brief business meeting, Tiffany Lyden will speak to us on Shoreline Restoration and zoning. Rep. Joe Handrick will say a few words. Eric Christiansen will update us on the Military Creek Property Remediation. We will need to vote on six Board candidates per our By-Laws. See Slate p.2. There will be three TV/VCR's set up in the small gym for viewing of Fishing on North and South Twin Lakes; Wild Voices, Quiet Waters (Loons); and a video of North and South Twin Lakes shoreline.

We will partake of our Potluck Picnic after the meeting. Bring $$$ for Fish Stocking Raffle.

**NSTLRA BOARD OF DIRECTORS**

| | |
|---|---|
| **President:** | |
| Jerry Parker | 545-2496 |
| **Vice President:** | |
| John Barron | 545-2844 |
| **Secretary:** | |
| Ginny Parker | 545-2496 |
| **Treasurer:** | |
| Joyce Adams | 545-2119 |
| **DIRECTORS:** | |
| Bob Clem | 479-6224 |
| Tom Hickson | 545-3474 |
| Mary Lou Knearem | 545-3233 |
| Mike Schindler | 545-3922 |
| Francis Schuster | 479-2206 |
| Kevin Stieneke | 545-2448 |
| Don Zirbel | 479-2800 |
| **Newsletter Editor:** | |
| Ginny Parker | 545-2496 |

# C.M. CHRISTIANSEN CO., INC.

P.O. Box 100
Phelps, WI 54554
Tel: (715) 545-2333
Fax: (715) 545-2334


June 21, 1999

«Salut» «First_Name» «Last_Name»
«Address»
Phelps, WI 54554

Re: Environmental Remediation at the former Poleyard

Dear «Salut» «Last_Name»:

As you may be aware, C.M. Christiansen Co., Inc., has been working with the Wisconsin DNR for some time now regarding an environmental remediation at the former CMC Co. Poleyard, County Hwy E, in Phelps. A summary of the project is enclosed for your information.

This letter is being sent to you because you own property near the Poleyard. We will likely begin the remediation construction at the Poleyard this summer. Although this construction should have no impact whatsoever on you or your property, there will be a period of time (we estimate 60 to 90 days) when heavy equipment will be operating at the Poleyard and entering and leaving just down the road from your property. As a result, I thought I would alert you to this in advance. We cannot at this time predict when this activity will begin because we are still awaiting final permits and final approval from the Wisconsin DNR.

If you would like additional information, I will be giving a short presentation at the annual meeting of the North & South Twin Lakes Riparian Association on Sunday, June 27, at the Phelps School Commons. The meeting starts at 1:00 p.m. Or, you may of course contact me directly.

We apologize in advance for any inconvenience this construction may cause you.

Very truly yours,

C. M. CHRISTIANSEN CO., INC.

Eric Christiansen
President

cc: Mr. P.C. Christiansen
Ms. Elizabeth Gamsky Rich
Ms. Laurie Parsons

| *Salut* | *First_Name* | *Last_Name* | *Address* |
|---|---|---|---|
| Mr. & Mrs. | Gerald | Grady | 4361 County A |
| Mr. & Mrs. | Raymond | Kangas | 4712 County E |
| Mr. & Mrs. | Robert | Hurkman | P.O. Box 1 |
| Mr. & Mrs. | Tom | Hendrickson | 4683 County E |
| Mr. & Mrs. | Richard | Whitehead | 4704 County E |
| Mr. & Mrs. | Mike | Kinner | 4708 County E |
| Mr. & Mrs. | Robert | Lugar | 4776 County E |

# C.M. CHRISTIANSEN CO., INC.

## Summary of Poleyard Remediation Project

### June 21, 1999

C.M. Christiansen Co., a lumber manufacturing and forest products company, was founded as the Hackley-Phelps-Bonnell Company in 1902. In addition to its sawmill operations, CMC Co. treated wood poles and posts, primarily for use by telephone and electric power utility companies, from the early 1950's until late 1970's/early 1980's. The approximately 22-acre treatment site is known as the Poleyard and is located in Phelps, north of Vilas County Highway E and north and west of the CTH E intersection with Military Creek. The thermal (as opposed to pressure) treatment process employed a wood preservative solution of 95% No. 2 fuel oil mixed with 5% pentachlorophenol, or PCP. Its purpose was to preserve the poles according to the specifications required by the Company's utility company customers. The Company conducted all pole treatment operations according to all rules and regulations applicable at the time.

Although the Company's pole-treatment operation has long-since been closed, and all of its equipment and storage tanks have been dismantled and removed, the Poleyard site remains impacted by residue from the treatment process. C.M. Christiansen Co., Inc., has been working with Wisconsin DNR (WDNR) for several years to effect a remediation of this residue, chiefly the fuel oil and PCP treatment solution.

This summer, CMC Co., Inc., expects to commence soil remediation operations at the Poleyard, excavating roughly 3,800 tons of PCP-impacted soil from several locations on the site. The remediation plan is subject to final approval by WDNR which is anticipated momentarily. The current plan is to construct a bio-pile at the site by mixing the impacted soil with material imported from elsewhere (bark, fertilizer, etc.) and letting bacteria and natural processes clean up the PCP to the WDNR-approved levels. The bio-degradation process is anticipated to be complete within a few years (currently estimating 5 years, although other similar sites have been issued closure letters in shorter timeframes).

## LEGEND

- ESTIMATED EXCAVATION EXTENT
- ESTIMATED 6" CAPPING AREA
- EXTENT OF GRUBBING AND CLEARING
- SILT FENCE
- B-15 (0.14) — BORING WITH PCP RESULTS
- MW-12 (0.005) — BORING/MONITORING WELL WITH PCP RESULTS
- PMW-14 — PIEZOMETER WITH PCP RESULTS
- HA-34 (0.77) — HAND AUGER BORING WITH PCP RESULTS
- S-1 (1700) — SURFACE SOIL SAMPLES WITH PCP RESULTS
- TP-1 — TEST PIT (BY NRT)
- PCP — PENTACHLOROPHENOL
- REL. B.E. — RELATIVE BASE ELEVATION
- APPROXIMATE TREE LINE OR NEW GROWTH
- 1720 — SURFACE ELEVATION CONTOURS
- WETLANDS
- 100N 800E — CONSTRUCTION GRID SURVEY POINT

N

0 25 50 100

SCALE IN FEET

PROPERTY BOUNDARY

BENCHMARK EL=1706.39

SCATTERED TREES & BRUSH IN CLEARING

GATE

UPPER WETLANDS AREA

AREA #4
4-6' DEPTH

A4B1

HA-15 (50)

B-19 (0.059)

B-22 (0.03)

B-16 (0.013)

FORMER BURN AREA

HA-7 (44000)

MW-13 (1200)

B-15 (0.14)

B-18 (0.990)

B-17 (73)

B-11 (120)

B-14 (0.034)

SMALL GROWTH

MW-8 (B-12A) B-12 (340)

A5B-1

B-20 (0.009)

B-13 (14)

B-21 (0.008)

LOWER WETLANDS AREA

APPROXIMATE AREA OF CONSTRUCTED SEEPAGE CELL FOR TREATED GROUNDWATER (SEE FIGURE 8 FOR DETAIL)

AREA #5
1-3' DEPTH

AREA #3
2-5' DEPTH

MW-9 (ND)

HA-19 (1300)

HA-30 (280)

A3B-2

AREA #1
6-14' DEPTH

PMW-14

B-5 (0.004)

FORMER 10,000 GAL WOOD TREATMENT CREOSOTE/PENTA TANKS

HA-29 (80)

HA-34 (0.77)

A3B-1

MW-12 (0.005)

B-1 (1300)

(B-7A) B-7 (0.012)

TREATMENT CELL BASE LOCATION 150 FT. X 150 FT.

MATERIAL PROCESSING AND SOIL STAGING AREA

(B-HA-17A) HA-17 (82000)

MW-17

PMW-17

A1B-1

A1B-2

MW-7 (0.78)

AREA #2A
5' DEPTH

(B-9A) B-9 (0.525)

(B-3A) B-3 (68)

(B-10A) B-10 (5)

FORMER POLE HOUSE

A2B-1

HA-2 & S-1 (1700)

A2B-2

AREA #2B
1' DEPTH

MW-5 (0.036)

FORMER POLE DIPPING TANK

HA-3 (16)

HA-27 (360)

(B-2A) B-2 (1.2)

MW-3

PMW-1

MW-10 (0.12)

A

B

MILITARY CREEK

MIDDLE BRANCH

COUNTY TRUNK HIGHWAY

RIGHT-OF-WAY

CENTER LINE

MW-4

MW-18

PMW-18

NOTES:
1. BASE MAP SURVEY COMPLETED BY CEC WITH ADDITIONAL INFORMATION OBTAINED FROM USDA-ASCS HISTORICAL AERIAL PHOTOGRAPHS. A 7/7/95 SITE VISIT WITH C M CHRISTIANSEN CO., AND A 5/21/98 FIELD INSPECTION. HAND AUGER BORINGS AND SURFACE SOIL SAMPLES OUTSIDE AREAS OF ESTIMATED EXCAVATION NOT SHOWN.
2. WETLAND AREA APPROXIMATELY INTERPRETED FROM WISCONSIN WETLAND INVENTORY MAP AND IS NOT FIELD VERIFIED.
3. CAPPING AREAS ARE APPROXIMATE AND WILL BE CONFIRMED DURING REMEDIATION ACTIVITIES.
4. CONSTRUCTION GRID SURVEY POINTS WITH ORIGIN AT SW 1/16 SECTION CORNER, IRON PIPE LOCATION BASED ON EAGLE LANDMARK SURVEY.

SOURCE NOTES:
THIS MAP WAS MODIFIED FROM DRAWING BY COLEMAN ENGINEERING COMPANY (CEC), IRON MOUNTAIN, MICHIGAN, DATED FEBRUARY 1997, JOB NO. 95042 A7, AND A SURVEY BY EAGLE LANDMARK SURVEYING, INC., EAGLE RIVER, WISCONSIN, DWG. NO. E1292, DATED 1-08-98, REVISED ON 5-13-98.

⊕ Waste Characterization TCLP Sample Location 9/2/99 SLF

Natural Resource Technology
N R T

# REMEDIAL CONSTRUCTION PLAN

DESIGN REPORT ADDENDUM
C.M. CHRISTIANSEN COMPANY, INC.
FORMER POLE TREATMENT FACILITY, PHELPS, WISCONSIN

| DRAWN BY: TAS | CHECKED BY: SLF | APPROVED BY: LJP |
|---|---|---|
| DATE: 05/20/99 | DATE: 05/20/99 | DATE: 05/20/99 |

PROJECT NO. 1226/4.1

DRAWING NO. 1226-D01

PLATE 1

TestAmerica
INCORPORATED

# ANALYTICAL REPORT

Mr. Spiro Fafalios
NATURAL RESOURCE TECH, INC
23713 W. Paul Road
Pewaukee, WI 53072

08/31/1999
Job No: 99.06350
Sample No: 358573
Account No: 52450


JOB DESCRIPTION: #1226 CMC
PROJECT DESCRIPTION: Soil Analysis
SAMPLE DESCRIPTION: Overall Comp #1226 CMC
Rec'd 6 degrees C

Date/Time Taken: 07/22/1999 16:00 Date Received: 07/23/1999

| Parameter | Results | Units | MDL | LOQ | Method | Date Analyzed | Prep/Run Batch | |
|---|---|---|---|---|---|---|---|---|
| Chloride, Parr bomb | <0.10 | % | 0.10 | 0.10 | EPA 325.3 | 08/31/1999 | | 299 |
| Cyanide, Reactive | <0.20 | mg/kg | 0.20 | 0.20 | SW Ch7 | 08/16/1999 | | 280 |
| Flash Point Nonaqueous | >200 | F | n/a | n/a | SW 1010 | 08/13/1999 | | 391 |
| Paint Filter Test | ND | | n/a | n/a | SW 9095 | 08/13/1999 | | 340 |
| pH, Non aqueous | 7.2 | units | n/a | n/a | SW 9040 | 08/16/1999 | | 1869 |
| Solids, Total | 81.9 | % | n/a | n/a | SW 5030 | 08/23/1999 | | 2910 |
| Specific Gravity | 1.6 | | n/a | n/a | EPA 160.4 | 08/16/1999 | | 177 |
| Sulfide, Reactive | <5.0 | mg/kg | 5.0 | 5.0 | SW Ch7 | 08/19/1999 | | 288 |
| TCLP ZHE VOLATILE PREP | COMPLETE | | | | SW 1311 | 08/05/1999 | 310 | |
| TCLP-Arsenic, ICP | <0.080 | mg/L | 0.080 | 0.080 | SW 6010B | 08/11/1999 | | 489 |
| TCLP-Barium, ICP | 0.33 | mg/L | 0.10 | 0.10 | SW 6010B | 08/11/1999 | | 565 |
| TCLP-Cadmium, ICP | <0.020 | mg/L | 0.020 | 0.020 | SW 6010B | 08/11/1999 | | 462 |
| TCLP-Chromium, ICP | <0.020 | mg/L | 0.020 | 0.020 | SW 6010B | 08/11/1999 | | 461 |
| TCLP-Copper, ICP | <0.10 | mg/L | 0.10 | 0.10 | SW 6010B | 08/11/1999 | | 366 |
| TCLP-Lead, ICP | 0.14 | mg/L | 0.10 | 0.10 | SW 6010B | 08/11/1999 | | 478 |
| TCLP-Mercury, CVAA | <0.0020 | mg/L | 0.0020 | 0.0020 | SW 7470 | 08/09/1999 | 784 | 664 |
| TCLP-Nickel, ICP | <0.050 | mg/L | 0.050 | 0.050 | SW 6010B | 08/11/1999 | | 361 |
| TCLP-Selenium, ICP | <0.15 | mg/L | 0.15 | 0.15 | SW 6010B | 08/11/1999 | | 490 |
| TCLP-Silver, ICP | <0.020 | mg/L | 0.020 | 0.020 | SW 6010B | 08/11/1999 | | 439 |
| TCLP-Zinc, ICP | 0.26 | mg/L | 0.10 | 0.10 | SW 6010B | 08/11/1999 | | 364 |
| Prep, TCLP - 1311 | complete | | | | SW 1311 | 08/10/1999 | 784 | |
| Prep, PCB - NONAQUEOUS | Complete | | | | | 08/11/1999 | 310 | |
| PCB'S - 8082 NONAQUEOUS | | | | | | | | |
| PCB-1016 | <0.50 | mg/kg | 0.50 | 0.50 | SW 8082 | 08/05/1999 | 310 | 509 |
| PCB-1221 | <0.50 | mg/kg | 0.50 | 0.50 | SW 8082 | 08/05/1999 | 310 | 509 |
| PCB-1232 | <0.50 | mg/kg | 0.50 | 0.50 | SW 8082 | 08/05/1999 | 310 | 509 |
| PCB-1242 | <0.50 | mg/kg | 0.50 | 0.50 | SW 8082 | 08/05/1999 | 310 | 509 |
| PCB-1248 | <0.50 | mg/kg | 0.50 | 0.50 | SW 8082 | 08/05/1999 | 310 | 509 |
| PCB-1254 | <0.50 | mg/kg | 0.50 | 0.50 | SW 8082 | 08/05/1999 | 310 | 509 |
| PCB-1260 | <0.50 | mg/kg | 0.50 | 0.50 | SW 8082 | 08/05/1999 | 310 | 509 |
| Surr: TCMX | 67.0 | % | | n/a | SW 8082 | 08/05/1999 | 310 | 509 |
| Surr: DCB | 95.0 | % | | n/a | SW 8082 | 08/05/1999 | 310 | 509 |
| TCLP-ACID COMPOUNDS - 8270 | | | | | | | | |
| TCLP-Cresols, Total | <0.10 | mg/L | 0.10 | 0.10 | SW 8270C | 08/17/1999 | | 507 |
| TCLP-2-Methylphenol (o-Cresol) | <0.10 | mg/L | 0.10 | 0.10 | SW 8270C | 08/17/1999 | | 507 |
| TCLP-4-Methylphenol (p-Cresol) | <0.10 | mg/L | 0.10 | 0.10 | SW 8270C | 08/17/1999 | | 507 |
| TCLP-Pentachlorophenol | <0.50 | mg/L | 0.50 | 0.50 | SW 8270C | 08/17/1999 | | 507 |

TestAmerica
INCORPORATED

# ANALYTICAL REPORT

Mr. Spiro Fafalios
NATURAL RESOURCE TECH, INC
23713 W. Paul Road
Pewaukee, WI 53072

08/31/1999
Job No: 99.06350
Sample No: 358573
Account No: 52450


JOB DESCRIPTION: #1226 CMC
PROJECT DESCRIPTION: Soil Analysis
SAMPLE DESCRIPTION: Overall Comp #1226 CMC
Rec'd 6 degrees C

Date/Time Taken: 07/22/1999 16:00 Date Received: 07/23/1999

| Parameter | Results | Units | MDL | LOQ | Method | Date Analyzed | Prep/Run Batch |
|---|---|---|---|---|---|---|---|
| TCLP-ACID COMPOUNDS - 8270 | | | | | | | |
| TCLP-Phenol | <10 | mg/L | 10 | 10 | SW 8270C | 08/17/1999 | 507 |
| TCLP-2,4,5-Trichlorophenol | <0.50 | mg/L | 0.50 | 0.50 | SW 8270C | 08/17/1999 | 507 |
| TCLP-2,4,6-Trichlorophenol | <0.10 | mg/L | 0.10 | 0.10 | SW 8270C | 08/17/1999 | 507 |
| Surr: Phenol-d6 | 44.5 | % | n/a | n/a | SW 8270C | 08/17/1999 | 507 |
| Surr: 2-Fluorophenol | 66.5 | % | n/a | n/a | SW 8270C | 08/17/1999 | 507 |
| Surr: Tribromophenol | 109.0 | % | n/a | n/a | SW 8270C | 08/17/1999 | 507 |
| TCLP-VOLATILES-8260 | | | | | | | |
| TCLP-Benzene | <0.020 | mg/L | 0.020 | 0.020 | SW 8260B | 08/24/1999 | 310 170 |
| TCLP-Carbon Tetrachloride | <0.020 | mg/L | 0.020 | 0.020 | SW 8260B | 08/24/1999 | 310 170 |
| TCLP-Chlorobenzene | <0.020 | mg/L | 0.020 | 0.020 | SW 8260B | 08/24/1999 | 310 170 |
| TCLP-Chloroform | <0.020 | mg/L | 0.020 | 0.020 | SW 8260B | 08/24/1999 | 310 170 |
| TCLP-1,4-Dichlorobenzene | <0.020 | mg/L | 0.020 | 0.020 | SW 8260B | 08/24/1999 | 310 170 |
| TCLP-1,2-Dichloroethane | <0.020 | mg/L | 0.020 | 0.020 | SW 8260B | 08/24/1999 | 310 170 |
| TCLP-1,1-Dichloroethene | <0.020 | mg/L | 0.020 | 0.020 | SW 8260B | 08/24/1999 | 310 170 |
| TCLP-Methyl Ethyl Ketone | <0.20 | mg/L | 0.20 | 0.20 | SW 8260B | 08/24/1999 | 310 170 |
| TCLP-Tetrachloroethene | <0.020 | mg/L | 0.020 | 0.020 | SW 8260B | 08/24/1999 | 310 170 |
| TCLP-Trichloroethene | <0.020 | mg/L | 0.020 | 0.020 | SW 8260B | 08/24/1999 | 310 170 |
| TCLP-Vinyl Chloride | <0.20 | mg/L | 0.20 | 0.20 | SW 8260B | 08/24/1999 | 310 170 |
| Surr: Dibromofluoromethane | 95.0 | % | n/a | n/a | SW 8260B | 08/24/1999 | 310 170 |
| Surr: Toluene-d8 | 103.0 | % | n/a | n/a | SW 8260B | 08/24/1999 | 310 170 |
| Surr: Bromofluorobenzene | 105.0 | % | n/a | n/a | SW 8260B | 08/24/1999 | 310 170 |
| TCLP BASE NEUTRAL COMPOUNDS | | | | | | | |
| TCLP-Hexachloroethane | <0.10 | mg/L | 0.10 | 0.10 | SW 8270C | 08/17/1999 | 461 |
| TCLP-Nitrobenzene | <0.10 | mg/L | 0.10 | 0.10 | SW 8270C | 08/17/1999 | 461 |
| TCLP-Hexachlorobutadiene | <0.10 | mg/L | 0.10 | 0.10 | SW 8270C | 08/17/1999 | 461 |
| TCLP-2,4-Dinitrotoluene | <0.10 | mg/L | 0.10 | 0.10 | SW 8270C | 08/17/1999 | 461 |
| TCLP-Hexachlorobenzene | <0.10 | mg/L | 0.10 | 0.10 | SW 8270C | 08/17/1999 | 461 |
| TCLP-Pyridine | <0.10 | mg/L | 0.10 | 0.10 | SW 8270C | 08/17/1999 | 461 |
| Surr: Nitrobenzene-d5 | 93.7 | % | n/a | n/a | SW 8270C | 08/17/1999 | 461 |
| Surr: 2-Fluorobiphenyl | 83.9 | % | n/a | n/a | SW 8270C | 08/17/1999 | 461 |
| Surr: Terphenyl-d14 | 102.0 | % | n/a | n/a | SW 8270C | 08/17/1999 | 461 |

TestAmerica
INCORPORATED

# QUALITY CONTROL REPORT

## BLANKS

08/31/1999

Mr. Spiro Fafalios
NATURAL RESOURCE TECH, INC
23713 W. Paul Road
Pewaukee, WI 53072

Job No: 99.06350
Account No: 52450



Job Description: #1226 CMC

| Parameter | Prep Batch | Run Batch | Blank Result | MDL | LOQ | Units |
|---|---|---|---|---|---|---|
| TCLP-ACID COMPOUNDS - 8270 | | | | | | |
| TCLP-Cresols, Total | | 507 | <0.10 | 0.10 | 0.10 | mg/L |
| TCLP-Pentachlorophenol | | 507 | <0.50 | 0.50 | 0.50 | mg/L |
| TCLP-2,4,5-Trichlorophenol | | 507 | <0.50 | 0.50 | 0.50 | mg/L |
| TCLP-2,4,6-Trichlorophenol | | 507 | <0.10 | 0.10 | 0.10 | mg/L |
| Surr: Phenol-d6 | | 507 | 35.6 | n/a | n/a | % |
| Surr: 2-Fluorophenol | | 507 | 48.8 | n/a | n/a | % |
| Surr: Tribromophenol | | 507 | 73.6 | n/a | n/a | % |

Method blank results exceed control limits when results are higher than the highest of any of the following: 1 - The limit of detection; 2 - Five percent of the regulatory limit for that analyte; 3 - Five percent of the measured concentration in the sample. NR149.14 (3)d

TestAmerica
INCORPORATED

# QUALITY CONTROL REPORT

## BLANKS

08/31/1999

Mr. Spiro Fafalios
NATURAL RESOURCE TECH, INC
23713 W. Paul Road
Pewaukee, WI 53072

Job No: 99.06350
Account No: 52450



Job Description: #1226 CMC

| Parameter | Prep Batch | Run Batch | Blank Result | MDL | LOQ | Units |
|---|---|---|---|---|---|---|
| TCLP-VOLATILES-8260 | | | | | | |
| TCLP-Benzene | 310 | 168 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-Carbon Tetrachloride | 310 | 168 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-Chlorobenzene | 310 | 168 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-Chloroform | 310 | 168 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-1,2-Dichloroethane | 310 | 168 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-1,1-Dichloroethene | 310 | 168 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-Methyl Ethyl Ketone | 310 | 168 | <0.20 | 0.20 | 0.20 | mg/L |
| TCLP-Tetrachloroethene | 310 | 168 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-Trichloroethene | 310 | 168 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-Vinyl Chloride | 310 | 168 | <0.20 | 0.20 | 0.20 | mg/L |
| Surr: Dibromofluoromethane | 310 | 168 | 110.0 | n/a | n/a | % |
| Surr: Toluene-d8 | 310 | 168 | 100.0 | n/a | n/a | % |
| Surr: Bromofluorobenzene | 310 | 168 | 100.0 | n/a | n/a | % |

Method blank results exceed control limits when results are higher than the highest of any of the following: 1 - The limit of detection; 2 - Five percent of the regulatory limit for that analyte; 3 - Five percent of the measured concentration in the sample. NR149.14 (3)d

TestAmerica
INCORPORATED

# QUALITY CONTROL REPORT

## BLANKS

08/31/1999

Mr. Spiro Fafalios
NATURAL RESOURCE TECH, INC
23713 W. Paul Road
Pewaukee, WI 53072

Job No: 99.06350
Account No: 52450



Job Description: #1226 CMC

| Parameter | Prep Batch | Run Batch | Blank Result | MDL | LOQ | Units |
|---|---|---|---|---|---|---|
| TCLP-VOLATILES-8260 | | | | | | |
| TCLP-Benzene | | 170 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-Carbon Tetrachloride | | 170 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-Chlorobenzene | | 170 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-Chloroform | | 170 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-1,2-Dichloroethane | | 170 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-1,1-Dichloroethene | | 170 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-Methyl Ethyl Ketone | | 170 | <0.20 | 0.20 | 0.20 | mg/L |
| TCLP-Tetrachloroethene | | 170 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-Trichloroethene | | 170 | <0.020 | 0.020 | 0.020 | mg/L |
| TCLP-Vinyl Chloride | | 170 | <0.20 | 0.20 | 0.20 | mg/L |
| Surr: Dibromofluoromethane | | 170 | 90.5 | n/a | n/a | % |
| Surr: Toluene-d8 | | 170 | 102.0 | n/a | n/a | % |
| Surr: Bromofluorobenzene | | 170 | 102.0 | n/a | n/a | % |

Method blank results exceed control limits when results are higher than the highest of any of the following: 1 - The limit of detection; 2 - Five percent of the regulatory limit for that analyte; 3 - Five percent of the measured concentration in the sample. NR149.14 (3)d

TestAmerica
INCORPORATED

# QUALITY CONTROL REPORT
## BLANKS

08/31/1999

Mr. Spiro Fafalios
NATURAL RESOURCE TECH, INC
23713 W. Paul Road
Pewaukee, WI 53072

Job No: 99.06350
Account No: 52450



Job Description: #1226 CMC

| Parameter | Prep Batch | Run Batch | Blank Result | MDL | LOQ | Units |
|---|---|---|---|---|---|---|
| TCLP BASE NEUTRAL COMPOUNDS | | | | | | |
| TCLP-Hexachloroethane | | 461 | <0.10 | 0.10 | 0.10 | mg/L |
| TCLP-Nitrobenzene | | 461 | <0.10 | 0.10 | 0.10 | mg/L |
| TCLP-Hexachlorobutadiene | | 461 | <0.10 | 0.10 | 0.10 | mg/L |
| TCLP-2,4-Dinitrotoluene | | 461 | <0.10 | 0.10 | 0.10 | mg/L |
| TCLP-Hexachlorobenzene | | 461 | <0.10 | 0.10 | 0.10 | mg/L |
| TCLP-Pyridine | | 461 | <0.10 | 0.10 | 0.10 | mg/L |
| Surr: Nitrobenzene-d5 | | 461 | 89.1 | n/a | n/a | % |
| Surr: 2-Fluorobiphenyl | | 461 | 78.9 | n/a | n/a | % |
| Surr: Terphenyl-d14 | | 461 | 91.1 | n/a | n/a | % |

Method blank results exceed control limits when results are higher than the highest of any of the following: 1 - The limit of detection; 2 - Five percent of the regulatory limit for that analyte; 3 - Five percent of the measured concentration in the sample. NR149.14 (3)d

# PHONE CONVERSATION RECORD

**DATE:** 9/8/99
**TIME:** 1525 hrs.

**CONVERSED WITH:** Laurie Parsons
Natural Resource Technology
414/523-9000

**SUBJECT/PROJECT:** C.M. Christiansen

**UNIQUE ID#.:** 02-64-000068

Parsons returned my call. I asked for clarification on dates for remediation start.

Parsons said they selected a contractor today, and site clearing will begin on 9/13, and excavation should start the week of 9/20, and it may extend into in the following week. Parsons said the first area to be excavated will be the wetland area (2A & 2B).

I said that I would likely visit the site during excavation. Parsons asked that I call Eric Christiansen (715/645-2333) beforehand to let him know; Parsons also asked that I call her or Spiros Fatlios I said that I would. Parsons said Dan Povnick from NRT will be on-site.

Parsons also said they will be sending me this week the bids specs with the final changes, plus recent groundwater results.

Signature: Christopher A Lajoie
(please write legibly)

# Natural Resource Technology, Inc.

# TRANSMITTAL



**To:** Northern Region
Wisc. Department of Natural Resources
Highway 2, PO Box 125
Brule, WI 54820

**Date:** September 10, 1999
**Project No:** 1226
**From:** Spiro Fafalios
Laurie Parsons

**Attn:** Mr. Chris Saari

**Re:** CMC Co, Inc. Site

☒ For Your Files ☐ As Requested ☐ For Review ☐ Approve and Return

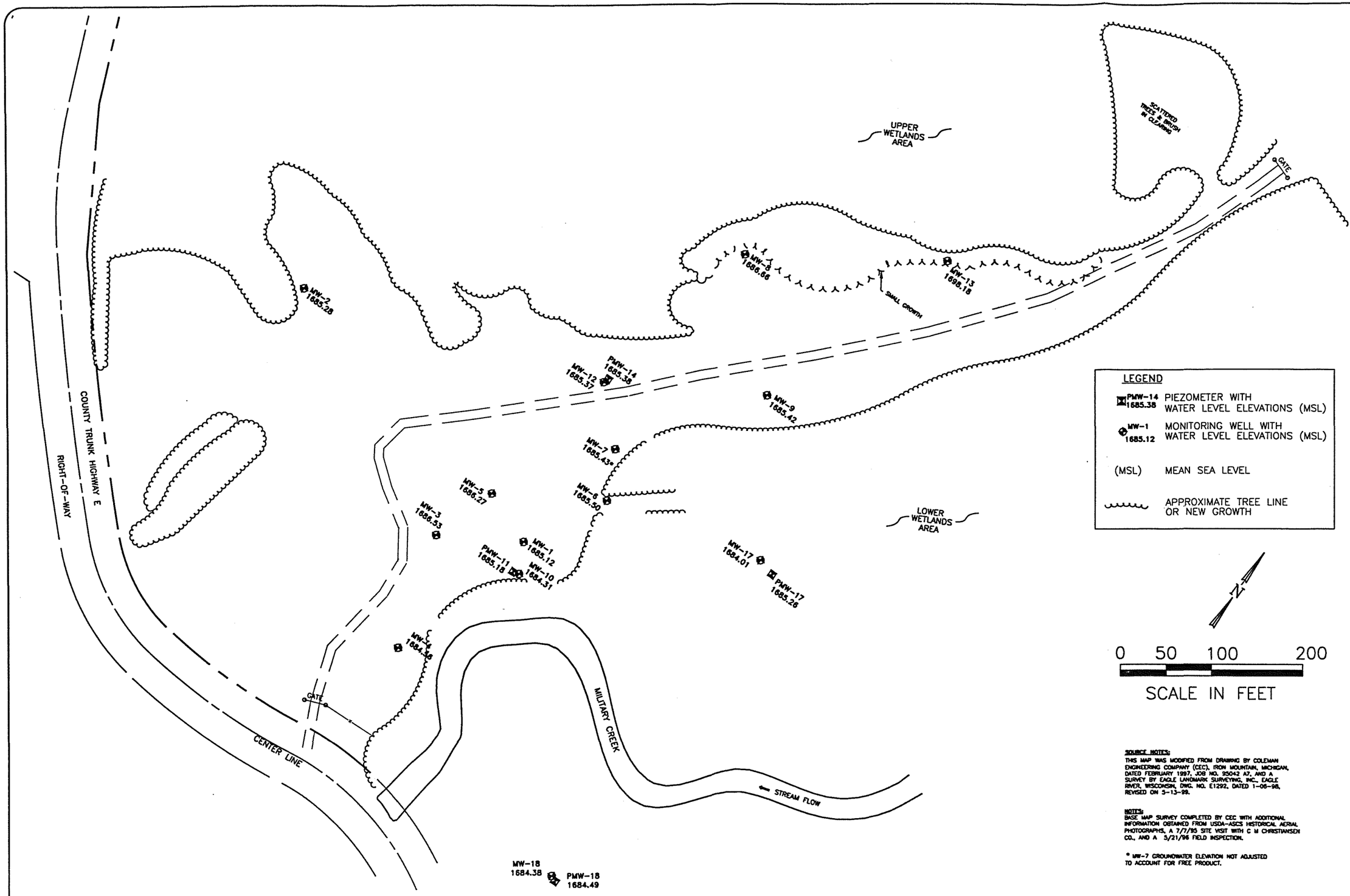
| Copies: | Description |
|---|---|
| 1 | Figure 1- Water Table Elevations May 99 |
| 1 | Figure 2 - PCP Concentrations in Groundwater, May 99 |
| 1 | PMW-17 Well Development Form |
| 1 | Table 2 - Groundwater Analytical Data Summary |
| 1 | NLS Field Report, May 1999 Baseline Groundwater Sampling |
| 1 | EnChem Laboratory Analytical Report, May 1999 Baseline Groundwater Sampling |

**Comments:**

Enclosed are results of baseline groundwater sampling from May 1999 at the C.M. Christiansen Co., Inc. property in Phelps, Wisconsin, including a field report, laboratory report and summary table. Northern Lake Service (NLS) conducted groundwater monitoring activities and EnChem performed groundwater analyses. A revised groundwater table elevation map and PCP concentrations map are also included for your information. Due to results of groundwater sampling at the MW-18/PMW-18 nest, installation of PMW-15 is no longer planned. PMW-17 was developed prior to sampling as groundwater froze within the well immediately after installation in March (development form attached). Post-remediation groundwater sampling will be conducted in accordance with the Design Report and Plan of Operations (June 1998) and subsequent addendum (October 1998).

cc: Eric Christiansen, CMC Co., Inc.

23713 W. Paul Road, Pewaukee, WI 53072 ■ Phone 414/523-9000 ■ Fax 414/523-9001




LEGEND

- PMW-14 1685.38 — PIEZOMETER WITH WATER LEVEL ELEVATIONS (MSL)
- MW-1 1685.12 — MONITORING WELL WITH WATER LEVEL ELEVATIONS (MSL)
- (MSL) — MEAN SEA LEVEL
- APPROXIMATE TREE LINE OR NEW GROWTH

N

0 50 100 200

SCALE IN FEET

SOURCE NOTES:
THIS MAP WAS MODIFIED FROM DRAWING BY COLEMAN ENGINEERING COMPANY (CEC), IRON MOUNTAIN, MICHIGAN, DATED FEBRUARY 1997, JOB NO. 95043 A7, AND A SURVEY BY EAGLE LANDMARK SURVEYING, INC., EAGLE RIVER, WISCONSIN, DWG. NO. E1292, DATED 1-06-98, REVISED ON 5-13-99.

NOTES:
BASE MAP SURVEY COMPLETED BY CEC WITH ADDITIONAL INFORMATION OBTAINED FROM USDA-ASCS HISTORICAL AERIAL PHOTOGRAPHS, A 7/7/95 SITE VISIT WITH C M CHRISTIANSEN CO., AND A 5/21/96 FIELD INSPECTION.

* MW-7 GROUNDWATER ELEVATION NOT ADJUSTED TO ACCOUNT FOR FREE PRODUCT.

# WATER TABLE ELEVATIONS MAY 24-25, 1999

C.M. CHRISTIANSEN COMPANY, INC.
FORMER POLE TREATMENT FACILITY
PHELPS, WISCONSIN

| | | |
|---|---|---|
| DRAWN BY: TAS | DATE: 07/08/99 | |
| CHECKED BY: SLF | DATE: 07/08/99 | |
| APPROVED BY: LJP | DATE: 07/08/99 | |
| AUTOCAD FILE: 1226-B10.DWG | | |

Natural Resource Technology

PROJECT NO. 1226-DC-5.1

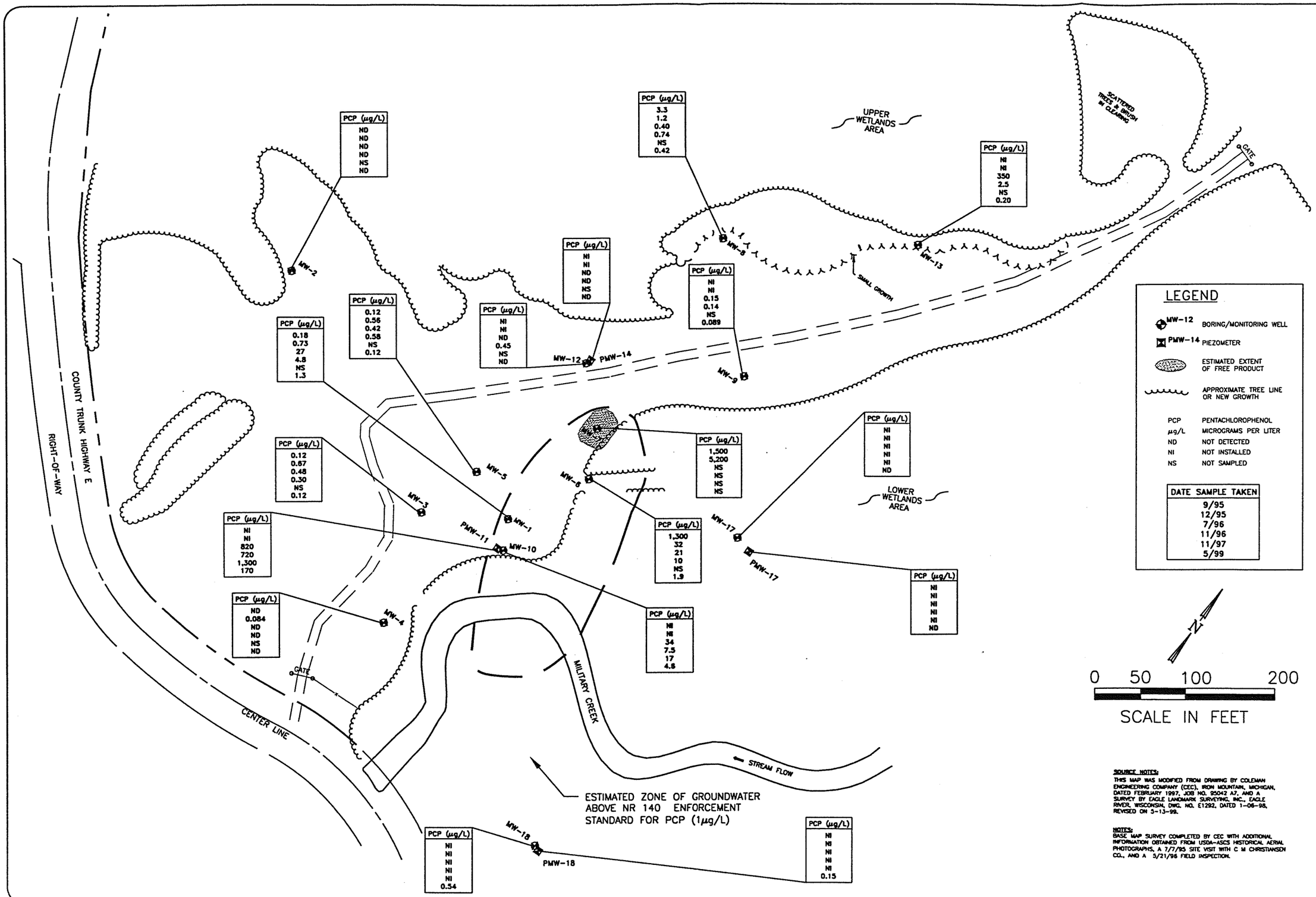
DRAWING NO. 1226-B10

FIGURE NO. 1

# PCP CONCENTRATIONS IN GROUNDWATER

C.M. CHRISTIANSEN COMPANY, INC.
FORMER POLE TREATMENT FACILITY
PHELPS, WISCONSIN

| | | |
|---|---|---|
| DRAWN BY: TAS | DATE: 07/08/99 | |
| CHECKED BY: SLF | DATE: 07/08/99 | |
| APPROVED BY: LJP | DATE: 07/08/99 | |
| AUTOCAD FILE: 1226-B11.DWG | | |




## LEGEND

- MW-12 — BORING/MONITORING WELL
- PMW-14 — PIEZOMETER
- ESTIMATED EXTENT OF FREE PRODUCT
- APPROXIMATE TREE LINE OR NEW GROWTH

| | |
|---|---|
| PCP | PENTACHLOROPHENOL |
| µg/L | MICROGRAMS PER LITER |
| ND | NOT DETECTED |
| NI | NOT INSTALLED |
| NS | NOT SAMPLED |

| DATE SAMPLE TAKEN |
|---|
| 9/95 |
| 12/95 |
| 7/96 |
| 11/96 |
| 11/97 |
| 5/99 |

N

0 50 100 200

SCALE IN FEET

SOURCE NOTES:
THIS MAP WAS MODIFIED FROM DRAWING BY COLEMAN ENGINEERING COMPANY (CEC), IRON MOUNTAIN, MICHIGAN, DATED FEBRUARY 1997, JOB NO. 95042 A7, AND A SURVEY BY EAGLE LANDMARK SURVEYING, INC., EAGLE RIVER, WISCONSIN, DWG. NO. E1292, DATED 1-08-98, REVISED ON 3-13-98.

NOTES:
BASE MAP SURVEY COMPLETED BY CEC WITH ADDITIONAL INFORMATION OBTAINED FROM USDA-ASCS HISTORICAL AERIAL PHOTOGRAPHS, A 7/7/95 SITE VISIT WITH C M CHRISTIANSEN CO., AND A 5/21/98 FIELD INSPECTION.

Natural Resource Technology

PROJECT NO. 1226-DC-5.1

DRAWING NO. 1226-B11

FIGURE NO. 2

State of Wisconsin
Department of Natural Resources

# MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

Route to: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐ _____

| Facility/Project Name | County Name | Well Name |
|---|---|---|
| CM CHRISTIANSEN | VILAS | PMW-17 |
| **Facility License, Permit or Monitoring Number** | **County Code** | **Wis. Unique Well Number** | **DNR Well ID Number** |
| | 64 | _____ | _____ |

1. Can this well be purged dry? ☐ Yes ■ No

2. Well development method

| | |
|---|---|
| surged with bailer and bailed | ☐ 41 |
| surged with bailer and pumped | ■ 61 |
| surged with block and bailed | ☐ 42 |
| surged with block and pumped | ☐ 62 |
| surged with block, bailed and pumped | ☐ 70 |
| compressed air | ☐ 20 |
| bailed only | ☐ 10 |
| pumped only | ☐ 51 |
| pumped slowly | ☐ 50 |
| Other _____ | ☐ |

3. Time spent developing well 60 min.

4. Depth of well (from top of well casing) 367 ft.

5. Inside diameter of well 2.__ in.

6. Volume of water in filter pack and well casing 12.__ gal.

7. Volume of water removed from well 60.__ gal.

8. Volume of water added (if any) ____.__ gal.

9. Source of water added _____

10. Analysis performed on water added? ☐ Yes ☐ No
(If yes, attach results)

| | Before Development | After Development |
|---|---|---|
| 11. Depth to Water (from top of well casing) | a. 35.24 ft. | 35.24 ft. |
| Date | b. 05/24/1999 (m m d d y y y y) | 05/24/1999 |
| Time | c. __:__ ☐ a.m. ☐ p.m. | 17:40 ☐ a.m. ☐ p.m. |
| 12. Sediment in well bottom | ___.__ inches | ___.__ inches |
| 13. Water clarity | Clear ☐ 10 Turbid ■ 15 (Describe) silty | Clear ■ 20 Turbid ☐ 25 (Describe) clear |
| 14. Total suspended solids | _____.__ mg/l | _____.__ mg/l |
| 15. COD | _____.__ mg/l | _____.__ mg/l |

Fill in if drilling fluids were used and well is at solid waste facility:

16. Well developed by: Name (first, last) and Firm
First Name: Andy Last Name: Ostrowski
Firm: Northern Lake Service, Inc.

17. Additional comments on development:

Name and Address of Facility Contact/Owner/Responsible Party
First Name: Eric Last Name: Christiansen
Facility/Firm: CM Christiansen, Co.
Street: 1 Lake Street, PO Box 100
City/State/Zip: Phelps, WI 54554

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: Dan Plovnick
Print Name: Dan Plovnick
Firm: Natural Resource Technology

NOTE: See instructions for more information including a list of county codes and well type codes.

**Table 2 - Groundwater Analytical Summary**
*Soil Remedial Action Options Report*
*CM Christiansen Co., Inc. Former Pole Treatment Facility*
*Phelps, Wisconsin*

| | | | Volatile Organic Compounds (µg/L) | | | | | | | | | | | | | Polynuclear Aromatic Hydrocarbons (µg/L) | | | | | | | | | | | | Metals (µg/L) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | Date | Pentachlorophenol (µg/L) | Toluene | Ethylbenzene | Xylenes (total) | n-Propylbenzene | 1,3,5-Trimethylbenzene | 1,2,4-Trimethylbenzene | sec-Butylbenzene | n-Butylbenzene | 1,1,1-Trichloroethane | 1,2,4-Trichlorobenzene | Hexachlorobutadiene | Naphthalene | 1,2,3-Trichlorobenzene | Acenaphthene | Acenaphthylene | Dibenzo (a,h) anthracene | Flouranthene | Fluorene | 1-Methylnaphthalene | 2-Methylnaphthalene | Naphthalene | Phenanthrene | Pyrene | Total PAHs | Dioxin (2378-TCDD) (ng /L) | Arsenic | Barium | Cadmium | Copper | Chromium (total) | Lead | Selenium | Zinc |
| MW-1 | 9/14/95 | 0.18 | nd | nd | nd | nd | nd | 2.1 | nd | 1.4 | nd | nd | 1.1 | 14 | nd | nd | nd | nd | nd | nd | -- | -- | 19 J | nd | nd | 19 | -- | 3 | 95 | nd | nd | nd | nd | 2 | 20 |
| (dup.) | 9/14/95 | -- | nd | nd | nd | nd | nd | 1.6 | nd | 1.1 | nd | nd | nd | 13 | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 12/15/95 | 0.73 | nd | nd | nd | nd | nd | 2 | nd | 1 | nd | nd | nd | 8 | nd | nd | nd | nd | nd | nd | -- | -- | 9 | nd | nd | 9 | -- | 7 | 99 | nd | nd | 1 | nd | nd | 16 |
| | 7/24/96 | 27 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3 | nd | nd | nd | 4 | -- | -- | 32 | 0.6 | nd | 40 | -- | 6 | 110 | -- | 4 | nd | nd | -- | -- |
| | 11/18/96 | 4.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | 16 | nd | nd | 16 | -- | nd | 98 | -- | nd | nd | nd | -- | -- |
| | 5/25/99 | 1.3 | nd | 0.3 | 0.55 | -- | 1.6 | 7.2 | -- | -- | -- | -- | -- | -- | -- | 0.79 | 3.1 | nd | nd | 0.42 | 13 | 16 | 5.4 | 3 | nd | 41.7 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-2 | 9/14/95 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | nd | nd | 2 | 2 | nd | nd |
| | 12/14/95 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | 1 | 41 | nd | nd | 2 | nd | 2 | nd |
| | 7/24/96 | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | 1 | nd | -- | 1 | 2 | nd | -- | -- |
| | 11/18/96 | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | -- | nd | nd | nd | -- | -- |
| | 5/25/99 | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-3 | 9/14/95 | 0.12 | nd | nd | nd | nd | nd | nd | nd | nd | 1.0 | nd | nd | 2.3 | nd | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | 0.2 | nd | nd | nd | nd | 10 |
| | 12/14/95 | 0.67 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | 2 | 18 | nd | nd | 1 | nd | nd | nd |
| | 7/24/96 | 0.48 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | -- | 3 | nd | nd | -- | -- |
| | 11/18/96 | 0.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | -- | 1 | nd | nd | -- | -- |
| | 5/24/99 | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-4 | 9/14/95 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | 690 | nd | nd | 3 | 3 | nd | 10 |
| | 12/15/95 | 0.084 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | 5 | 770 | nd | nd | 1 | nd | nd | 22 |
| | 7/24/96 | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | 2 | 710 | -- | 1 | 1 | nd | -- | -- |
| | 11/18/96 | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | 710 | -- | 4 | nd | nd | -- | -- |
| | 5/24/99 | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-5 | 9/14/95 | 0.12 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | 2.1 | nd | nd | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | nd | 1 | nd | nd | nd | nd |
| | 12/15/95 | 0.56 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | 16 | nd | nd | 1 | nd | nd | 10 |
| | 7/24/96 | 0.42 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | 1 | nd | -- | 2 | 2 | nd | -- | -- |
| | 11/18/96 | 0.58 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | -- | 1 | nd | nd | -- | -- |
| (dup.) | 11/18/96 | 0.28 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | -- | 2 | nd | nd | -- | -- |
| | 5/24/99 | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-6 | 9/14/95 | 1,300 | nd | nd | 1.2 | nd | 1.3 | 3.5 | nd | 2.6 | nd | nd | nd | 13 | nd | nd | nd | nd | nd | nd | -- | -- | 13 J | nd | nd | 13 | -- | nd | nd | nd | 2 | nd | nd | nd | nd |
| (dup.) | 9/14/95 | -- | nd | nd | 0.8 | nd | 0.9 | 2.7 | nd | 1.9 | nd | nd | nd | 12 | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 12/15/95 | 32 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | 16 | nd | 2 | nd | nd | nd | 12 |
| | 7/25/96 | 21 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | 1 | nd | -- | 8 | nd | nd | -- | -- |
| (dup.) | 7/25/96 | 16 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | -- | 9 | 4 | nd | -- | -- |
| | 11/19/96 | 10.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | -- | 5 | nd | nd | -- | -- |
| | 5/25/99 | 1.9 | nd | nd | nd | -- | nd | nd | -- | -- | -- | -- | -- | -- | -- | nd | nd | 0.039 | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| (dup.) | 5/25/99 | 1.9 | nd | nd | nd | -- | nd | nd | -- | -- | -- | -- | -- | -- | -- | nd | nd | 0.033 | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-7 | 9/14/95 | 960 | 1.2 | nd | 2.2 | nd | 1.6 | 4.9 | nd | 4.3 | 2.8 | 1.5 | 1.2 | 16 | 1.8 | 7 J | nd | nd | nd | 12 J | -- | -- | nd | 21 | 3 | 40 | nd E | nd | nd | nd | nd | nd | 3 | nd | nd |
| (dup.) | 9/14/95 | 1,500 | nd | nd | 2.0 | nd | 1.5 | 4.9 | nd | 4.1 | nd | nd | nd | 16 | 1.3 | 9 J | nd | nd | 2 | 16 J | -- | -- | nd | 31 | 4 | 62 | nd E | nd | nd | 0.2 | 1 | nd | nd | nd | nd |
| | 12/15/95 | 5,200 | 2 | nd | 13 | 1 | 4 | 16 | 1 | 7 | nd | nd | nd | 36 | nd | 16 | nd | nd | nd | 28 | -- | -- | nd | 45 | nd | 89 | -- | 2 | 37 | 0.1 | nd | nd | nd | nd | 29 |
| (dup.) | 12/15/95 | -- | nd | nd | 11 | 1 | 6 | 11 | nd | 7 | nd | nd | nd | 22 | nd | nd | nd | nd | nd | 29 | -- | -- | nd | 52 | nd | 81 | -- | 1 | 34 | nd | nd | nd | nd | nd | 10 |

*Table 2, continued - Groundwater Analytical Summary*
CM Christiansen Co., Inc. - Phelps, WI

| Sample ID | Date | Pentachlorophenol (µg/L) | Volatile Organic Compounds (µg/L) | | | | | | | | | | | | | Polynuclear Aromatic Hydrocarbons (µg/L) | | | | | | | | | | | Dioxin (2378-TCDD) (ng /L) | Metals (µg/L) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Toluene | Ethylbenzene | Xylenes (total) | n-Propylbenzene | 1,3,5-Trimethylbenzene | 1,2,4-Trimethylbenzene | sec-Butylbenzene | n-Butylbenzene | 1,1,1-Trichloroethane | 1,2,4-Trichlorobenzene | Hexachlorobutadiene | Naphthalene | 1,2,3-Trichlorobenzene | Acenaphthene | Acenaphthylene | Dibenzo (a,h) anthracene | Flouranthene | Fluorene | 1-Methylnaphthalene | 2-Methylnaphthalene | Naphthalene | Phenanthrene | Pyrene | Total PAHs | | Arsenic | Barium | Cadmium | Copper | Chromium (total) | Lead | Selenium | Zinc |
| MW-8 | 9/14/95 | 2.5 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | 2 | nd | nd | 4 | 2 | 2 | nd | nd |
| (dup.) | 9/14/95 | 3.3 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | nd | 3 | 2 | 2 | nd | 20 |
| | 12/15/95 | 1.2 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | 3 | 28 | nd | nd | 2 | nd | nd | 45 |
| | 7/25/96 | 0.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | 1 | nd | -- | 2 | 2 | nd | -- | -- |
| | 11/19/96 | 0.74 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | -- | nd | nd | nd | -- | -- |
| | 5/25/99 | 0.42 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-9 | 7/24/96 | 0.15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | 2 | nd | -- | 2 | nd | nd | -- | -- |
| | 11/18/96 | 0.14 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | -- | 5 | nd | nd | -- | -- |
| | 5/24/99 | 0.089 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-10 | 7/25/96 | 34 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | 22 | nd | nd | 22 | -- | nd | 170 | -- | nd | 3 | nd | -- | -- |
| | 11/18/96 | 7.5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | 29 | nd | nd | 29 | -- | nd | 170 | -- | 1 | nd | nd | -- | -- |
| | 11/6/97 | 17 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 5/25/99 | 4.6 | nd | nd | 0.64 | nd | nd | 3.4 | nd | nd | nd | nd | nd | 28 | nd | nd | 3.7 | nd | nd | nd | 14 | 8.3 | 14 | 1.5 | nd | 41.5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| PMW-11 | 7/25/96 | 820 | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | nd | nd | nd | 1 | -- | -- | 20 | nd | nd | 22 | -- | 3 | 71 | -- | nd | nd | nd | -- | -- |
| | 11/18/96 | 720 | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | 15 | nd | nd | 15 | -- | nd | 61 | -- | nd | nd | nd | -- | -- |
| | 11/6/97 | 1300 | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 5/25/99 | 170 | nd | nd | 2.2 | nd | nd | 4.1 | nd | 0.41 | nd | nd | nd | 14 | nd | nd | 26 | nd | nd | 0.26 | 12 | 4.3 | 1.8 | 3.7 | nd | 48.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-12 | 7/24/96 | nd | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | -- | 2 | nd | nd | -- | -- |
| | 11/18/96 | 0.45 | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | -- | nd | nd | nd | -- | -- |
| | 5/24/99 | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-13 | 7/25/96 | 350 | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 2 | nd | nd | nd | 2 | -- | -- | nd | 1 | nd | 5 | -- | 4 | 71 | -- | 1 | 2 | nd | -- | -- |
| | 11/19/96 | 2.5 | -- | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | 13 | nd | nd | 13 | -- | 6 | nd | -- | nd | nd | nd | -- | -- |
| | 5/25/99 | 0.2 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| PMW-14 | 7/24/96 | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | -- | 3 | nd | nd | -- | -- |
| | 11/18/96 | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | nd | nd | nd | nd | nd | -- | -- | nd | nd | nd | nd | -- | nd | nd | -- | nd | nd | nd | -- | -- |
| | 5/24/99 | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-17 | 5/25/99 | nd | nd | nd | nd | nd | nd | 0.46 | nd | nd | nd | nd | nd | 0.64 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| PMW17 | 5/24/99 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-18 | 5/25/99 | 0.54 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| PMW-18 | 5/25/99 | 0.15 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| *Wisconsin Groundwater Quality Standards* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NR 140 ES | | 1 | 343 | 700 | 620 | NS | 480* | 480* | NS | NS | 200 | 70 | NS | 40 | NS | NS | NS | NS | 400 | 400 | NS | NS | 40 | NS | 250 | NS | 0.03 | 50 | 2,000 | 5 | 1,300 | 100 | 15 | 50 | 5,000 |
| NR 140 PAL | | 0.1 | 68.6 | 140 | 124 | NS | 96* | 96* | NS | NS | 40 | 14 | NS | 8 | NS | NS | NS | NS | 80 | 80 | NS | NS | 8 | NS | 50 | NS | 0 | 5 | 400 | 0.5 | 130 | 10 | 1.5 | 10 | 2,500 |

**Notes:** 1. Only those parameters detected are identified in the above Table. Refer to laboratory reports for complete analyte list.
2. Some of the laboratory reports use GW instead of a MW designation for Sample ID. MW is also used instead of PMW in PMW-11.
3. Bold and shading denotes concentrations in exceedance of NR 140 enforcement standards.
4. Multiple duplicates were collected from many of the monitoring wells on September 14, 1995. Highest concentrations detected at each monitoring point on each date are noted on this table. In some instances, results from two or more duplicates are compiled in the same line. Some duplicates are included on this table as noted.
5. Methylene chloride, a common laboratory solvent, was detected at low concentrations in several samples collected during the May 1999 sampling event.

**Footnotes:**
nd = parameter not detected above laboratory method detection limit.
-- = parameter not analyzed.
NR 140 ES and PAL - Enforcement Standards and Preventive Action Limit, WAC NR 140.
NS = no standard exists for compound.
* = ES and PAL for total trimethylbenzenes.
µg/L = micrograms per liter or parts per billion.
ng/L = nanograms per liter or parts per trillion.
(dup.) = duplicate sample.
J = assumed to be an estimated concentration of tentatively identified compound
E = PCDPE interference, Total-TCDD concentrations of 0.270 E ng/L and 0.3800 E ng/L reported in MW-7. Totals include 2378-substitute isomers.

**NORTHERN LAKE SERVICE, INC.**
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Tel:(715)478-2777 Fax:(715)478-3060

WIS. LAB CERT. NO. 721026460

# ANALYTICAL REPORT



NLS PROJECT# 48191

NLS CUST# 84233

Client: Natural Resource Technology, Inc.
Attn: Spiros Fafalios
23713 W. Paul Road
Pewaukee, WI 53072

Project Description: Groundwater Sampling by NLS

---

**Sample ID: MW5** **NLS#: 202021**
COC Description: MW5
Collected: 05/24/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field static water level | 1686.27 | ft, NGVD | | | | 05/24/99 | 721026460 |

---

**Sample ID: MW4** **NLS#: 202022**
COC Description: MW4
Collected: 05/24/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field static water level | 1684.56 | ft, NGVD | | | | 05/24/99 | 721026460 |

---

**Sample ID: MW3** **NLS#: 202023**
COC Description: MW3
Collected: 05/24/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field static water level | 1686.53 | ft, NGVD | | | | 05/24/99 | 721026460 |

---

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Tel:(715)478-2777 Fax:(715)478-3060

WIS. LAB CERT. NO. 721026460

# ANALYTICAL REPORT

 NLS PROJECT# 48191

NLS CUST# 84233

Client: Natural Resource Technology, Inc.
Attn: Spiros Fafalios
23713 W. Paul Road
Pewaukee, WI 53072

Project Description: Groundwater Sampling by NLS

---

**Sample ID: PMW14** **NLS#: 202024**
COC Description: PMW14
Collected: 05/24/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field static water level | 1685.38 | ft, NGVD | | | | 05/24/99 | 721026460 |

---

**Sample ID: MW12** **NLS#: 202025**
COC Description: MW12
Collected: 05/24/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field static water level | 1685.37 | ft, NGVD | | | | 05/24/99 | 721026460 |

---

**Sample ID: MW9** **NLS#: 202026**
COC Description: MW9
Collected: 05/24/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field static water level | 1685.42 | ft, NGVD | | | | 05/24/99 | 721026460 |

---

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Tel:(715)478-2777 Fax:(715)478-3060

WIS. LAB CERT. NO. 721026460

# ANALYTICAL REPORT

 NLS PROJECT# 48191

NLS CUST# 84233

Client: Natural Resource Technology, Inc.
Attn: Spiros Fafalios
23713 W. Paul Road
Pewaukee, WI 53072

Project Description: Groundwater Sampling by NLS

---

**Sample ID: PMW17** **NLS#: 202027**
COC Description: PMW17
Collected: 05/24/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field static water level | 1685.26 | ft, NGVD | | | | 05/24/99 | 721026460 |

---

**Sample ID: MW2** **NLS#: 202028**
COC Description: MW2
Collected: 05/25/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field dis. oxygen | 8.9 | mg/L | | | | 05/25/99 | 721026460 |
| Field conductivity | 620 | umho@25C | | | EPA 120.1 | 05/25/99 | 721026460 |
| Field filtering | yes | | | | | 05/25/99 | 721026460 |
| Field pH | 6.5 | s.u. | | | SW846 9045 | 05/25/99 | 721026460 |
| Field eH | 82.20 | mv | | | | 05/25/99 | 721026460 |
| Field temperature | 7.1 | deg. C | | | | 05/25/99 | 721026460 |
| Field static water level | 1685.28 | ft, NGVD | | | | 05/25/99 | 721026460 |

---

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Tel:(715)478-2777 Fax:(715)478-3060

WIS. LAB CERT. NO. 721026460

# ANALYTICAL REPORT

 NLS PROJECT# 48191

NLS CUST# 84233

Client: Natural Resource Technology, Inc.
Attn: Spiros Fafalios
23713 W. Paul Road
Pewaukee, WI 53072

Project Description: Groundwater Sampling by NLS

---

**Sample ID: MW17** **NLS#: 202029**
COC Description: MW17
Collected: 05/25/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field static water level | 1684.01 | ft, NGVD | | | | 05/25/99 | 721026460 |

---

**Sample ID: MW13** **NLS#: 202030**
COC Description: MW13
Collected: 05/25/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field dis. oxygen | 0.10 | mg/L | | | | 05/25/99 | 721026460 |
| Field conductivity | 250 | umho@25C | | | EPA 120.1 | 05/25/99 | 721026460 |
| Field filtering | yes | | | | | 05/25/99 | 721026460 |
| Field pH | 5.8 | s.u. | | | SW846 9045 | 05/25/99 | 721026460 |
| Field eH | 7.60 | mv | | | | 05/25/99 | 721026460 |
| Field temperature | 6.8 | deg. C | | | | 05/25/99 | 721026460 |
| Field static water level | 1698.18 | ft, NGVD | | | | 05/25/99 | 721026460 |

---

**NORTHERN LAKE SERVICE, INC.**
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Tel:(715)478-2777 Fax:(715)478-3060

WIS. LAB CERT. NO. 721026460

# ANALYTICAL REPORT



NLS PROJECT# 48191

NLS CUST# 84233

Client: Natural Resource Technology, Inc.
Attn: Spiros Fafalios
23713 W. Paul Road
Pewaukee, WI 53072

Project Description: Groundwater Sampling by NLS

---

**Sample ID: MW8** **NLS#: 202031**
COC Description: MW8
Collected: 05/25/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field dis. oxygen | 0.20 | mg/L | | | | 05/25/99 | 721026460 |
| Field conductivity | 110 | umho@25C | | | EPA 120.1 | 05/25/99 | 721026460 |
| Field filtering | yes | | | | | 05/25/99 | 721026460 |
| Field pH | 5.2 | s.u. | | | SW846 9045 | 05/25/99 | 721026460 |
| Field eH | 32.20 | mv | | | | 05/25/99 | 721026460 |
| Field temperature | 8.0 | deg. C | | | | 05/25/99 | 721026460 |
| Field static water level | 1686.66 | ft, NGVD | | | | 05/25/99 | 721026460 |

---

**Sample ID: MW18** **NLS#: 202032**
COC Description: MW18
Collected: 05/25/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field static water level | 1684.38 | ft, NGVD | | | | 05/25/99 | 721026460 |

---

**NORTHERN LAKE SERVICE, INC.**
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Tel:(715)478-2777 Fax:(715)478-3060

WIS. LAB CERT. NO. 721026460

# ANALYTICAL REPORT

 NLS PROJECT# 48191
NLS CUST# 84233

Client: Natural Resource Technology, Inc.
Attn: Spiros Fafalios
23713 W. Paul Road
Pewaukee, WI 53072

Project Description: Groundwater Sampling by NLS

---

**Sample ID: PMW18** **NLS#: 202033**
COC Description: PMW18
Collected: 05/25/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field static water level | 1684.55 | ft, NGVD | | | | 05/25/99 | 721026460 |

---

**Sample ID: MW11** **NLS#: 202034**
COC Description: MW11
Collected: 05/25/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field dis. oxygen | 2.8 | mg/L | | | | 05/25/99 | 721026460 |
| Field conductivity | 370 | umho@25C | | | EPA 120.1 | 05/25/99 | 721026460 |
| Field filtering | yes | | | | | 05/25/99 | 721026460 |
| Field pH | 6.8 | s.u. | | | SW846 9045 | 05/25/99 | 721026460 |
| Field eH | -77.50 | mv | | | | 05/25/99 | 721026460 |
| Field temperature | 7.8 | deg. C | | | | 05/25/99 | 721026460 |
| Field static water level | 1685.18 | ft, NGVD | | | | 05/25/99 | 721026460 |

---

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Tel:(715)478-2777 Fax:(715)478-3060

WIS. LAB CERT. NO. 721026460

# ANALYTICAL REPORT

 NLS PROJECT# 48191

NLS CUST# 84233

Client: Natural Resource Technology, Inc.
Attn: Spiros Fafalios
23713 W. Paul Road
Pewaukee, WI 53072

Project Description: Groundwater Sampling by NLS

---

**Sample ID: MW10** **NLS#: 202035**
COC Description: MW10
Collected: 05/25/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field dis. oxygen | 0.10 | mg/L | | | | 05/25/99 | 721026460 |
| Field conductivity | 410 | umho@25C | | | EPA 120.1 | 05/25/99 | 721026460 |
| Field filtering | yes | | | | | 05/25/99 | 721026460 |
| Field pH | 6.2 | s.u. | | | SW846 9045 | 05/25/99 | 721026460 |
| Field eH | -90.80 | mv | | | | 05/25/99 | 721026460 |
| Field temperature | 7.1 | deg. C | | | | 05/25/99 | 721026460 |
| Field static water level | 1684.31 | ft, NGVD | | | | 05/25/99 | 721026460 |

---

**Sample ID: MW1** **NLS#: 202036**
COC Description: MW1
Collected: 05/25/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field static water level | 1685.12 | ft, NGVD | | | | 05/25/99 | 721026460 |

---

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Tel:(715)478-2777 Fax:(715)478-3060

WIS. LAB CERT. NO. 721026460

# ANALYTICAL REPORT

 NLS PROJECT# 48191

NLS CUST# 84233

Client: Natural Resource Technology, Inc.
Attn: Spiros Fafalios
23713 W. Paul Road
Pewaukee, WI 53072

Project Description: Groundwater Sampling by NLS

---

**Sample ID: MW6** **NLS#: 202037**
COC Description: MW6
Collected: 05/25/99 Received: 05/26/99 Reported: 06/08/99

| Parameter | Result | Units | LOD | LOQ | Method | Analyzed | Lab |
|---|---|---|---|---|---|---|---|
| Field dis. oxygen | 4.9 | mg/L | | | | 05/25/99 | 721026460 |
| Field conductivity | 82 | umho@25C | | | EPA 120.1 | 05/25/99 | 721026460 |
| Field filtering | yes | | | | | 05/25/99 | 721026460 |
| Field pH | 5.9 | s.u. | | | SW846 9045 | 05/25/99 | 721026460 |
| Field eH | 39.90 | mv | | | | 05/25/99 | 721026460 |
| Field temperature | 9.8 | deg. C | | | | 05/25/99 | 721026460 |
| Field static water level | 1685.50 | ft, NGVD | | | | 05/25/99 | 721026460 |

---

Values in brackets represent results greater than the LOD but less than the LOQ and are within a region of "Less-Certain Quantitation". Results greater than the LOQ are considered to be in the region of "Certain Quantitation".

LOD = Limit of Detection
DWB = Dry Weight Basis
LOQ = Limit of Quantitation
NA = Not Applicable
ND = Not Detected
%DWB = (mg/kg DWB)/10000

Reviewed by:

Authorized by:
R. T. Krueger
Laboratory Manager

Company Name: Natural Resource Technology, Inc.
Branch or Location: Pewaukee
Project Contact: Spiros Fatalios
Telephone: 414-523-9000
Project Number: 1226 HW
Project Name: C.M. Christiansen
Project State: Phelps, WI
Sampled By (Print): Andy Ostrowski (NLS)

Regulatory Program *(circle)*: UST RCRA CLP SDWA
NPDES/WPDES CAA NR_____
Other _____


EN CHEM INC.

1241 Bellevue St., Suite 9
Green Bay, WI 54302
920-469-2436 • 1-800-736-2436
FAX 920-469-8827

525 Science Drive
Madison, WI 53711
608-232-3300 • 1-888-536-2436
FAX: 608-233-0502

1423 N. 8th Street, Suite 122
Superior, WI 54880
715-392-5844 • 1-800-837-8238
FAX 715-392-5843


# CHAIN OF CUSTODY

40201

Page 1 of 2
P.O. # _____ Quote # _____
Mail Report To: Spiros Fatalios
Company: Natural Resource Technology
Address: 23713 W. Paul Road
Pewaukee, WI 53072
Invoice To: _____
Company: _____
Address: _____
Mail Invoice To: _____

| FIELD ID | SAMPLE DESCRIPTION | COLLECTION DATE | COLLECTION TIME | ANALYSES REQUESTED: PCP by 8151 in Unit 3287(2); VOC (8260); FILTERED? (YES/NO) | PRESERVATION (CODE)* | | | | | | | | SHADED AREA FOR LABORATORY USE ONLY: FIELD SCREEN | MATRIX | GOOD COND. | TOTAL BOTTLES | COMMENTS | LABORATORY NUMBER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | No | No | | | | | | | | | | | | |
| | | | | | A | B | | | | | | | | | | | | |
| | MW5 | 5-24 | 1620 | X | | | | | | | | | No | GW | ✓ | 1-1L amber | | 001 |
| | MW4 | ↓ | 1645 | X | | | | | | | | | ↓ | ↓ | ↓ | ↓ | | 002 |
| | MW3 | | 1650 | X | | | | | | | | | | | | | | 003 |
| | PMW14 | | 1710 | X | | | | | | | | | | | | | | 004 |
| | MW12 | | 1720 | X | | | | | | | | | | | | | | 005 |
| | ~~MW9~~ recovers | | ~~1730~~ | ~~X~~ | | | | | | | | | | | | | | 006 |
| | PMW17 | ↓ | 1740 | X | X | | | | | | | | ↓ | ↓ | ↓ | 1-1L amber 5-40ml | | 007 |

*Preservation Code
A=None B=HCL C=H2SO4
D=HN03 E=EnCore F=Methanol**
G=NaOH O=Other (Indicate)

**If not using En Chem's methanol, indicate volume of methanol added and mark the appropriate samples.

| Relinquished By: | Date/Time: | Received By: | Date/Time: |
|---|---|---|---|
| [signature] (to UPS) | 5-26-99 1500 | | |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |
| Relinquished By: UPS | Date/Time: | Received By: [signature] | Date/Time: 5/27/99 9:00 |

En Chem Project No. 692781
Sample Receipt Temp. ROL
Sample Receipt pH (Wet/Metals) ph VOK
Custody Seal

EN CHEM INC.

1241 Bellevue St., Suite 9
Green Bay, WI 54302
920-469-2436 • 1-800-736-2436
FAX 920-469-8827

525 Science Drive
Madison, WI 53711
608-232-3300 • 1-888-536-2436
FAX: 608-233-0502

1423 N. 8th Street, Suite 122
Superior, WI 54880
715-392-5844 • 1-800-837-8238
FAX 715-392-5843

# CHAIN OF CUSTODY

Page 2 of 2

Company Name: Natural Resource Technology
Branch or Location: Pewaukee
Project Contact: Spiros Fatalios
Telephone: 414-523-9000
Project Number: 2226 LW
Project Name: C.M. Christiansen
Project State: Phelps, WI
Sampled By (Print): Andy Ostrowski (NLS)

Regulatory Program (circle): UST RCRA CLP SDWA NPDES/WPDES CAA NR_____ Other _____

P.O. # _____ Quote # _____

Mail Report To: Spiros Fatalios
Company: Natural Resource Technology
Address: 23713 W. Paul Road Pewaukee, WI 53072

Invoice To: _____
Company: _____
Address: _____
Mail Invoice To: _____

| FIELD ID | SAMPLE DESCRIPTION | COLLECTION DATE | COLLECTION TIME | ANALYSES REQUESTED: PCP Low 8/SDA Chlor Phen; Dissolved Iron; Nitrate+Nitrite; Sulfate; Methane; Chloride; VOC (8260); PAH; PVOC | FIELD SCREEN | MATRIX | GOOD COND. | TOTAL BOTTLES | COMMENTS | LABORATORY NUMBER |
|---|---|---|---|---|---|---|---|---|---|---|
| | MW2 | 5-25 | 1050 | X X X X X X X | | GW | ✓ | 1-1L 2-250ml 1-500ml 2-40ml | | 007 008 |
| | MW17 | | 1135 | X X X X | | | | 2-1L amber 3-40ml | | 008 009 |
| | MW13 | | 1210 | X X X X X X X X | | | | 1-1L amber 2-250ml 1-500ml 5-40ml | | 009 010 |
| | MW8 | | 1230 | X X X X X X X | | | | 1-1L amber 2-40ml 1-500ml 2-250 | | 010 011 |
| | MW18 | | 1315 | X X X X | | | | 2-1L amber 3-40ml | | 011 012 |
| | PMW18 | | 1345 | X X X | | | | ↓ | | 012 013 |
| | MW11 | | 1422 | X X X X X X X X X | | | | 2-1L amber 7-250ml 1-500ml 5-40ml | | 013 014 |
| | MW10 | | 1445 | X X X X X X X X X | | | | ↓ | | 014 015 |
| | MW1 | | 1518 | X X X X | | | | 2-1L amber 3-40ml | | 015 016 |
| | MW6 | | 1600 | X X X X X X X X X | | | | 2-1L amber 2-250ml 1-500ml 5-40ml | | 016 017 |
| | Duplicate | | 1605 | X X X X X X X X X | | | | ↓ | | 017 018 |
| | Trip blank | | | | | | DW Only | 2-40ml | | 018 019 |
| | | 5/24/99 | 1600 | 5/24/99 B | | | | | ① Run NO2NO3 per SPIRO | |

SHADED AREA FOR LABORATORY USE ONLY

*Preservation Code
A=None B=HCL C=H2SO4
D=HN03 E=EnCore F=Methanol**
G=NaOH O=Other (Indicate)

**If not using En Chem's methanol, indicate volume of methanol added and mark the appropriate samples.

| Relinquished By: | Date/Time: | Received By: | Date/Time: |
|---|---|---|---|
| Gordon Patrick (+UPS) | 5-26-99/1500 | | |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |
| Relinquished By: | Date/Time: | Received By: | Date/Time: |
| Relinquished By: UPS | Date/Time: | Received By: | Date/Time: 5/27/99 11:00 |

En Chem Project No. 892781 512 (91)
Sample Receipt Temp. ROI
Sample Receipt pH (Wet/Metals)
Custody Seal

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Client: NATURAL RESOURCE TECHNOLOG

WI DNR LAB ID : 405132750

Report Date : 6/25/99

| Sample No. | Field ID | Collection Date | Sample No. | Field ID | Collection Date |
|---|---|---|---|---|---|
| 892781-001 | MW5 | 5/24/99 | | | |
| 892781-002 | MW4 | 5/24/99 | | | |
| 892781-003 | MW3 | 5/24/99 | | | |
| 892781-004 | PMW14 | 5/24/99 | | | |
| 892781-005 | MW12 | 5/24/99 | | | |
| 892781-006 | MW9 | 5/24/99 | | | |
| 892781-007 | PMW17 | 5/24/99 | | | |
| 892781-008 | MW2 | 5/25/99 | | | |
| 892781-009 | MW17 | 5/25/99 | | | |
| 892781-010 | MW13 | 5/25/99 | | | |
| 892781-011 | MW8 | 5/25/99 | | | |
| 892781-012 | MW18 | 5/25/99 | | | |
| 892781-013 | PMW18 | 5/25/99 | | | |
| 892781-014 | MW11 | 5/25/99 | | | |
| 892781-015 | MW10 | 5/25/99 | | | |
| 892781-016 | MW1 | 5/25/99 | | | |
| 892781-017 | MW6 | 5/25/99 | | | |
| 892781-018 | DUPLICATE | 5/25/99 | | | |
| 892781-019 | TRIP BLANK | 5/25/99 | | | |

The "Q" flag is present when a parameter has been detected below the LOQ. This indicates the results are qualified due to the uncertainty of the parameter concentration between the LOD and the LOQ.

Soil VOC detects are corrected for the total solids, unless otherwise noted.

I certify that the data contained in this Final Report has been generated and reviewed in accordance with approved methods and Laboratory Standard Operating Procedure. Exceptions, if any, are discussed in the accompanying sample narrative. Release of this final report is authorized by Laboratory management, as is verified by the following signature.

Mike Mellberg

Approval Signature

6/25/99

Date

ENCHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

| Lab#: | TestGroupID: | Comment: |
|---|---|---|
| 892781 | All Samples | For PAH waters, several compounds were below the LCL in the MS and one compound was below the LCL in the MSD. Also, RPD between MS/MSD were above UCL for several compounds. See attached spreadsheet for specific compounds, limits and recoveries. |
| 892781- | W-SO4-D | ED - Elevated detection limit due to matrix effect. |
| | W-CL-D | ED - Elevated detection limit due to matrix effect. |
| | 8260+-W | Methylene chloride is present in the laboratory environment. Detects should be considered suspect. |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN
**Project Number :**
**Field ID :** MW5
**Lab Sample Number :** 892781-001
**WI DNR LAB ID :** 405132750

**Client :** NATURAL RESOURCE TECHNOLOGY, INC
**Report Date :** 6/25/99
**Collection Date :** 5/24/99
**Matrix Type :** WATER

## Organic Results

HERBICIDES — Prep Method: SW846 — Prep Date: — Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 74 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | 0.12 | 0.052 | 0.17 | | ug/L | Q | 6/18/99 | SW846 8151 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN
**Project Number :**
**Field ID :** MW4
**Lab Sample Number :** 892781-002
**WI DNR LAB ID :** 405132750

**Client :** NATURAL RESOURCE TECHNOLOGY, INC
**Report Date :** 6/25/99
**Collection Date :** 5/24/99
**Matrix Type :** WATER

## Organic Results

HERBICIDES — Prep Method: SW846 — Prep Date: — Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 70 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | < 0.051 | 0.051 | 0.16 | | ug/L | | 6/18/99 | SW846 8151 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Field ID : MW3

Lab Sample Number : 892781-003

WI DNR LAB ID : 405132750

Client : NATURAL RESOURCE TECHNOLOGY, INC

Report Date : 6/25/99

Collection Date : 5/24/99

Matrix Type : WATER

## Organic Results

HERBICIDES — Prep Method: SW846 — Prep Date: — Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 77 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | 0.12 | 0.052 | 0.17 | | ug/L | Q | 6/18/99 | SW846 8151 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Client : NATURAL RESOURCE TECHNOLOGY, INC

Field ID : PMW14

Report Date : 6/25/99

Lab Sample Number : 892781-004

Collection Date : 5/24/99

WI DNR LAB ID : 405132750

Matrix Type : WATER

## Organic Results

HERBICIDES  Prep Method: SW846  Prep Date:  Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 85 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | < 0.052 | 0.052 | 0.17 | | ug/L | | 6/18/99 | SW846 8151 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Field ID : MW12

Lab Sample Number : 892781-005

WI DNR LAB ID : 405132750

Client : NATURAL RESOURCE TECHNOLOGY, INC

Report Date : 6/25/99

Collection Date : 5/24/99

Matrix Type : WATER

## Organic Results

HERBICIDES — Prep Method: SW846 — Prep Date: — Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 70 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | < 0.052 | 0.052 | 0.17 | | ug/L | | 6/18/99 | SW846 8151 |

ENCHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Field ID : MW9

Lab Sample Number : 892781-006

WI DNR LAB ID : 405132750

Client : NATURAL RESOURCE TECHNOLOGY, INC

Report Date : 6/25/99

Collection Date : 5/24/99

Matrix Type : WATER

## Organic Results

HERBICIDES — Prep Method: SW846 — Prep Date: — Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 64 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | 0.089 | 0.052 | 0.17 | | ug/L | Q | 6/18/99 | SW846 8151 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN
**Project Number :**
**Field ID :** PMW17
**Lab Sample Number :** 892781-007
**WI DNR LAB ID :** 405132750

**Client :** NATURAL RESOURCE TECHNOLOGY, INC
**Report Date :** 6/25/99
**Collection Date :** 5/24/99
**Matrix Type :** WATER

## Organic Results

**EPA 8260 VOLATILE LIST- WATER** **Prep Method:** SW846 5030B **Prep Date:** 5/28/99 **Analyst:** HW

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Benzene | < 0.27 | 0.27 | 0.86 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromobenzene | < 0.83 | 0.83 | 2.6 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromochloromethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromodichloromethane | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromoform | < 0.44 | 0.44 | 1.4 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromomethane | < 0.70 | 0.70 | 2.2 | | ug/L | | 5/28/99 | SW846 8260B |
| s-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/28/99 | SW846 8260B |
| t-Butylbenzene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/28/99 | SW846 8260B |
| n-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/28/99 | SW846 8260B |
| Carbon tetrachloride | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloroform | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| Chlorobenzene | < 0.23 | 0.23 | 0.73 | | ug/L | | 5/28/99 | SW846 8260B |
| Chlorodibromomethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloroethane | < 0.54 | 0.54 | 1.7 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloromethane | < 0.61 | 0.61 | 1.9 | | ug/L | | 5/28/99 | SW846 8260B |
| 2-Chlorotoluene | < 0.31 | 0.31 | 0.99 | | ug/L | | 5/28/99 | SW846 8260B |
| 4-Chlorotoluene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dibromo-3-chloropropane | < 0.41 | 0.41 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dibromoethane | < 0.39 | 0.39 | 1.2 | | ug/L | | 5/28/99 | SW846 8260B |
| Dibromomethane | < 0.53 | 0.53 | 1.7 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,3-Dichlorobenzene | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,4-Dichlorobenzene | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichloroethane | < 0.37 | 0.37 | 1.2 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichlorobenzene | < 0.25 | 0.25 | 0.80 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloroethene | < 0.43 | 0.43 | 1.4 | | ug/L | | 5/28/99 | SW846 8260B |
| cis-1,2-Dichloroethene | < 0.28 | 0.28 | 0.89 | | ug/L | | 5/28/99 | SW846 8260B |
| Dichlorodifluoromethane | < 0.47 | 0.47 | 1.5 | | ug/L | | 5/28/99 | SW846 8260B |
| trans-1,2-Dichloroethene | < 0.79 | 0.79 | 2.5 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichloropropane | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloroethane | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** PMW17

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-007

**Collection Date :** 5/24/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1,3-Dichloropropane | < 0.42 | 0.42 | 1.3 | ug/L | | 5/28/99 | SW846 8260B |
| 2,2-Dichloropropane | < 0.36 | 0.36 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloropropene | < 0.81 | 0.81 | 2.6 | ug/L | | 5/28/99 | SW846 8260B |
| cis-1,3-Dichloropropene | < 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| trans-1,3-Dichloropropene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Diisopropyl ether | < 0.55 | 0.55 | 1.8 | ug/L | | 5/28/99 | SW846 8260B |
| Ethylbenzene | < 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| Fluorotrichloromethane | < 0.28 | 0.28 | 0.89 | ug/L | | 5/28/99 | SW846 8260B |
| Hexachlorobutadiene | < 0.62 | 0.62 | 2.0 | ug/L | | 5/28/99 | SW846 8260B |
| Isopropylbenzene | < 0.26 | 0.26 | 0.83 | ug/L | | 5/28/99 | SW846 8260B |
| p-Isopropyltoluene | < 0.24 | 0.24 | 0.76 | ug/L | | 5/28/99 | SW846 8260B |
| Methylene chloride | 0.95 | 0.36 | 1.1 | ug/L | Q | 5/28/99 | SW846 8260B |
| Methyl-tert-butyl-ether | < 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| Naphthalene | < 0.35 | 0.35 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| n-Propylbenzene | < 0.76 | 0.76 | 2.4 | ug/L | | 5/28/99 | SW846 8260B |
| Styrene | < 0.17 | 0.17 | 0.54 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,2,2-Tetrachloroethane | < 0.69 | 0.69 | 2.2 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,1,2-Tetrachloroethane | < 0.70 | 0.70 | 2.2 | ug/L | | 5/28/99 | SW846 8260B |
| Tetrachloroethene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Toluene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,3-Trichlorobenzene | < 0.47 | 0.47 | 1.5 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,4-Trichlorobenzene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,1-Trichloroethane | < 0.30 | 0.30 | 0.96 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,2-Trichloroethane | < 0.61 | 0.61 | 1.9 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,4-Trimethylbenzene | < 0.22 | 0.22 | 0.70 | ug/L | | 5/28/99 | SW846 8260B |
| Trichloroethene | < 0.37 | 0.37 | 1.2 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,3-Trichloropropane | < 0.75 | 0.75 | 2.4 | ug/L | | 5/28/99 | SW846 8260B |
| 1,3,5-Trimethylbenzene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/28/99 | SW846 8260B |
| Vinyl chloride | < 0.20 | 0.20 | 0.64 | ug/L | | 5/28/99 | SW846 8260B |
| Xylenes, -m, -p | < 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Xylene, -o | < 0.24 | 0.24 | 0.76 | ug/L | | 5/28/99 | SW846 8260B |
| 4-Bromofluorobenzene | 112 | | | %Recov | | 5/28/99 | SW846 8260B |
| Dibromofluoromethane | 112 | | | %Recov | | 5/28/99 | SW846 8260B |
| Toluene-d8 | 110 | | | %Recov | | 5/28/99 | SW846 8260B |

ENCHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Client : NATURAL RESOURCE TECHNOLOGY, INC

Field ID : PMW17

Report Date : 6/25/99

Lab Sample Number : 892781-007

Collection Date : 5/24/99

WI DNR LAB ID : 405132750

Matrix Type : WATER

## Organic Results

HERBICIDES  Prep Method: SW846  Prep Date:  Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 73 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | < 0.052 | 0.052 | 0.17 | | ug/L | | 6/18/99 | SW846 8151 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Field ID : MW2

Lab Sample Number : 892781-008

WI DNR LAB ID : 405132750

Client : NATURAL RESOURCE TECHNOLOGY, INC

Report Date : 6/25/99

Collection Date : 5/25/99

Matrix Type : WATER

## Inorganic Results

| Test | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Prep Method | Analysis Method | Analys |
|---|---|---|---|---|---|---|---|---|---|---|
| Iron - Dissolved | < 47 | 47 | 150 | | ug/L | | 6/3/99 | SW846 6010 | SW846 6010 | CCR |
| Chloride - Dissolved | 140 | 2.4 | 7.6 | | mg/L | | 6/1/99 | EPA 300.0 | EPA 300.0 | *MD |
| Nitrogen, NO3 + NO2 | 2.1 | 0.017 | 0.054 | | mg/L | | 6/7/99 | EPA 353.2 | EPA 353.2 | *MD |
| Sulfate | 12 | 0.62 | 2.0 | | mg/L | ED | 6/1/99 | EPA 300.0 | EPA 300.0 | *MD |

## Organic Results

HERBICIDES — Prep Method: SW846 — Prep Date: — Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 75 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | < 0.053 | 0.053 | 0.17 | | ug/L | | 6/18/99 | SW846 8151 |

## Organic Results

METHANE — Prep Method: MOD. 8015 — Prep Date: 6/1/99 — Analyst: JJB

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Methane | < 0.9 | 0.9 | 2.9 | | ug/l | | 6/1/99 | MOD. 8015 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Client : NATURAL RESOURCE TECHNOLOGY, INC

Field ID : MW17

Report Date : 6/25/99

Lab Sample Number : 892781-009

Collection Date : 5/25/99

WI DNR LAB ID : 405132750

Matrix Type : WATER

## Organic Results

EPA 8260 VOLATILE LIST- WATER  Prep Method: SW846 5030B  Prep Date: 5/28/99  Analyst: HW

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Benzene | < 0.27 | 0.27 | 0.86 | | ug/L | | 5/29/99 | SW846 8260B |
| Bromobenzene | < 0.83 | 0.83 | 2.6 | | ug/L | | 5/29/99 | SW846 8260B |
| Bromochloromethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/29/99 | SW846 8260B |
| Bromodichloromethane | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/29/99 | SW846 8260B |
| Bromoform | < 0.44 | 0.44 | 1.4 | | ug/L | | 5/29/99 | SW846 8260B |
| Bromomethane | < 0.70 | 0.70 | 2.2 | | ug/L | | 5/29/99 | SW846 8260B |
| s-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/29/99 | SW846 8260B |
| t-Butylbenzene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/29/99 | SW846 8260B |
| n-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/29/99 | SW846 8260B |
| Carbon tetrachloride | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/29/99 | SW846 8260B |
| Chloroform | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/29/99 | SW846 8260B |
| Chlorobenzene | < 0.23 | 0.23 | 0.73 | | ug/L | | 5/29/99 | SW846 8260B |
| Chlorodibromomethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/29/99 | SW846 8260B |
| Chloroethane | < 0.54 | 0.54 | 1.7 | | ug/L | | 5/29/99 | SW846 8260B |
| Chloromethane | < 0.61 | 0.61 | 1.9 | | ug/L | | 5/29/99 | SW846 8260B |
| 2-Chlorotoluene | < 0.31 | 0.31 | 0.99 | | ug/L | | 5/29/99 | SW846 8260B |
| 4-Chlorotoluene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/29/99 | SW846 8260B |
| 1,2-Dibromo-3-chloropropane | < 0.41 | 0.41 | 1.3 | | ug/L | | 5/29/99 | SW846 8260B |
| 1,2-Dibromoethane | < 0.39 | 0.39 | 1.2 | | ug/L | | 5/29/99 | SW846 8260B |
| Dibromomethane | < 0.53 | 0.53 | 1.7 | | ug/L | | 5/29/99 | SW846 8260B |
| 1,3-Dichlorobenzene | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/29/99 | SW846 8260B |
| 1,4-Dichlorobenzene | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/29/99 | SW846 8260B |
| 1,2-Dichloroethane | < 0.37 | 0.37 | 1.2 | | ug/L | | 5/29/99 | SW846 8260B |
| 1,2-Dichlorobenzene | < 0.25 | 0.25 | 0.80 | | ug/L | | 5/29/99 | SW846 8260B |
| 1,1-Dichloroethene | < 0.43 | 0.43 | 1.4 | | ug/L | | 5/29/99 | SW846 8260B |
| cis-1,2-Dichloroethene | < 0.28 | 0.28 | 0.89 | | ug/L | | 5/29/99 | SW846 8260B |
| Dichlorodifluoromethane | < 0.47 | 0.47 | 1.5 | | ug/L | | 5/29/99 | SW846 8260B |
| trans-1,2-Dichloroethene | < 0.79 | 0.79 | 2.5 | | ug/L | | 5/29/99 | SW846 8260B |
| 1,2-Dichloropropane | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/29/99 | SW846 8260B |
| 1,1-Dichloroethane | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/29/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** MW17

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-009

**Collection Date :** 5/25/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1,3-Dichloropropane | < 0.42 | 0.42 | 1.3 | ug/L | | 5/29/99 | SW846 8260B |
| 2,2-Dichloropropane | < 0.36 | 0.36 | 1.1 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1-Dichloropropene | < 0.81 | 0.81 | 2.6 | ug/L | | 5/29/99 | SW846 8260B |
| cis-1,3-Dichloropropene | < 0.32 | 0.32 | 1.0 | ug/L | | 5/29/99 | SW846 8260B |
| trans-1,3-Dichloropropene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/29/99 | SW846 8260B |
| Diisopropyl ether | < 0.55 | 0.55 | 1.8 | ug/L | | 5/29/99 | SW846 8260B |
| Ethylbenzene | < 0.32 | 0.32 | 1.0 | ug/L | | 5/29/99 | SW846 8260B |
| Fluorotrichloromethane | < 0.28 | 0.28 | 0.89 | ug/L | | 5/29/99 | SW846 8260B |
| Hexachlorobutadiene | < 0.62 | 0.62 | 2.0 | ug/L | | 5/29/99 | SW846 8260B |
| Isopropylbenzene | < 0.26 | 0.26 | 0.83 | ug/L | | 5/29/99 | SW846 8260B |
| p-Isopropyltoluene | < 0.24 | 0.24 | 0.76 | ug/L | | 5/29/99 | SW846 8260B |
| Methylene chloride | 0.82 | 0.36 | 1.1 | ug/L | Q | 5/29/99 | SW846 8260B |
| Methyl-tert-butyl-ether | < 0.32 | 0.32 | 1.0 | ug/L | | 5/29/99 | SW846 8260B |
| Naphthalene | 0.64 | 0.35 | 1.1 | ug/L | Q | 5/29/99 | SW846 8260B |
| n-Propylbenzene | < 0.76 | 0.76 | 2.4 | ug/L | | 5/29/99 | SW846 8260B |
| Styrene | < 0.17 | 0.17 | 0.54 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1,2,2-Tetrachloroethane | < 0.69 | 0.69 | 2.2 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1,1,2-Tetrachloroethane | < 0.70 | 0.70 | 2.2 | ug/L | | 5/29/99 | SW846 8260B |
| Tetrachloroethene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/29/99 | SW846 8260B |
| Toluene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2,3-Trichlorobenzene | < 0.47 | 0.47 | 1.5 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2,4-Trichlorobenzene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1,1-Trichloroethane | < 0.30 | 0.30 | 0.96 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1,2-Trichloroethane | < 0.61 | 0.61 | 1.9 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2,4-Trimethylbenzene | 0.46 | 0.22 | 0.70 | ug/L | Q | 5/29/99 | SW846 8260B |
| Trichloroethene | < 0.37 | 0.37 | 1.2 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2,3-Trichloropropane | < 0.75 | 0.75 | 2.4 | ug/L | | 5/29/99 | SW846 8260B |
| 1,3,5-Trimethylbenzene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/29/99 | SW846 8260B |
| Vinyl chloride | < 0.20 | 0.20 | 0.64 | ug/L | | 5/29/99 | SW846 8260B |
| Xylenes, -m, -p | < 0.43 | 0.43 | 1.4 | ug/L | | 5/29/99 | SW846 8260B |
| Xylene, -o | < 0.24 | 0.24 | 0.76 | ug/L | | 5/29/99 | SW846 8260B |
| 4-Bromofluorobenzene | 114 | | | %Recov | | 5/29/99 | SW846 8260B |
| Dibromofluoromethane | 114 | | | %Recov | | 5/29/99 | SW846 8260B |
| Toluene-d8 | 112 | | | %Recov | | 5/29/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** MW17

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-009

**Collection Date :** 5/25/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1,3-Dichloropropane | < | 0.42 | 0.42 | 1.3 | ug/L | | 5/29/99 | SW846 8260B |
| 2,2-Dichloropropane | < | 0.36 | 0.36 | 1.1 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1-Dichloropropene | < | 0.81 | 0.81 | 2.6 | ug/L | | 5/29/99 | SW846 8260B |
| cis-1,3-Dichloropropene | < | 0.32 | 0.32 | 1.0 | ug/L | | 5/29/99 | SW846 8260B |
| trans-1,3-Dichloropropene | < | 0.43 | 0.43 | 1.4 | ug/L | | 5/29/99 | SW846 8260B |
| Diisopropyl ether | < | 0.55 | 0.55 | 1.8 | ug/L | | 5/29/99 | SW846 8260B |
| Ethylbenzene | < | 0.32 | 0.32 | 1.0 | ug/L | | 5/29/99 | SW846 8260B |
| Fluorotrichloromethane | < | 0.28 | 0.28 | 0.89 | ug/L | | 5/29/99 | SW846 8260B |
| Hexachlorobutadiene | < | 0.62 | 0.62 | 2.0 | ug/L | | 5/29/99 | SW846 8260B |
| Isopropylbenzene | < | 0.26 | 0.26 | 0.83 | ug/L | | 5/29/99 | SW846 8260B |
| p-Isopropyltoluene | < | 0.24 | 0.24 | 0.76 | ug/L | | 5/29/99 | SW846 8260B |
| Methylene chloride | | 0.82 | 0.36 | 1.1 | ug/L | Q | 5/29/99 | SW846 8260B |
| Methyl-tert-butyl-ether | < | 0.32 | 0.32 | 1.0 | ug/L | | 5/29/99 | SW846 8260B |
| Naphthalene | | 0.64 | 0.35 | 1.1 | ug/L | Q | 5/29/99 | SW846 8260B |
| n-Propylbenzene | < | 0.76 | 0.76 | 2.4 | ug/L | | 5/29/99 | SW846 8260B |
| Styrene | < | 0.17 | 0.17 | 0.54 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1,2,2-Tetrachloroethane | < | 0.69 | 0.69 | 2.2 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1,1,2-Tetrachloroethane | < | 0.70 | 0.70 | 2.2 | ug/L | | 5/29/99 | SW846 8260B |
| Tetrachloroethene | < | 0.43 | 0.43 | 1.4 | ug/L | | 5/29/99 | SW846 8260B |
| Toluene | < | 0.27 | 0.27 | 0.86 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2,3-Trichlorobenzene | < | 0.47 | 0.47 | 1.5 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2,4-Trichlorobenzene | < | 0.27 | 0.27 | 0.86 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1,1-Trichloroethane | < | 0.30 | 0.30 | 0.96 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1,2-Trichloroethane | < | 0.61 | 0.61 | 1.9 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2,4-Trimethylbenzene | | 0.46 | 0.22 | 0.70 | ug/L | Q | 5/29/99 | SW846 8260B |
| Trichloroethene | < | 0.37 | 0.37 | 1.2 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2,3-Trichloropropane | < | 0.75 | 0.75 | 2.4 | ug/L | | 5/29/99 | SW846 8260B |
| 1,3,5-Trimethylbenzene | < | 0.27 | 0.27 | 0.86 | ug/L | | 5/29/99 | SW846 8260B |
| Vinyl chloride | < | 0.20 | 0.20 | 0.64 | ug/L | | 5/29/99 | SW846 8260B |
| Xylenes, -m, -p | < | 0.43 | 0.43 | 1.4 | ug/L | | 5/29/99 | SW846 8260B |
| Xylene, -o | < | 0.24 | 0.24 | 0.76 | ug/L | | 5/29/99 | SW846 8260B |
| 4-Bromofluorobenzene | | 114 | | | %Recov | | 5/29/99 | SW846 8260B |
| Dibromofluoromethane | | 114 | | | %Recov | | 5/29/99 | SW846 8260B |
| Toluene-d8 | | 112 | | | %Recov | | 5/29/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Client : NATURAL RESOURCE TECHNOLOGY, INC

Field ID : MW17

Report Date : 6/25/99

Lab Sample Number : 892781-009

Collection Date : 5/25/99

WI DNR LAB ID : 405132750

Matrix Type : WATER

## Organic Results

HERBICIDES — Prep Method: SW846 — Prep Date: — Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 62 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | < 0.053 | 0.053 | 0.17 | | ug/L | | 6/18/99 | SW846 8151 |

## Organic Results

PAH (HPLC) LIST - SEMIVOLATILES — Prep Method: SW846 3510 — Prep Date: 5/28/99 — Analyst: ARO

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Acenaphthene | < 0.47 | 0.47 | 1.5 | | ug/L | | 5/28/99 | SW846 8310 |
| Acenaphthylene | < 0.41 | 0.41 | 1.3 | | ug/L | | 5/28/99 | SW846 8310 |
| Anthracene | < 0.021 | 0.021 | 0.067 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(a)anthracene | < 0.014 | 0.014 | 0.045 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(a)pyrene | < 0.015 | 0.015 | 0.048 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(b)fluoranthene | < 0.015 | 0.015 | 0.048 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(g,h,i)perylene | < 0.021 | 0.021 | 0.067 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(k)fluoranthene | < 0.0090 | 0.0090 | 0.029 | | ug/L | | 5/28/99 | SW846 8310 |
| Chrysene | < 0.016 | 0.016 | 0.051 | | ug/L | | 5/28/99 | SW846 8310 |
| Dibenzo(a,h)anthracene | < 0.020 | 0.020 | 0.064 | | ug/L | | 5/28/99 | SW846 8310 |
| Fluoranthene | < 0.015 | 0.015 | 0.048 | | ug/L | | 5/28/99 | SW846 8310 |
| Fluorene | < 0.058 | 0.058 | 0.18 | | ug/L | | 5/28/99 | SW846 8310 |
| Indeno(1,2,3-cd)pyrene | < 0.025 | 0.025 | 0.080 | | ug/L | | 5/28/99 | SW846 8310 |
| 1-Methylnaphthalene | < 0.36 | 0.36 | 1.1 | | ug/L | | 5/28/99 | SW846 8310 |
| 2-Methylnaphthalene | < 0.36 | 0.36 | 1.1 | | ug/L | | 5/28/99 | SW846 8310 |
| Naphthalene | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8310 |
| Phenanthrene | < 0.046 | 0.046 | 0.15 | | ug/L | | 5/28/99 | SW846 8310 |
| Pyrene | < 0.017 | 0.017 | 0.054 | | ug/L | | 5/28/99 | SW846 8310 |
| 9,10-Diphenylanthracene | 55.7 | | | | %Recov | | 5/28/99 | SW846 8310 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Client : NATURAL RESOURCE TECHNOLOGY, INC

Field ID : MW13

Report Date : 6/25/99

Lab Sample Number : 892781-010

Collection Date : 5/25/99

WI DNR LAB ID : 405132750

Matrix Type : WATER

## Inorganic Results

| Test | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Prep Method | Analysis Method | Analys |
|---|---|---|---|---|---|---|---|---|---|---|
| Iron - Dissolved | 4400 | 52 | 170 | | ug/L | | 5/7/99 | SW846 3015 | SW846 6010 | CCR |
| Chloride - Dissolved | 14 | 2.4 | 7.6 | | mg/L | ED | 6/1/99 | EPA 300.0 | EPA 300.0 | *MD |
| Nitrogen, NO3 + NO2 | < 0.017 | 0.017 | 0.054 | | mg/L | | 6/1/99 | EPA 353.2 | EPA 353.2 | *MD |
| Sulfate | < 0.62 | 0.62 | 2.0 | | mg/L | ED | 6/1/99 | EPA 300.0 | EPA 300.0 | *MD |

## Organic Results

EPA 8260 VOLATILE LIST- WATER  Prep Method: SW846 5030B  Prep Date: 5/28/99  Analyst: HW

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Benzene | < 0.27 | 0.27 | 0.86 | | ug/L | | 5/29/99 | SW846 8260B |
| Bromobenzene | < 0.83 | 0.83 | 2.6 | | ug/L | | 5/29/99 | SW846 8260B |
| Bromochloromethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/29/99 | SW846 8260B |
| Bromodichloromethane | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/29/99 | SW846 8260B |
| Bromoform | < 0.44 | 0.44 | 1.4 | | ug/L | | 5/29/99 | SW846 8260B |
| Bromomethane | < 0.70 | 0.70 | 2.2 | | ug/L | | 5/29/99 | SW846 8260B |
| s-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/29/99 | SW846 8260B |
| t-Butylbenzene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/29/99 | SW846 8260B |
| n-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/29/99 | SW846 8260B |
| Carbon tetrachloride | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/29/99 | SW846 8260B |
| Chloroform | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/29/99 | SW846 8260B |
| Chlorobenzene | < 0.23 | 0.23 | 0.73 | | ug/L | | 5/29/99 | SW846 8260B |
| Chlorodibromomethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/29/99 | SW846 8260B |
| Chloroethane | < 0.54 | 0.54 | 1.7 | | ug/L | | 5/29/99 | SW846 8260B |
| Chloromethane | < 0.61 | 0.61 | 1.9 | | ug/L | | 5/29/99 | SW846 8260B |
| 2-Chlorotoluene | < 0.31 | 0.31 | 0.99 | | ug/L | | 5/29/99 | SW846 8260B |
| 4-Chlorotoluene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/29/99 | SW846 8260B |
| 1,2-Dibromo-3-chloropropane | < 0.41 | 0.41 | 1.3 | | ug/L | | 5/29/99 | SW846 8260B |
| 1,2-Dibromoethane | < 0.39 | 0.39 | 1.2 | | ug/L | | 5/29/99 | SW846 8260B |
| Dibromomethane | < 0.53 | 0.53 | 1.7 | | ug/L | | 5/29/99 | SW846 8260B |
| 1,3-Dichlorobenzene | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/29/99 | SW846 8260B |
| 1,4-Dichlorobenzene | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/29/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** MW13

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-010

**Collection Date :** 5/25/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane | < 0.37 | 0.37 | 1.2 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2-Dichlorobenzene | < 0.25 | 0.25 | 0.80 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1-Dichloroethene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/29/99 | SW846 8260B |
| cis-1,2-Dichloroethene | < 0.28 | 0.28 | 0.89 | ug/L | | 5/29/99 | SW846 8260B |
| Dichlorodifluoromethane | < 0.47 | 0.47 | 1.5 | ug/L | | 5/29/99 | SW846 8260B |
| trans-1,2-Dichloroethene | < 0.79 | 0.79 | 2.5 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2-Dichloropropane | < 0.35 | 0.35 | 1.1 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1-Dichloroethane | < 0.35 | 0.35 | 1.1 | ug/L | | 5/29/99 | SW846 8260B |
| 1,3-Dichloropropane | < 0.42 | 0.42 | 1.3 | ug/L | | 5/29/99 | SW846 8260B |
| 2,2-Dichloropropane | < 0.36 | 0.36 | 1.1 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1-Dichloropropene | < 0.81 | 0.81 | 2.6 | ug/L | | 5/29/99 | SW846 8260B |
| cis-1,3-Dichloropropene | < 0.32 | 0.32 | 1.0 | ug/L | | 5/29/99 | SW846 8260B |
| trans-1,3-Dichloropropene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/29/99 | SW846 8260B |
| Diisopropyl ether | < 0.55 | 0.55 | 1.8 | ug/L | | 5/29/99 | SW846 8260B |
| Ethylbenzene | < 0.32 | 0.32 | 1.0 | ug/L | | 5/29/99 | SW846 8260B |
| Fluorotrichloromethane | < 0.28 | 0.28 | 0.89 | ug/L | | 5/29/99 | SW846 8260B |
| Hexachlorobutadiene | < 0.62 | 0.62 | 2.0 | ug/L | | 5/29/99 | SW846 8260B |
| Isopropylbenzene | < 0.26 | 0.26 | 0.83 | ug/L | | 5/29/99 | SW846 8260B |
| p-Isopropyltoluene | < 0.24 | 0.24 | 0.76 | ug/L | | 5/29/99 | SW846 8260B |
| Methylene chloride | 0.80 | 0.36 | 1.1 | ug/L | Q | 5/29/99 | SW846 8260B |
| Methyl-tert-butyl-ether | < 0.32 | 0.32 | 1.0 | ug/L | | 5/29/99 | SW846 8260B |
| Naphthalene | < 0.35 | 0.35 | 1.1 | ug/L | | 5/29/99 | SW846 8260B |
| n-Propylbenzene | < 0.76 | 0.76 | 2.4 | ug/L | | 5/29/99 | SW846 8260B |
| Styrene | < 0.17 | 0.17 | 0.54 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1,2,2-Tetrachloroethane | < 0.69 | 0.69 | 2.2 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1,1,2-Tetrachloroethane | < 0.70 | 0.70 | 2.2 | ug/L | | 5/29/99 | SW846 8260B |
| Tetrachloroethene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/29/99 | SW846 8260B |
| Toluene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2,3-Trichlorobenzene | < 0.47 | 0.47 | 1.5 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2,4-Trichlorobenzene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1,1-Trichloroethane | < 0.30 | 0.30 | 0.96 | ug/L | | 5/29/99 | SW846 8260B |
| 1,1,2-Trichloroethane | < 0.61 | 0.61 | 1.9 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2,4-Trimethylbenzene | < 0.22 | 0.22 | 0.70 | ug/L | | 5/29/99 | SW846 8260B |
| Trichloroethene | < 0.37 | 0.37 | 1.2 | ug/L | | 5/29/99 | SW846 8260B |
| 1,2,3-Trichloropropane | < 0.75 | 0.75 | 2.4 | ug/L | | 5/29/99 | SW846 8260B |
| 1,3,5-Trimethylbenzene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/29/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN
**Project Number :**
**Client :** NATURAL RESOURCE TECHNOLOGY, INC
**Field ID :** MW13
**Report Date :** 6/25/99
**Lab Sample Number :** 892781-010
**Collection Date :** 5/25/99
**WI DNR LAB ID :** 405132750
**Matrix Type :** WATER

| | | | | | | |
|---|---|---|---|---|---|---|
| Vinyl chloride | < 0.20 | 0.20 | 0.64 | ug/L | 5/29/99 | SW846 8260B |
| Xylenes, -m, -p | < 0.43 | 0.43 | 1.4 | ug/L | 5/29/99 | SW846 8260B |
| Xylene, -o | < 0.24 | 0.24 | 0.76 | ug/L | 5/29/99 | SW846 8260B |
| 4-Bromofluorobenzene | 113 | | | %Recov | 5/29/99 | SW846 8260B |
| Dibromofluoromethane | 113 | | | %Recov | 5/29/99 | SW846 8260B |
| Toluene-d8 | 110 | | | %Recov | 5/29/99 | SW846 8260B |

## Organic Results

**HERBICIDES** — **Prep Method:** SW846 — **Prep Date:** — **Analyst:** *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 67 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | 0.20 | 0.053 | 0.17 | | ug/L | | 6/18/99 | SW846 8151 |

## Organic Results

**METHANE** — **Prep Method:** MOD. 8015 — **Prep Date:** 6/1/99 — **Analyst:** JJB

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Methane | 3100 | 180 | 570 | | ug/l | | 6/1/99 | MOD. 8015 |

ENCHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN
**Project Number :**
**Field ID :** MW8
**Lab Sample Number :** 892781-011
**WI DNR LAB ID :** 405132750

**Client :** NATURAL RESOURCE TECHNOLOGY, INC
**Report Date :** 6/25/99
**Collection Date :** 5/25/99
**Matrix Type :** WATER

## Inorganic Results

| Test | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Prep Method | Analysis Method | Analys |
|---|---|---|---|---|---|---|---|---|---|---|
| Iron - Dissolved | 4000 | 52 | 170 | | ug/L | | 5/7/99 | SW846 3015 | SW846 6010 | CCR |
| Chloride - Dissolved | 9.4 | 2.4 | 7.6 | | mg/L | ED | 6/2/99 | EPA 300.0 | EPA 300.0 | *MD |
| Nitrogen, NO3 + NO2 | 0.030 | 0.017 | 0.054 | | mg/L | Q | 6/7/99 | EPA 353.2 | EPA 353.2 | *MD |
| Sulfate | 3.5 | 0.62 | 2.0 | | mg/L | ED | 6/2/99 | EPA 300.0 | EPA 300.0 | *MD |

## Organic Results

**HERBICIDES** — **Prep Method:** SW846 — **Prep Date:** — **Analyst:** *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 90 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | 0.42 | 0.052 | 0.17 | | ug/L | | 6/18/99 | SW846 8151 |

## Organic Results

**METHANE** — **Prep Method:** MOD. 8015 — **Prep Date:** 6/1/99 — **Analyst:** JJB

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Methane | 4600 | 180 | 570 | | ug/l | | 6/1/99 | MOD. 8015 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Client : NATURAL RESOURCE TECHNOLOGY, INC

Field ID : MW18

Report Date : 6/25/99

Lab Sample Number : 892781-012

Collection Date : 5/25/99

WI DNR LAB ID : 405132750

Matrix Type : WATER

## Organic Results

EPA 8260 VOLATILE LIST- WATER  Prep Method: SW846 5030B  Prep Date: 5/28/99  Analyst: HW

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Benzene | < 0.27 | 0.27 | 0.86 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromobenzene | < 0.83 | 0.83 | 2.6 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromochloromethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromodichloromethane | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromoform | < 0.44 | 0.44 | 1.4 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromomethane | < 0.70 | 0.70 | 2.2 | | ug/L | | 5/28/99 | SW846 8260B |
| s-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/28/99 | SW846 8260B |
| t-Butylbenzene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/28/99 | SW846 8260B |
| n-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/28/99 | SW846 8260B |
| Carbon tetrachloride | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloroform | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| Chlorobenzene | < 0.23 | 0.23 | 0.73 | | ug/L | | 5/28/99 | SW846 8260B |
| Chlorodibromomethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloroethane | < 0.54 | 0.54 | 1.7 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloromethane | < 0.61 | 0.61 | 1.9 | | ug/L | | 5/28/99 | SW846 8260B |
| 2-Chlorotoluene | < 0.31 | 0.31 | 0.99 | | ug/L | | 5/28/99 | SW846 8260B |
| 4-Chlorotoluene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dibromo-3-chloropropane | < 0.41 | 0.41 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dibromoethane | < 0.39 | 0.39 | 1.2 | | ug/L | | 5/28/99 | SW846 8260B |
| Dibromomethane | < 0.53 | 0.53 | 1.7 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,3-Dichlorobenzene | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,4-Dichlorobenzene | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichloroethane | < 0.37 | 0.37 | 1.2 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichlorobenzene | < 0.25 | 0.25 | 0.80 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloroethene | < 0.43 | 0.43 | 1.4 | | ug/L | | 5/28/99 | SW846 8260B |
| cis-1,2-Dichloroethene | < 0.28 | 0.28 | 0.89 | | ug/L | | 5/28/99 | SW846 8260B |
| Dichlorodifluoromethane | < 0.47 | 0.47 | 1.5 | | ug/L | | 5/28/99 | SW846 8260B |
| trans-1,2-Dichloroethene | < 0.79 | 0.79 | 2.5 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichloropropane | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloroethane | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
Fax: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** MW18

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-012

**Collection Date :** 5/25/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1,3-Dichloropropane | < 0.42 | 0.42 | 1.3 | ug/L | | 5/28/99 | SW846 8260B |
| 2,2-Dichloropropane | < 0.36 | 0.36 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloropropene | < 0.81 | 0.81 | 2.6 | ug/L | | 5/28/99 | SW846 8260B |
| cis-1,3-Dichloropropene | < 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| trans-1,3-Dichloropropene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Diisopropyl ether | < 0.55 | 0.55 | 1.8 | ug/L | | 5/28/99 | SW846 8260B |
| Ethylbenzene | < 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| Fluorotrichloromethane | < 0.28 | 0.28 | 0.89 | ug/L | | 5/28/99 | SW846 8260B |
| Hexachlorobutadiene | < 0.62 | 0.62 | 2.0 | ug/L | | 5/28/99 | SW846 8260B |
| Isopropylbenzene | < 0.26 | 0.26 | 0.83 | ug/L | | 5/28/99 | SW846 8260B |
| p-Isopropyltoluene | < 0.24 | 0.24 | 0.76 | ug/L | | 5/28/99 | SW846 8260B |
| Methylene chloride | 0.90 | 0.36 | 1.1 | ug/L | Q | 5/28/99 | SW846 8260B |
| Methyl-tert-butyl-ether | < 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| Naphthalene | < 0.35 | 0.35 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| n-Propylbenzene | < 0.76 | 0.76 | 2.4 | ug/L | | 5/28/99 | SW846 8260B |
| Styrene | < 0.17 | 0.17 | 0.54 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,2,2-Tetrachloroethane | < 0.69 | 0.69 | 2.2 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,1,2-Tetrachloroethane | < 0.70 | 0.70 | 2.2 | ug/L | | 5/28/99 | SW846 8260B |
| Tetrachloroethene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Toluene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,3-Trichlorobenzene | < 0.47 | 0.47 | 1.5 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,4-Trichlorobenzene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,1-Trichloroethane | < 0.30 | 0.30 | 0.96 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,2-Trichloroethane | < 0.61 | 0.61 | 1.9 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,4-Trimethylbenzene | < 0.22 | 0.22 | 0.70 | ug/L | | 5/28/99 | SW846 8260B |
| Trichloroethene | < 0.37 | 0.37 | 1.2 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,3-Trichloropropane | < 0.75 | 0.75 | 2.4 | ug/L | | 5/28/99 | SW846 8260B |
| 1,3,5-Trimethylbenzene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/28/99 | SW846 8260B |
| Vinyl chloride | < 0.20 | 0.20 | 0.64 | ug/L | | 5/28/99 | SW846 8260B |
| Xylenes, -m, -p | < 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Xylene, -o | < 0.24 | 0.24 | 0.76 | ug/L | | 5/28/99 | SW846 8260B |
| 4-Bromofluorobenzene | 112 | | | %Recov | | 5/28/99 | SW846 8260B |
| Dibromofluoromethane | 113 | | | %Recov | | 5/28/99 | SW846 8260B |
| Toluene-d8 | 111 | | | %Recov | | 5/28/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Client : NATURAL RESOURCE TECHNOLOGY, INC

Field ID : MW18

Report Date : 6/25/99

Lab Sample Number : 892781-012

Collection Date : 5/25/99

WI DNR LAB ID : 405132750

Matrix Type : WATER

## Organic Results

HERBICIDES — Prep Method: SW846 — Prep Date: — Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 69 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | 0.54 | 0.052 | 0.17 | | ug/L | | 6/18/99 | SW846 8151 |

## Organic Results

PAH (HPLC) LIST - SEMIVOLATILES — Prep Method: SW846 3510 — Prep Date: 5/28/99 — Analyst: ARO

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Acenaphthene | < 0.47 | 0.47 | 1.5 | | ug/L | | 5/28/99 | SW846 8310 |
| Acenaphthylene | < 0.41 | 0.41 | 1.3 | | ug/L | | 5/28/99 | SW846 8310 |
| Anthracene | < 0.021 | 0.021 | 0.067 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(a)anthracene | < 0.014 | 0.014 | 0.045 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(a)pyrene | < 0.015 | 0.015 | 0.048 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(b)fluoranthene | < 0.015 | 0.015 | 0.048 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(g,h,i)perylene | < 0.021 | 0.021 | 0.067 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(k)fluoranthene | < 0.0090 | 0.0090 | 0.029 | | ug/L | | 5/28/99 | SW846 8310 |
| Chrysene | < 0.016 | 0.016 | 0.051 | | ug/L | | 5/28/99 | SW846 8310 |
| Dibenzo(a,h)anthracene | < 0.020 | 0.020 | 0.064 | | ug/L | | 5/28/99 | SW846 8310 |
| Fluoranthene | < 0.015 | 0.015 | 0.048 | | ug/L | | 5/28/99 | SW846 8310 |
| Fluorene | < 0.058 | 0.058 | 0.18 | | ug/L | | 5/28/99 | SW846 8310 |
| Indeno(1,2,3-cd)pyrene | < 0.025 | 0.025 | 0.080 | | ug/L | | 5/28/99 | SW846 8310 |
| 1-Methylnaphthalene | < 0.36 | 0.36 | 1.1 | | ug/L | | 5/28/99 | SW846 8310 |
| 2-Methylnaphthalene | < 0.36 | 0.36 | 1.1 | | ug/L | | 5/28/99 | SW846 8310 |
| Naphthalene | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8310 |
| Phenanthrene | < 0.046 | 0.046 | 0.15 | | ug/L | | 5/28/99 | SW846 8310 |
| Pyrene | < 0.017 | 0.017 | 0.054 | | ug/L | | 5/28/99 | SW846 8310 |
| 9,10-Diphenylanthracene | 82.1 | | | | %Recov | | 5/28/99 | SW846 8310 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN
**Project Number :**
**Field ID :** PMW18
**Lab Sample Number :** 892781-013
**WI DNR LAB ID :** 405132750

**Client :** NATURAL RESOURCE TECHNOLOGY, INC
**Report Date :** 6/25/99
**Collection Date :** 5/25/99
**Matrix Type :** WATER

## Organic Results

**EPA 8260 VOLATILE LIST- WATER** **Prep Method:** SW846 5030B **Prep Date:** 5/28/99 **Analyst:** HW

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Benzene | < 0.27 | 0.27 | 0.86 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromobenzene | < 0.83 | 0.83 | 2.6 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromochloromethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromodichloromethane | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromoform | < 0.44 | 0.44 | 1.4 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromomethane | < 0.70 | 0.70 | 2.2 | | ug/L | | 5/28/99 | SW846 8260B |
| s-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/28/99 | SW846 8260B |
| t-Butylbenzene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/28/99 | SW846 8260B |
| n-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/28/99 | SW846 8260B |
| Carbon tetrachloride | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloroform | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| Chlorobenzene | < 0.23 | 0.23 | 0.73 | | ug/L | | 5/28/99 | SW846 8260B |
| Chlorodibromomethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloroethane | < 0.54 | 0.54 | 1.7 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloromethane | < 0.61 | 0.61 | 1.9 | | ug/L | | 5/28/99 | SW846 8260B |
| 2-Chlorotoluene | < 0.31 | 0.31 | 0.99 | | ug/L | | 5/28/99 | SW846 8260B |
| 4-Chlorotoluene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dibromo-3-chloropropane | < 0.41 | 0.41 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dibromoethane | < 0.39 | 0.39 | 1.2 | | ug/L | | 5/28/99 | SW846 8260B |
| Dibromomethane | < 0.53 | 0.53 | 1.7 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,3-Dichlorobenzene | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,4-Dichlorobenzene | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichloroethane | < 0.37 | 0.37 | 1.2 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichlorobenzene | < 0.25 | 0.25 | 0.80 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloroethene | < 0.43 | 0.43 | 1.4 | | ug/L | | 5/28/99 | SW846 8260B |
| cis-1,2-Dichloroethene | < 0.28 | 0.28 | 0.89 | | ug/L | | 5/28/99 | SW846 8260B |
| Dichlorodifluoromethane | < 0.47 | 0.47 | 1.5 | | ug/L | | 5/28/99 | SW846 8260B |
| trans-1,2-Dichloroethene | < 0.79 | 0.79 | 2.5 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichloropropane | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloroethane | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** PMW18

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-013

**Collection Date :** 5/25/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1,3-Dichloropropane | < 0.42 | 0.42 | 1.3 | ug/L | | 5/28/99 | SW846 8260B |
| 2,2-Dichloropropane | < 0.36 | 0.36 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloropropene | < 0.81 | 0.81 | 2.6 | ug/L | | 5/28/99 | SW846 8260B |
| cis-1,3-Dichloropropene | < 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| trans-1,3-Dichloropropene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Diisopropyl ether | < 0.55 | 0.55 | 1.8 | ug/L | | 5/28/99 | SW846 8260B |
| Ethylbenzene | < 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| Fluorotrichloromethane | < 0.28 | 0.28 | 0.89 | ug/L | | 5/28/99 | SW846 8260B |
| Hexachlorobutadiene | < 0.62 | 0.62 | 2.0 | ug/L | | 5/28/99 | SW846 8260B |
| Isopropylbenzene | < 0.26 | 0.26 | 0.83 | ug/L | | 5/28/99 | SW846 8260B |
| p-Isopropyltoluene | < 0.24 | 0.24 | 0.76 | ug/L | | 5/28/99 | SW846 8260B |
| Methylene chloride | 0.99 | 0.36 | 1.1 | ug/L | Q | 5/28/99 | SW846 8260B |
| Methyl-tert-butyl-ether | < 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| Naphthalene | < 0.35 | 0.35 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| n-Propylbenzene | < 0.76 | 0.76 | 2.4 | ug/L | | 5/28/99 | SW846 8260B |
| Styrene | < 0.17 | 0.17 | 0.54 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,2,2-Tetrachloroethane | < 0.69 | 0.69 | 2.2 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,1,2-Tetrachloroethane | < 0.70 | 0.70 | 2.2 | ug/L | | 5/28/99 | SW846 8260B |
| Tetrachloroethene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Toluene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,3-Trichlorobenzene | < 0.47 | 0.47 | 1.5 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,4-Trichlorobenzene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,1-Trichloroethane | < 0.30 | 0.30 | 0.96 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,2-Trichloroethane | < 0.61 | 0.61 | 1.9 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,4-Trimethylbenzene | < 0.22 | 0.22 | 0.70 | ug/L | | 5/28/99 | SW846 8260B |
| Trichloroethene | < 0.37 | 0.37 | 1.2 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,3-Trichloropropane | < 0.75 | 0.75 | 2.4 | ug/L | | 5/28/99 | SW846 8260B |
| 1,3,5-Trimethylbenzene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/28/99 | SW846 8260B |
| Vinyl chloride | < 0.20 | 0.20 | 0.64 | ug/L | | 5/28/99 | SW846 8260B |
| Xylenes, -m, -p | < 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Xylene, -o | < 0.24 | 0.24 | 0.76 | ug/L | | 5/28/99 | SW846 8260B |
| 4-Bromofluorobenzene | 112 | | | %Recov | | 5/28/99 | SW846 8260B |
| Dibromofluoromethane | 113 | | | %Recov | | 5/28/99 | SW846 8260B |
| Toluene-d8 | 110 | | | %Recov | | 5/28/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Client : NATURAL RESOURCE TECHNOLOGY, INC

Field ID : PMW18

Report Date : 6/25/99

Lab Sample Number : 892781-013

Collection Date : 5/25/99

WI DNR LAB ID : 405132750

Matrix Type : WATER

## Organic Results

HERBICIDES Prep Method: SW846 Prep Date: Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 76 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | 0.15 | 0.052 | 0.17 | | ug/L | Q | 6/18/99 | SW846 8151 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN
**Project Number :**
**Field ID :** MW11
**Lab Sample Number :** 892781-014
**WI DNR LAB ID :** 405132750

**Client :** NATURAL RESOURCE TECHNOLOGY, INC
**Report Date :** 6/25/99
**Collection Date :** 5/25/99
**Matrix Type :** WATER

## Inorganic Results

| Test | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Prep Method | Analysis Method | Analys |
|---|---|---|---|---|---|---|---|---|---|---|
| Iron - Dissolved | 4300 | 47 | 150 | | ug/L | | 6/3/99 | SW846 6010 | SW846 6010 | CCR |
| Chloride - Dissolved | 7.5 | 2.4 | 7.6 | | mg/L | QED | 6/2/99 | EPA 300.0 | EPA 300.0 | *MD |
| Nitrogen, NO3 + NO2 | 0.030 | 0.017 | 0.054 | | mg/L | Q | 6/7/99 | EPA 353.2 | EPA 353.2 | *MD |
| Sulfate | 9.9 | 0.62 | 2.0 | | mg/L | ED | 6/2/99 | EPA 300.0 | EPA 300.0 | *MD |

## Organic Results

EPA 8260 VOLATILE LIST- WATER — Prep Method: SW846 5030B — Prep Date: 5/28/99 — Analyst: HW

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Benzene | < 0.27 | 0.27 | 0.86 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromobenzene | < 0.83 | 0.83 | 2.6 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromochloromethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromodichloromethane | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromoform | < 0.44 | 0.44 | 1.4 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromomethane | < 0.70 | 0.70 | 2.2 | | ug/L | | 5/28/99 | SW846 8260B |
| s-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/28/99 | SW846 8260B |
| t-Butylbenzene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/28/99 | SW846 8260B |
| n-Butylbenzene | 0.41 | 0.29 | 0.92 | | ug/L | Q | 5/28/99 | SW846 8260B |
| Carbon tetrachloride | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloroform | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| Chlorobenzene | < 0.23 | 0.23 | 0.73 | | ug/L | | 5/28/99 | SW846 8260B |
| Chlorodibromomethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloroethane | < 0.54 | 0.54 | 1.7 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloromethane | < 0.61 | 0.61 | 1.9 | | ug/L | | 5/28/99 | SW846 8260B |
| 2-Chlorotoluene | < 0.31 | 0.31 | 0.99 | | ug/L | | 5/28/99 | SW846 8260B |
| 4-Chlorotoluene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dibromo-3-chloropropane | < 0.41 | 0.41 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dibromoethane | < 0.39 | 0.39 | 1.2 | | ug/L | | 5/28/99 | SW846 8260B |
| Dibromomethane | < 0.53 | 0.53 | 1.7 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,3-Dichlorobenzene | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,4-Dichlorobenzene | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/28/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** MW11

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-014

**Collection Date :** 5/25/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane | < | 0.37 | 0.37 | 1.2 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichlorobenzene | < | 0.25 | 0.25 | 0.80 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloroethene | < | 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| cis-1,2-Dichloroethene | < | 0.28 | 0.28 | 0.89 | ug/L | | 5/28/99 | SW846 8260B |
| Dichlorodifluoromethane | < | 0.47 | 0.47 | 1.5 | ug/L | | 5/28/99 | SW846 8260B |
| trans-1,2-Dichloroethene | < | 0.79 | 0.79 | 2.5 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichloropropane | < | 0.35 | 0.35 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloroethane | < | 0.35 | 0.35 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| 1,3-Dichloropropane | < | 0.42 | 0.42 | 1.3 | ug/L | | 5/28/99 | SW846 8260B |
| 2,2-Dichloropropane | < | 0.36 | 0.36 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloropropene | < | 0.81 | 0.81 | 2.6 | ug/L | | 5/28/99 | SW846 8260B |
| cis-1,3-Dichloropropene | < | 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| trans-1,3-Dichloropropene | < | 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Diisopropyl ether | < | 0.55 | 0.55 | 1.8 | ug/L | | 5/28/99 | SW846 8260B |
| Ethylbenzene | < | 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| Fluorotrichloromethane | < | 0.28 | 0.28 | 0.89 | ug/L | | 5/28/99 | SW846 8260B |
| Hexachlorobutadiene | < | 0.62 | 0.62 | 2.0 | ug/L | | 5/28/99 | SW846 8260B |
| Isopropylbenzene | < | 0.26 | 0.26 | 0.83 | ug/L | | 5/28/99 | SW846 8260B |
| p-Isopropyltoluene | < | 0.24 | 0.24 | 0.76 | ug/L | | 5/28/99 | SW846 8260B |
| Methylene chloride | | 1.2 | 0.36 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| Methyl-tert-butyl-ether | < | 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| Naphthalene | | 14 | 0.35 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| n-Propylbenzene | < | 0.76 | 0.76 | 2.4 | ug/L | | 5/28/99 | SW846 8260B |
| Styrene | < | 0.17 | 0.17 | 0.54 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,2,2-Tetrachloroethane | < | 0.69 | 0.69 | 2.2 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,1,2-Tetrachloroethane | < | 0.70 | 0.70 | 2.2 | ug/L | | 5/28/99 | SW846 8260B |
| Tetrachloroethene | < | 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Toluene | < | 0.27 | 0.27 | 0.86 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,3-Trichlorobenzene | < | 0.47 | 0.47 | 1.5 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,4-Trichlorobenzene | < | 0.27 | 0.27 | 0.86 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,1-Trichloroethane | < | 0.30 | 0.30 | 0.96 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,2-Trichloroethane | < | 0.61 | 0.61 | 1.9 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,4-Trimethylbenzene | | 4.1 | 0.22 | 0.70 | ug/L | | 5/28/99 | SW846 8260B |
| Trichloroethene | < | 0.37 | 0.37 | 1.2 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,3-Trichloropropane | < | 0.75 | 0.75 | 2.4 | ug/L | | 5/28/99 | SW846 8260B |
| 1,3,5-Trimethylbenzene | | 0.34 | 0.27 | 0.86 | ug/L | Q | 5/28/99 | SW846 8260B |

ENCHEM INC.
1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
Fax: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN
**Project Number :**
**Client :** NATURAL RESOURCE TECHNOLOGY, INC
**Field ID :** MW11
**Report Date :** 6/25/99
**Lab Sample Number :** 892781-014
**Collection Date :** 5/25/99
**WI DNR LAB ID :** 405132750
**Matrix Type :** WATER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Vinyl chloride | < 0.20 | 0.20 | 0.64 | ug/L | | 5/28/99 | SW846 8260B |
| Xylenes, -m, -p | 1.0 | 0.43 | 1.4 | ug/L | Q | 5/28/99 | SW846 8260B |
| Xylene, -o | 1.2 | 0.24 | 0.76 | ug/L | | 5/28/99 | SW846 8260B |
| 4-Bromofluorobenzene | 112 | | | %Recov | | 5/28/99 | SW846 8260B |
| Dibromofluoromethane | 114 | | | %Recov | | 5/28/99 | SW846 8260B |
| Toluene-d8 | 111 | | | %Recov | | 5/28/99 | SW846 8260B |

## Organic Results

**HERBICIDES** — **Prep Method:** SW846 — **Prep Date:** — **Analyst:** *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | < 1.0 | | | | %Recov | DL | 6/22/99 | SW846 8151 |
| Pentachlorophenol | 170 | 26 | 83 | | ug/L | | 6/22/99 | SW846 8151 |

## Organic Results

**METHANE** — **Prep Method:** MOD. 8015 — **Prep Date:** 6/1/99 — **Analyst:** JJB

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Methane | 180 | 8.8 | 28 | | ug/l | | 6/1/99 | MOD. 8015 |

## Organic Results

**PAH (HPLC) LIST - SEMIVOLATILES** — **Prep Method:** SW846 3510 — **Prep Date:** 5/28/99 — **Analyst:** ARO

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Acenaphthene | < 0.47 | 0.47 | 1.5 | | ug/L | | 6/1/99 | SW846 8310 |
| Acenaphthylene | 26 | 8.2 | 26 | | ug/L | | 6/1/99 | SW846 8310 |
| Anthracene | < 0.021 | 0.021 | 0.067 | | ug/L | | 6/1/99 | SW846 8310 |
| Benzo(a)anthracene | < 0.014 | 0.014 | 0.045 | | ug/L | | 6/1/99 | SW846 8310 |
| Benzo(a)pyrene | < 0.015 | 0.015 | 0.048 | | ug/L | | 6/1/99 | SW846 8310 |
| Benzo(b)fluoranthene | < 0.015 | 0.015 | 0.048 | | ug/L | | 6/1/99 | SW846 8310 |
| Benzo(g,h,i)perylene | < 0.021 | 0.021 | 0.067 | | ug/L | | 6/1/99 | SW846 8310 |
| Benzo(k)fluoranthene | < 0.0090 | 0.0090 | 0.029 | | ug/L | | 6/1/99 | SW846 8310 |
| Chrysene | < 0.016 | 0.016 | 0.051 | | ug/L | | 6/1/99 | SW846 8310 |
| Dibenzo(a,h)anthracene | < 0.020 | 0.020 | 0.064 | | ug/L | | 6/1/99 | SW846 8310 |
| Fluoranthene | < 0.015 | 0.015 | 0.048 | | ug/L | | 6/1/99 | SW846 8310 |

ENCHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** MW11

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-014

**Collection Date :** 5/25/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Fluorene | | 0.26 | 0.058 | 0.18 | ug/L | | 6/1/99 | SW846 8310 |
| Indeno(1,2,3-cd)pyrene | < | 0.025 | 0.025 | 0.080 | ug/L | | 6/1/99 | SW846 8310 |
| 1-Methylnaphthalene | | 12 | 7.2 | 23 | ug/L | Q | 6/1/99 | SW846 8310 |
| 2-Methylnaphthalene | | 4.3 | 0.36 | 1.1 | ug/L | | 6/1/99 | SW846 8310 |
| Naphthalene | | 1.8 | 0.42 | 1.3 | ug/L | | 6/1/99 | SW846 8310 |
| Phenanthrene | | 3.7 | 0.92 | 2.9 | ug/L | | 6/1/99 | SW846 8310 |
| Pyrene | < | 0.017 | 0.017 | 0.054 | ug/L | | 6/1/99 | SW846 8310 |
| 9,10-Diphenylanthracene | | 90.7 | | | %Recov | | 6/1/99 | SW846 8310 |

ENCHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN
**Project Number :**
**Field ID :** MW10
**Lab Sample Number :** 892781-015
**WI DNR LAB ID :** 405132750

**Client :** NATURAL RESOURCE TECHNOLOGY, INC
**Report Date :** 6/25/99
**Collection Date :** 5/25/99
**Matrix Type :** WATER

## Inorganic Results

| Test | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Prep Method | Analysis Method | Analys |
|---|---|---|---|---|---|---|---|---|---|---|
| Iron - Dissolved | 27000 | 47 | 150 | | ug/L | | 6/3/99 | SW846 6010 | SW846 6010 | CCR |
| Chloride - Dissolved | 3.9 | 2.4 | 7.6 | | mg/L | QED | 6/2/99 | EPA 300.0 | EPA 300.0 | *MD |
| Nitrogen, NO3 + NO2 | 0.025 | 0.017 | 0.054 | | mg/L | Q | 6/7/99 | EPA 353.2 | EPA 353.2 | *MD |
| Sulfate | 4.4 | 0.62 | 2.0 | | mg/L | ED | 6/2/99 | EPA 300.0 | EPA 300.0 | *MD |

## Organic Results

EPA 8260 VOLATILE LIST- WATER — Prep Method: SW846 5030B — Prep Date: 5/28/99 — Analyst: HW

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Benzene | < 0.27 | 0.27 | 0.86 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromobenzene | < 0.83 | 0.83 | 2.6 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromochloromethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromodichloromethane | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromoform | < 0.44 | 0.44 | 1.4 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromomethane | < 0.70 | 0.70 | 2.2 | | ug/L | | 5/28/99 | SW846 8260B |
| s-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/28/99 | SW846 8260B |
| t-Butylbenzene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/28/99 | SW846 8260B |
| n-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/28/99 | SW846 8260B |
| Carbon tetrachloride | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloroform | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| Chlorobenzene | < 0.23 | 0.23 | 0.73 | | ug/L | | 5/28/99 | SW846 8260B |
| Chlorodibromomethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloroethane | < 0.54 | 0.54 | 1.7 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloromethane | < 0.61 | 0.61 | 1.9 | | ug/L | | 5/28/99 | SW846 8260B |
| 2-Chlorotoluene | < 0.31 | 0.31 | 0.99 | | ug/L | | 5/28/99 | SW846 8260B |
| 4-Chlorotoluene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dibromo-3-chloropropane | < 0.41 | 0.41 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dibromoethane | < 0.39 | 0.39 | 1.2 | | ug/L | | 5/28/99 | SW846 8260B |
| Dibromomethane | < 0.53 | 0.53 | 1.7 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,3-Dichlorobenzene | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,4-Dichlorobenzene | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/28/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** MW10

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-015

**Collection Date :** 5/25/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane | < 0.37 | 0.37 | 1.2 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichlorobenzene | < 0.25 | 0.25 | 0.80 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloroethene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| cis-1,2-Dichloroethene | < 0.28 | 0.28 | 0.89 | ug/L | | 5/28/99 | SW846 8260B |
| Dichlorodifluoromethane | < 0.47 | 0.47 | 1.5 | ug/L | | 5/28/99 | SW846 8260B |
| trans-1,2-Dichloroethene | < 0.79 | 0.79 | 2.5 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichloropropane | < 0.35 | 0.35 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloroethane | < 0.35 | 0.35 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| 1,3-Dichloropropane | < 0.42 | 0.42 | 1.3 | ug/L | | 5/28/99 | SW846 8260B |
| 2,2-Dichloropropane | < 0.36 | 0.36 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloropropene | < 0.81 | 0.81 | 2.6 | ug/L | | 5/28/99 | SW846 8260B |
| cis-1,3-Dichloropropene | < 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| trans-1,3-Dichloropropene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Diisopropyl ether | < 0.55 | 0.55 | 1.8 | ug/L | | 5/28/99 | SW846 8260B |
| Ethylbenzene | < 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| Fluorotrichloromethane | < 0.28 | 0.28 | 0.89 | ug/L | | 5/28/99 | SW846 8260B |
| Hexachlorobutadiene | < 0.62 | 0.62 | 2.0 | ug/L | | 5/28/99 | SW846 8260B |
| Isopropylbenzene | < 0.26 | 0.26 | 0.83 | ug/L | | 5/28/99 | SW846 8260B |
| p-Isopropyltoluene | < 0.24 | 0.24 | 0.76 | ug/L | | 5/28/99 | SW846 8260B |
| Methylene chloride | 0.89 | 0.36 | 1.1 | ug/L | Q | 5/28/99 | SW846 8260B |
| Methyl-tert-butyl-ether | < 0.32 | 0.32 | 1.0 | ug/L | | 5/28/99 | SW846 8260B |
| Naphthalene | 28 | 0.35 | 1.1 | ug/L | | 5/28/99 | SW846 8260B |
| n-Propylbenzene | < 0.76 | 0.76 | 2.4 | ug/L | | 5/28/99 | SW846 8260B |
| Styrene | < 0.17 | 0.17 | 0.54 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,2,2-Tetrachloroethane | < 0.69 | 0.69 | 2.2 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,1,2-Tetrachloroethane | < 0.70 | 0.70 | 2.2 | ug/L | | 5/28/99 | SW846 8260B |
| Tetrachloroethene | < 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Toluene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,3-Trichlorobenzene | < 0.47 | 0.47 | 1.5 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,4-Trichlorobenzene | < 0.27 | 0.27 | 0.86 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,1-Trichloroethane | < 0.30 | 0.30 | 0.96 | ug/L | | 5/28/99 | SW846 8260B |
| 1,1,2-Trichloroethane | < 0.61 | 0.61 | 1.9 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,4-Trimethylbenzene | 3.4 | 0.22 | 0.70 | ug/L | | 5/28/99 | SW846 8260B |
| Trichloroethene | < 0.37 | 0.37 | 1.2 | ug/L | | 5/28/99 | SW846 8260B |
| 1,2,3-Trichloropropane | < 0.75 | 0.75 | 2.4 | ug/L | | 5/28/99 | SW846 8260B |
| 1,3,5-Trimethylbenzene | 0.39 | 0.27 | 0.86 | ug/L | Q | 5/28/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** MW10

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-015

**Collection Date :** 5/25/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Vinyl chloride | < 0.20 | 0.20 | 0.64 | ug/L | | 5/28/99 | SW846 8260B |
| Xylenes, -m, -p | < 0.43 | 0.43 | 1.4 | ug/L | | 5/28/99 | SW846 8260B |
| Xylene, -o | 0.64 | 0.24 | 0.76 | ug/L | Q | 5/28/99 | SW846 8260B |
| 4-Bromofluorobenzene | 112 | | | %Recov | | 5/28/99 | SW846 8260B |
| Dibromofluoromethane | 113 | | | %Recov | | 5/28/99 | SW846 8260B |
| Toluene-d8 | 111 | | | %Recov | | 5/28/99 | SW846 8260B |

## Organic Results

**HERBICIDES** — **Prep Method:** SW846 — **Prep Date:** — **Analyst:** *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 77 | | | | %Recov | | 6/20/99 | SW846 8151 |
| Pentachlorophenol | 4.6 | 1.0 | 3.2 | | ug/L | | 6/20/99 | SW846 8151 |

## Organic Results

**METHANE** — **Prep Method:** MOD. 8015 — **Prep Date:** 6/1/99 — **Analyst:** JJB

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Methane | 3100 | 88 | 280 | | ug/l | | 6/1/99 | MOD. 8015 |

## Organic Results

**PAH (HPLC) LIST - SEMIVOLATILES** — **Prep Method:** SW846 3510 — **Prep Date:** 5/28/99 — **Analyst:** ARO

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Acenaphthene | < 2.4 | 2.4 | 7.6 | | ug/L | | 6/1/99 | SW846 8310 |
| Acenaphthylene | 3.7 | 2.0 | 6.4 | | ug/L | Q | 6/1/99 | SW846 8310 |
| Anthracene | < 0.10 | 0.10 | 0.32 | | ug/L | | 6/1/99 | SW846 8310 |
| Benzo(a)anthracene | < 0.070 | 0.070 | 0.22 | | ug/L | | 6/1/99 | SW846 8310 |
| Benzo(a)pyrene | < 0.075 | 0.075 | 0.24 | | ug/L | | 6/1/99 | SW846 8310 |
| Benzo(b)fluoranthene | < 0.075 | 0.075 | 0.24 | | ug/L | | 6/1/99 | SW846 8310 |
| Benzo(g,h,i)perylene | < 0.10 | 0.10 | 0.32 | | ug/L | | 6/1/99 | SW846 8310 |
| Benzo(k)fluoranthene | < 0.045 | 0.045 | 0.14 | | ug/L | | 6/1/99 | SW846 8310 |
| Chrysene | < 0.080 | 0.080 | 0.25 | | ug/L | | 6/1/99 | SW846 8310 |
| Dibenzo(a,h)anthracene | < 0.100 | 0.10 | 0.32 | | ug/L | | 6/1/99 | SW846 8310 |
| Fluoranthene | < 0.075 | 0.075 | 0.24 | | ug/L | | 6/1/99 | SW846 8310 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** MW10

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-015

**Collection Date :** 5/25/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Fluorene | < | 0.29 | 0.29 | 0.92 | ug/L | 6/1/99 | SW846 8310 |
| Indeno(1,2,3-cd)pyrene | < | 0.12 | 0.12 | 0.38 | ug/L | 6/1/99 | SW846 8310 |
| 1-Methylnaphthalene | | 14 | 1.8 | 5.7 | ug/L | 6/1/99 | SW846 8310 |
| 2-Methylnaphthalene | | 8.3 | 1.8 | 5.7 | ug/L | 6/1/99 | SW846 8310 |
| Naphthalene | | 14 | 2.1 | 6.7 | ug/L | 6/1/99 | SW846 8310 |
| Phenanthrene | | 1.5 | 0.23 | 0.73 | ug/L | 6/1/99 | SW846 8310 |
| Pyrene | < | 0.085 | 0.085 | 0.27 | ug/L | 6/1/99 | SW846 8310 |
| 9,10-Diphenylanthracene | | 60.3 | | | %Recov | 6/1/99 | SW846 8310 |

ENCHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Client : NATURAL RESOURCE TECHNOLOGY, INC

Field ID : MW1

Report Date : 6/25/99

Lab Sample Number : 892781-016

Collection Date : 5/25/99

WI DNR LAB ID : 405132750

Matrix Type : WATER

## Organic Results

HERBICIDES — Prep Method: SW846 — Prep Date: — Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 69 | | | | %Recov | | 6/20/99 | SW846 8151 |
| Pentachlorophenol | 1.3 | 0.52 | 1.7 | | ug/L | Q | 6/20/99 | SW846 8151 |

## Organic Results

PAH (HPLC) LIST - SEMIVOLATILES — Prep Method: SW846 3510 — Prep Date: 5/28/99 — Analyst: ARO

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 0.79 | 0.47 | 1.5 | | ug/L | Q | 6/3/99 | SW846 8310 |
| Acenaphthylene | 3.1 | 0.41 | 1.3 | | ug/L | | 6/3/99 | SW846 8310 |
| Anthracene | < 0.021 | 0.021 | 0.067 | | ug/L | | 6/3/99 | SW846 8310 |
| Benzo(a)anthracene | < 0.014 | 0.014 | 0.045 | | ug/L | | 6/3/99 | SW846 8310 |
| Benzo(a)pyrene | < 0.015 | 0.015 | 0.048 | | ug/L | | 6/3/99 | SW846 8310 |
| Benzo(b)fluoranthene | < 0.015 | 0.015 | 0.048 | | ug/L | | 6/3/99 | SW846 8310 |
| Benzo(g,h,i)perylene | < 0.021 | 0.021 | 0.067 | | ug/L | | 6/3/99 | SW846 8310 |
| Benzo(k)fluoranthene | < 0.0090 | 0.0090 | 0.029 | | ug/L | | 6/3/99 | SW846 8310 |
| Chrysene | < 0.016 | 0.016 | 0.051 | | ug/L | | 6/3/99 | SW846 8310 |
| Dibenzo(a,h)anthracene | < 0.020 | 0.020 | 0.064 | | ug/L | | 6/3/99 | SW846 8310 |
| Fluoranthene | < 0.015 | 0.015 | 0.048 | | ug/L | | 6/3/99 | SW846 8310 |
| Fluorene | 0.42 | 0.058 | 0.18 | | ug/L | | 6/3/99 | SW846 8310 |
| Indeno(1,2,3-cd)pyrene | < 0.025 | 0.025 | 0.080 | | ug/L | | 6/3/99 | SW846 8310 |
| 1-Methylnaphthalene | 13 | 3.6 | 11 | | ug/L | | 6/3/99 | SW846 8310 |
| 2-Methylnaphthalene | 16 | 3.6 | 11 | | ug/L | | 6/3/99 | SW846 8310 |
| Naphthalene | 5.4 | 4.2 | 13 | | ug/L | Q | 6/3/99 | SW846 8310 |
| Phenanthrene | 3.0 | 0.46 | 1.5 | | ug/L | | 6/3/99 | SW846 8310 |
| Pyrene | < 0.017 | 0.017 | 0.054 | | ug/L | | 6/3/99 | SW846 8310 |
| 9,10-Diphenylanthracene | 83.9 | | | | %Recov | | 6/3/99 | SW846 8310 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Client : NATURAL RESOURCE TECHNOLOGY, INC

Field ID : MW1

Report Date : 6/25/99

Lab Sample Number : 892781-016

Collection Date : 5/25/99

WI DNR LAB ID : 405132750

Matrix Type : WATER

## Organic Results

PVOC - WATER

Prep Method: SW846 5030B Prep Date: 5/28/99 Analyst: PMS

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| a,a,a-Trifluorotoluene | 98 | | | | %Recov | | 5/31/99 | MOD 8021B |
| Benzene | < 0.26 | 0.26 | 0.83 | | ug/l | | 5/31/99 | MOD 8021B |
| Ethylbenzene | 0.30 | 0.24 | 0.76 | | ug/l | Q | 5/31/99 | MOD 8021B |
| Methyl-tert-butyl-ether | < 0.22 | 0.22 | 0.70 | | ug/l | | 5/31/99 | MOD 8021B |
| Toluene | < 0.21 | 0.21 | 0.67 | | ug/l | | 5/31/99 | MOD 8021B |
| 1,3,5-Trimethylbenzene | 1.6 | 0.54 | 1.7 | | ug/l | Q | 5/31/99 | MOD 8021B |
| 1,2,4-Trimethylbenzene | 7.2 | 0.86 | 2.7 | | ug/l | | 5/31/99 | MOD 8021B |
| Xylenes, -m, -p | < 0.97 | 0.97 | 3.1 | | ug/l | | 5/31/99 | MOD 8021B |
| Xylene, -o | 0.55 | 0.37 | 1.2 | | ug/l | Q | 5/31/99 | MOD 8021B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Field ID : MW6

Lab Sample Number : 892781-017

WI DNR LAB ID : 405132750

Client : NATURAL RESOURCE TECHNOLOGY, INC

Report Date : 6/25/99

Collection Date : 5/25/99

Matrix Type : WATER

## Inorganic Results

| Test | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Prep Method | Analysis Method | Analys |
|---|---|---|---|---|---|---|---|---|---|---|
| Iron - Dissolved | 51 | 47 | 150 | | ug/L | Q | 6/3/99 | SW846 6010 | SW846 6010 | CCR |
| Chloride - Dissolved | 4.2 | 2.4 | 7.6 | | mg/L | QED | 6/2/99 | EPA 300.0 | EPA 300.0 | *MD |
| Nitrogen, NO3 + NO2 | 0.061 | 0.017 | 0.054 | | mg/L | | 6/7/99 | EPA 353.2 | EPA 353.2 | *MD |
| Sulfate | 9.2 | 0.62 | 2.0 | | mg/L | ED | 6/2/99 | EPA 300.0 | EPA 300.0 | *MD |

## Organic Results

HERBICIDES — Prep Method: SW846 — Prep Date: — Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 77 | | | | %Recov | | 6/18/99 | SW846 8151 |
| Pentachlorophenol | 1.9 | 1.0 | 3.2 | | ug/L | Q | 6/18/99 | SW846 8151 |

## Organic Results

METHANE — Prep Method: MOD. 8015 — Prep Date: 6/1/99 — Analyst: JJB

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Methane | 1.5 | 0.9 | 2.9 | | ug/l | Q | 6/1/99 | MOD. 8015 |

## Organic Results

PAH (HPLC) LIST - SEMIVOLATILES — Prep Method: SW846 3510 — Prep Date: 5/28/99 — Analyst: ARO

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Acenaphthene | < 0.47 | 0.47 | 1.5 | | ug/L | | 5/28/99 | SW846 8310 |
| Acenaphthylene | < 0.41 | 0.41 | 1.3 | | ug/L | | 5/28/99 | SW846 8310 |
| Anthracene | < 0.021 | 0.021 | 0.067 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(a)anthracene | < 0.014 | 0.014 | 0.045 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(a)pyrene | < 0.015 | 0.015 | 0.048 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(b)fluoranthene | < 0.015 | 0.015 | 0.048 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(g,h,i)perylene | < 0.021 | 0.021 | 0.067 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(k)fluoranthene | < 0.0090 | 0.0090 | 0.029 | | ug/L | | 5/28/99 | SW846 8310 |
| Chrysene | < 0.016 | 0.016 | 0.051 | | ug/L | | 5/28/99 | SW846 8310 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** MW6

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-017

**Collection Date :** 5/25/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dibenzo(a,h)anthracene | 0.039 | 0.020 | 0.064 | ug/L | Q | 5/28/99 | SW846 8310 |
| Fluoranthene | < 0.015 | 0.015 | 0.048 | ug/L | | 5/28/99 | SW846 8310 |
| Fluorene | < 0.058 | 0.058 | 0.18 | ug/L | | 5/28/99 | SW846 8310 |
| Indeno(1,2,3-cd)pyrene | < 0.025 | 0.025 | 0.080 | ug/L | | 5/28/99 | SW846 8310 |
| 1-Methylnaphthalene | < 0.36 | 0.36 | 1.1 | ug/L | | 5/28/99 | SW846 8310 |
| 2-Methylnaphthalene | < 0.36 | 0.36 | 1.1 | ug/L | | 5/28/99 | SW846 8310 |
| Naphthalene | < 0.42 | 0.42 | 1.3 | ug/L | | 5/28/99 | SW846 8310 |
| Phenanthrene | < 0.046 | 0.046 | 0.15 | ug/L | | 5/28/99 | SW846 8310 |
| Pyrene | < 0.017 | 0.017 | 0.054 | ug/L | | 5/28/99 | SW846 8310 |
| 9,10-Diphenylanthracene | 146 | | | %Recov | | 5/28/99 | SW846 8310 |

## Organic Results

PVOC - WATER **Prep Method:** SW846 5030B **Prep Date:** 5/28/99 **Analyst:** PMS

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| a,a,a-Trifluorotoluene | 98 | | | | %Recov | | 5/31/99 | MOD 8021B |
| Benzene | < 0.26 | 0.26 | 0.83 | | ug/l | | 5/31/99 | MOD 8021B |
| Ethylbenzene | < 0.24 | 0.24 | 0.76 | | ug/l | | 5/31/99 | MOD 8021B |
| Methyl-tert-butyl-ether | < 0.22 | 0.22 | 0.70 | | ug/l | | 5/31/99 | MOD 8021B |
| Toluene | < 0.21 | 0.21 | 0.67 | | ug/l | | 5/31/99 | MOD 8021B |
| 1,3,5-Trimethylbenzene | < 0.54 | 0.54 | 1.7 | | ug/l | | 5/31/99 | MOD 8021B |
| 1,2,4-Trimethylbenzene | < 0.86 | 0.86 | 2.7 | | ug/l | | 5/31/99 | MOD 8021B |
| Xylenes, -m, -p | < 0.97 | 0.97 | 3.1 | | ug/l | | 5/31/99 | MOD 8021B |
| Xylene, -o | < 0.37 | 0.37 | 1.2 | | ug/l | | 5/31/99 | MOD 8021B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN
**Project Number :**
**Field ID :** DUPLICATE
**Lab Sample Number :** 892781-018
**WI DNR LAB ID :** 405132750

**Client :** NATURAL RESOURCE TECHNOLOGY, INC
**Report Date :** 6/25/99
**Collection Date :** 5/25/99
**Matrix Type :** WATER

## Inorganic Results

| Test | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Prep Method | Analysis Method | Analys |
|---|---|---|---|---|---|---|---|---|---|---|
| Iron - Dissolved | < 47 | 47 | 150 | | ug/L | | 6/3/99 | SW846 6010 | SW846 6010 | CCR |
| Chloride - Dissolved | 4.1 | 2.4 | 7.6 | | mg/L | QED | 6/2/99 | EPA 300.0 | EPA 300.0 | *MD |
| Nitrogen, NO3 + NO2 | 0.055 | 0.017 | 0.054 | | mg/L | | 6/7/99 | EPA 353.2 | EPA 353.2 | *MD |
| Sulfate | 9.0 | 0.62 | 2.0 | | mg/L | ED | 6/2/99 | EPA 300.0 | EPA 300.0 | *MD |

## Organic Results

**HERBICIDES** — Prep Method: SW846 — Prep Date: — Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2,4-Dichlorophenyl Acetic Acid ( | 99 | | | | %Recov | | 6/20/99 | SW846 8151 |
| Pentachlorophenol | 1.9 | 0.53 | 1.7 | | ug/L | | 6/20/99 | SW846 8151 |

## Organic Results

**METHANE** — Prep Method: MOD. 8015 — Prep Date: 6/1/99 — Analyst: JJB

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Methane | < 0.9 | 0.9 | 2.9 | | ug/l | | 6/1/99 | MOD. 8015 |

## Organic Results

**PAH (HPLC) LIST - SEMIVOLATILES** — Prep Method: SW846 3510 — Prep Date: 5/28/99 — Analyst: ARO

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Acenaphthene | < 0.47 | 0.47 | 1.5 | | ug/L | | 5/28/99 | SW846 8310 |
| Acenaphthylene | < 0.41 | 0.41 | 1.3 | | ug/L | | 5/28/99 | SW846 8310 |
| Anthracene | < 0.021 | 0.021 | 0.067 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(a)anthracene | < 0.014 | 0.014 | 0.045 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(a)pyrene | < 0.015 | 0.015 | 0.048 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(b)fluoranthene | < 0.015 | 0.015 | 0.048 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(g,h,i)perylene | < 0.021 | 0.021 | 0.067 | | ug/L | | 5/28/99 | SW846 8310 |
| Benzo(k)fluoranthene | < 0.0090 | 0.0090 | 0.029 | | ug/L | | 5/28/99 | SW846 8310 |
| Chrysene | < 0.016 | 0.016 | 0.051 | | ug/L | | 5/28/99 | SW846 8310 |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** DUPLICATE

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-018

**Collection Date :** 5/25/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dibenzo(a,h)anthracene | 0.033 | 0.020 | 0.064 | ug/L | Q | 5/28/99 | SW846 8310 |
| Fluoranthene | < 0.015 | 0.015 | 0.048 | ug/L | | 5/28/99 | SW846 8310 |
| Fluorene | < 0.058 | 0.058 | 0.18 | ug/L | | 5/28/99 | SW846 8310 |
| Indeno(1,2,3-cd)pyrene | < 0.025 | 0.025 | 0.080 | ug/L | | 5/28/99 | SW846 8310 |
| 1-Methylnaphthalene | < 0.36 | 0.36 | 1.1 | ug/L | | 5/28/99 | SW846 8310 |
| 2-Methylnaphthalene | < 0.36 | 0.36 | 1.1 | ug/L | | 5/28/99 | SW846 8310 |
| Naphthalene | < 0.42 | 0.42 | 1.3 | ug/L | | 5/28/99 | SW846 8310 |
| Phenanthrene | < 0.046 | 0.046 | 0.15 | ug/L | | 5/28/99 | SW846 8310 |
| Pyrene | < 0.017 | 0.017 | 0.054 | ug/L | | 5/28/99 | SW846 8310 |
| 9,10-Diphenylanthracene | 139 | | | %Recov | | 5/28/99 | SW846 8310 |

## Organic Results

**PVOC - WATER** **Prep Method:** SW846 5030B **Prep Date:** 5/28/99 **Analyst:** PMS

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| a,a,a-Trifluorotoluene | 97 | | | | %Recov | | 5/31/99 | MOD 8021B |
| Benzene | < 0.26 | 0.26 | 0.83 | | ug/l | | 5/31/99 | MOD 8021B |
| Ethylbenzene | < 0.24 | 0.24 | 0.76 | | ug/l | | 5/31/99 | MOD 8021B |
| Methyl-tert-butyl-ether | < 0.22 | 0.22 | 0.70 | | ug/l | | 5/31/99 | MOD 8021B |
| Toluene | < 0.21 | 0.21 | 0.67 | | ug/l | | 5/31/99 | MOD 8021B |
| 1,3,5-Trimethylbenzene | < 0.54 | 0.54 | 1.7 | | ug/l | | 5/31/99 | MOD 8021B |
| 1,2,4-Trimethylbenzene | < 0.86 | 0.86 | 2.7 | | ug/l | | 5/31/99 | MOD 8021B |
| Xylenes, -m, -p | < 0.97 | 0.97 | 3.1 | | ug/l | | 5/31/99 | MOD 8021B |
| Xylene, -o | < 0.37 | 0.37 | 1.2 | | ug/l | | 5/31/99 | MOD 8021B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : C.M. CHRISTIANSEN

Project Number :

Client : NATURAL RESOURCE TECHNOLOGY, INC

Field ID : TRIP BLANK

Report Date : 6/25/99

Lab Sample Number : 892781-019

Collection Date : 5/25/99

WI DNR LAB ID : 405132750

Matrix Type : WATER

## Organic Results

EPA 8260 VOLATILE LIST- WATER

Prep Method: SW846 5030B Prep Date: 5/28/99 Analyst: HW

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Benzene | < 0.27 | 0.27 | 0.86 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromobenzene | < 0.83 | 0.83 | 2.6 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromochloromethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromodichloromethane | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromoform | < 0.44 | 0.44 | 1.4 | | ug/L | | 5/28/99 | SW846 8260B |
| Bromomethane | < 0.70 | 0.70 | 2.2 | | ug/L | | 5/28/99 | SW846 8260B |
| s-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/28/99 | SW846 8260B |
| t-Butylbenzene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/28/99 | SW846 8260B |
| n-Butylbenzene | < 0.29 | 0.29 | 0.92 | | ug/L | | 5/28/99 | SW846 8260B |
| Carbon tetrachloride | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloroform | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| Chlorobenzene | < 0.23 | 0.23 | 0.73 | | ug/L | | 5/28/99 | SW846 8260B |
| Chlorodibromomethane | < 0.42 | 0.42 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloroethane | < 0.54 | 0.54 | 1.7 | | ug/L | | 5/28/99 | SW846 8260B |
| Chloromethane | < 0.61 | 0.61 | 1.9 | | ug/L | | 5/28/99 | SW846 8260B |
| 2-Chlorotoluene | < 0.31 | 0.31 | 0.99 | | ug/L | | 5/28/99 | SW846 8260B |
| 4-Chlorotoluene | < 0.32 | 0.32 | 1.0 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dibromo-3-chloropropane | < 0.41 | 0.41 | 1.3 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dibromoethane | < 0.39 | 0.39 | 1.2 | | ug/L | | 5/28/99 | SW846 8260B |
| Dibromomethane | < 0.53 | 0.53 | 1.7 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,3-Dichlorobenzene | < 0.34 | 0.34 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,4-Dichlorobenzene | < 0.30 | 0.30 | 0.96 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichloroethane | < 0.37 | 0.37 | 1.2 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichlorobenzene | < 0.25 | 0.25 | 0.80 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloroethene | < 0.43 | 0.43 | 1.4 | | ug/L | | 5/28/99 | SW846 8260B |
| cis-1,2-Dichloroethene | < 0.28 | 0.28 | 0.89 | | ug/L | | 5/28/99 | SW846 8260B |
| Dichlorodifluoromethane | < 0.47 | 0.47 | 1.5 | | ug/L | | 5/28/99 | SW846 8260B |
| trans-1,2-Dichloroethene | < 0.79 | 0.79 | 2.5 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,2-Dichloropropane | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |
| 1,1-Dichloroethane | < 0.35 | 0.35 | 1.1 | | ug/L | | 5/28/99 | SW846 8260B |

EN CHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

**Project Name :** C.M. CHRISTIANSEN

**Project Number :**

**Client :** NATURAL RESOURCE TECHNOLOGY, INC

**Field ID :** TRIP BLANK

**Report Date :** 6/25/99

**Lab Sample Number :** 892781-019

**Collection Date :** 5/25/99

**WI DNR LAB ID :** 405132750

**Matrix Type :** WATER

| | | | | | | |
|---|---|---|---|---|---|---|
| 1,3-Dichloropropane | < 0.42 | 0.42 | 1.3 | ug/L | 5/28/99 | SW846 8260B |
| 2,2-Dichloropropane | < 0.36 | 0.36 | 1.1 | ug/L | 5/28/99 | SW846 8260B |
| 1,1-Dichloropropene | < 0.81 | 0.81 | 2.6 | ug/L | 5/28/99 | SW846 8260B |
| cis-1,3-Dichloropropene | < 0.32 | 0.32 | 1.0 | ug/L | 5/28/99 | SW846 8260B |
| trans-1,3-Dichloropropene | < 0.43 | 0.43 | 1.4 | ug/L | 5/28/99 | SW846 8260B |
| Diisopropyl ether | < 0.55 | 0.55 | 1.8 | ug/L | 5/28/99 | SW846 8260B |
| Ethylbenzene | < 0.32 | 0.32 | 1.0 | ug/L | 5/28/99 | SW846 8260B |
| Fluorotrichloromethane | < 0.28 | 0.28 | 0.89 | ug/L | 5/28/99 | SW846 8260B |
| Hexachlorobutadiene | < 0.62 | 0.62 | 2.0 | ug/L | 5/28/99 | SW846 8260B |
| Isopropylbenzene | < 0.26 | 0.26 | 0.83 | ug/L | 5/28/99 | SW846 8260B |
| p-Isopropyltoluene | < 0.24 | 0.24 | 0.76 | ug/L | 5/28/99 | SW846 8260B |
| Methylene chloride | 4.4 | 0.36 | 1.1 | ug/L | 5/28/99 | SW846 8260B |
| Methyl-tert-butyl-ether | < 0.32 | 0.32 | 1.0 | ug/L | 5/28/99 | SW846 8260B |
| Naphthalene | < 0.35 | 0.35 | 1.1 | ug/L | 5/28/99 | SW846 8260B |
| n-Propylbenzene | < 0.76 | 0.76 | 2.4 | ug/L | 5/28/99 | SW846 8260B |
| Styrene | < 0.17 | 0.17 | 0.54 | ug/L | 5/28/99 | SW846 8260B |
| 1,1,2,2-Tetrachloroethane | < 0.69 | 0.69 | 2.2 | ug/L | 5/28/99 | SW846 8260B |
| 1,1,1,2-Tetrachloroethane | < 0.70 | 0.70 | 2.2 | ug/L | 5/28/99 | SW846 8260B |
| Tetrachloroethene | < 0.43 | 0.43 | 1.4 | ug/L | 5/28/99 | SW846 8260B |
| Toluene | < 0.27 | 0.27 | 0.86 | ug/L | 5/28/99 | SW846 8260B |
| 1,2,3-Trichlorobenzene | < 0.47 | 0.47 | 1.5 | ug/L | 5/28/99 | SW846 8260B |
| 1,2,4-Trichlorobenzene | < 0.27 | 0.27 | 0.86 | ug/L | 5/28/99 | SW846 8260B |
| 1,1,1-Trichloroethane | < 0.30 | 0.30 | 0.96 | ug/L | 5/28/99 | SW846 8260B |
| 1,1,2-Trichloroethane | < 0.61 | 0.61 | 1.9 | ug/L | 5/28/99 | SW846 8260B |
| 1,2,4-Trimethylbenzene | < 0.22 | 0.22 | 0.70 | ug/L | 5/28/99 | SW846 8260B |
| Trichloroethene | < 0.37 | 0.37 | 1.2 | ug/L | 5/28/99 | SW846 8260B |
| 1,2,3-Trichloropropane | < 0.75 | 0.75 | 2.4 | ug/L | 5/28/99 | SW846 8260B |
| 1,3,5-Trimethylbenzene | < 0.27 | 0.27 | 0.86 | ug/L | 5/28/99 | SW846 8260B |
| Vinyl chloride | < 0.20 | 0.20 | 0.64 | ug/L | 5/28/99 | SW846 8260B |
| Xylenes, -m, -p | < 0.43 | 0.43 | 1.4 | ug/L | 5/28/99 | SW846 8260B |
| Xylene, -o | < 0.24 | 0.24 | 0.76 | ug/L | 5/28/99 | SW846 8260B |
| 4-Bromofluorobenzene | 112 | | | %Recov | 5/28/99 | SW846 8260B |
| Dibromofluoromethane | 111 | | | %Recov | 5/28/99 | SW846 8260B |
| Toluene-d8 | 110 | | | %Recov | 5/28/99 | SW846 8260B |

Natural
Resource
Technology, Inc.
N R T



August 18, 1999
(1226)

Ms. Margie Ring
Michigan Department of Environmental Quality
Marquette District Office
1990 U.S. Highway 41 South
Marquette, MI 49855

RE: Sampling Plan and Request for Soil Disposal Approval at K & W Landfill,
C.M. Christiansen Co., Inc., Former Pole Treatment Facility,
Phelps, Wisconsin

Dear Ms. Ring:

This letter is a follow-up on pending approvals for Waste Management Inc.'s (WMI's) acceptance of soil from the above referenced site for disposal at the K & W Landfill in Michigan. On August 11th we submitted requested information to the Michigan Department of Environmental Quality (MDEQ) regarding historical operations and waste classification for the C.M. Christiansen Company, Inc. (CMC) site. We spoke with Mr. Hank Switzer of MDEQ on August 12th regarding MDEQ's position on this matter.

From the August 12 conversation, we understand MDEQ will accept the plan to send excavated soils to the K&W Landfill, subject to WMI's approval of a testing plan for excavated soils. Excavated soils will be sampled prior to transport to verify the initial characterization test results. The sampling plan described below is designed to verify that characteristically hazardous wastes will not be transported to the K&W facility. WMI has reviewed and accepted this plan.

**Project Timing and Existing Waste Characterization Information**

We are planning to excavate and dispose approximately 2,500 cubic yards (3,800 tons) of soil from the site beginning in September 1999. Sampling was conducted on July 22, 1999 in accordance with our previously submitted Waste Characterization Plan. A summary table and laboratory results for TCLP-pentachlorophenol (PCP) were sent to you with the hard-copy of our August 11, 1999 correspondence. Results for the five samples analyzed were less than 0.35 mg/L to 1.2 mg/L PCP, well below the regulatory limit of 100 mg/L. The Generator's Waste Profile Sheet and Service Agreement with WMI will completed with the final protocol B sampling results, which are expected the week of August 23, 1999.

**Waste Verification Sampling Plan**

During the project we will also perform the following sampling to verify the existing waste characterization results:

- NRT will direct excavation and blending of soil. The soil will be blended in order to mix "wet" soil with "dry" soil as necessary to homogenize moisture content prior to transportation off-site. The soil will be blended and temporarily stockpiled on-site in a lined material processing and staging area. The stockpile will be covered by plastic sheeting daily and otherwise managed according to NR 718.05.

- For every 300 cubic yards of stockpiled soil, one representative soil sample will be collected in order to verify the results of profile sampling of in-place soils previously conducted. This frequency is consistent with WMI requirements on other projects. The representative sample will be collected by filling one pint jar of soil for each quarter of the representative 300 cubic yard volume from a depth of 1 to 2 feet below the surface of the pile.

- The four samples will be placed and mechanically mixed in a decontaminated bucket until the soil appears to be uniform. A sample of the composited soil will then be collected in the appropriate glassware for TCLP-PCP. The Wisconsin-certified laboratory that will perform the required analyses will provide glassware.

- Sample containers will immediately be placed on ice after they are filled, labeled according to pile, and sent to the laboratory, along with a completed chain of custody.

- Results of samples will be evaluated against characteristically hazardous criteria for pentachlorophenol, or 100 mg/l, as defined by state and federal regulations. If found to be non-hazardous based on this criteria, the soil will be transported to K & W landfill for disposal.

- If the TCLP fails (the results are above 100 mg/l PCP) and the results are thought to be biased high, the pile will be re-sampled in a similar manner as described above to obtain a more representative PCP-TCLP sample for analysis. If the second sample does not fail 100 mg/l criteria, the soil will be transported to K & W landfill for disposal.

- If an original sample TCLP failure is not thought to be biased high, or if re-sampling results in a second TCLP failure, the soil represented by the sample will not be disposed at the landfill.

Please do not hesitate to call if you have any questions regarding this correspondence. If this plan meets with your approval, please provide written acknowledgement to WMI with a copy to us at

your earliest convenience. Due to the approaching schedule for excavation, we would appreciate your timely cooperation and response.

Sincerely,

NATURAL RESOURCE TECHNOLOGY, INC.

Spiros L. Fafalios, P.E.
Project Engineer

Laurie J. Parsons, P.E.
Senior Engineer

cc: Mr. Eric Christiansen, C. M. Christiansen Company, Inc.
Ms. Elizabeth Rich, Frazer, Schapiro & Rich, S.C.
Mr. Rick Pager, Waste Management Inc., Menomonee Falls
Mr. Don Miller, Wisconsin Department of Natural Resources, Rhinelander

[1226 MDEQ 8.18.99.ltr]

STATE OF MICHIGAN

JOHN ENGLER, Governor

**DEPARTMENT OF ENVIRONMENTAL QUALITY**

*"Better Service for a Better Environment"*

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: www.deq.state.mi.us

**RUSSELL J. HARDING,** Director

REPLY TO:

MARQUETTE DISTRICT OFFICE
1990 US HIGHWAY 41 S
MARQUETTE MI 49855

SEP - 2 1999

August 30, 1999



Mr. Spiros Fafalios
Ms. Laurie Parsons
Natural Resource Technology, Inc.
23713 West Paul Road
Pewaukee, Wisconsin 53072

Dear Mr. Fafalios and Ms. Parsons:

SUBJECT: Sampling Plan and Request for Solid Disposal Approval at K & W Landfill, C.M. Christiansen Company, Inc. Former Pole Treatment Facility, Phelps, Wisconsin

The Michigan Department of Environmental Quality (MDEQ) has completed a review of the proposed Waste Verification Sampling Plan, preliminary waste characterization data, and other materials provided for the C.M. Christiansen Company, Inc. site in Phelps, Wisconsin.

The sampling protocol for the waste characterization of the waste is acceptable to the MDEQ. However, prior to transporting the waste to the K & W Landfill for disposal, you must have concurrence from the Wisconsin Department of Natural Resources (WDNR) that the waste is not a characteristic hazardous waste (D037). It is my understanding that a contingency plan for treatment and disposal of the waste has been approved by the WDNR in the event it is determined to be D037.

In the event that the waste is determined to be a solid waste under Michigan Law, the waste may be transported to the K & W Landfill for disposal. Since the material has been classified as a hazardous waste (Wisconsin only – F027), it may be required to be manifested for transport. If this is done, the MDEQ suggests the following protocol:

1. K & W would get a MIP (Michigan Identification Number) to be used in the Designated Facility Section.

2. The waste code would reveal the waste to be Wisconsin only – F027.

3. In the Description Section, there would be a note stating this is not a hazardous waste in Michigan.

4. In the Special Handling Section, there would be landfill disposal requirements (not to be used for daily cover, etc.).

5. The Certification of Receipt Section would have the Part 115 Licensing Facility Identification number.

If you have any questions, please contact me at the Marquette District Office.

Sincerely,

Margie Ring
Senior Environmental Engineer
Waste Management Division
906-228-6568

ksi

cc: Mr. Eric Christiansen, C.M. Christiansen Company, Inc.
Ms. Elizabeth Rich, Frazer, Schapiro & Rich, S.C.
Mr. Rick Pager, WMI, Menomonee Falls
Mr. Don Miller, WDNR, Rhinelander
Mr. Robert Pliska, WMI, Marquette
Mr. Hank Switzer, MDEQ

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Tommy G. Thompson, Governor
George E. Meyer, Secretary
William H. Smith, Regional Director

Northern Region Headquarters
107 Sutliff Ave.
Rhinelander, Wisconsin 54501-0818
Telephone 715-365-8900
FAX 715-365-8932
TDD 715-365-8957



September 16, 1999

Ms. Margie Ring
Michigan Department of Environmental Quality
1990 US Highway 41 South
Marquette, MI 49855

Subject: Waste Determination, Pentachlorophenol Contaminated Soil at CM Christiansen Co. Inc, Phelps, Wis.

Dear Ms. Ring:

The Wisconsin Department of Natural Resources (WDNR) has received requests from the Michigan DEQ as well as from Natural Resources Technologies on behalf of CM Christiansen Co. Inc (CMC) in Phelps Wisconsin, to issue an opinion on the waste determination for the soon to be excavated pentachlorophenol contaminated soil at CMC. CMC as the generator of the waste soil, has determined that the contaminated soil meets the criteria for a Wisconsin only F027 hazardous waste listing, the soil was contaminated from disposal of used formulations of pentachlorophenol. CMC has further determined that the Federal F027 listing does not apply as the waste was not from disposal of unused formulations. Natural Resources Technology, Inc. (NRT) also submitted TCLP data to the WDNR on September 2, 1999, which indicate that the site does not contain any soil which would fail TCLP at any point.

The WDNR concurs with CMC that the pentachlorophenol-contaminated soil at CMC is a Wisconsin only listed hazardous waste, and does not fail TCLP for pentachlorophenol or any other TCLP compound. The F027 waste listing opinion is also based on discussion with EPA region 5 staff during a variance from licensing request submittal for storage and treatment of contaminated soil at this site. Previously, Wisconsin only F027 contaminated soil from another site in western Wisconsin was shipped to a solid waste landfill in Minnesota.

If you have any questions regarding this letter, please call me at 715/365-8980.

Sincerely,

Don Miller
Waste Management Specialist

c. Dave Kafura, DNR Spooner
Chris Saari, DNR Brule
Mr. Eric Christiansen, CM Christiansen Co. Inc., PO Box 100, Phelps, WI
Mr. Spiro Fafalios, Natural Resources Technology, 23713 W. Paul Rd., Pewaukee, WI 53072
Mr. Rick Pager, Waste Management, N96W13475 County Line Rd., Menomonee Falls, WI 53051

# PHONE CONVERSATION RECORD

**DATE:** 10/6/99
**TIME:** 1322 hrs.

**CONVERSED WITH:** Gina Egan
Director
Vilas Co. Health Dept.
715/479-3659

**SUBJECT/PROJECT:** C M Christiansen

**UNIQUE ID#.:** 02-64-000068

I returned a call to Egan.

Egan said she was going to be meeting with the county LEPC and wanted an update on the project. Egan mentioned that she was new at her job, and didn't know a lot about environmental cleanups.

I explained that the soil remedial action should be nearly complete, and that I had been at the site on 9/23/99. I also described the plan for monitoring groundwater for improvement, as well as the intent to further investigate Military Creek. In response to questions from Egan, I also briefly described the RP-lead process for cleanups, as well as soil, groundwater, surface water & sediment techniques.

Egan asked that I call her if I plan on being in the area, as she would like to visit the site and find out more about the environmental cleanup process. I told Egan that I hoped to visit the site again before winter, and that I would call Egan if a visit could be scheduled.

Signature: Christopher A Saar
(please write legibly)

Read 11/8/99
B Rule

# C.M. CHRISTIANSEN CO., INC.

P.O. Box 100
PHELPS, WI 54554
TEL: (715) 545-2333
Fax: (715) 545-2334

ERIC R. CHRISTIANSEN
*PRESIDENT*
EMAIL: erc@execpc.com

November 4, 1999

Ms. Liesa Nesta
Wisconsin Department of Natural Resources
Woodruff Service Center
8770 Highway J
Woodruff, WI 54568

Re: Grading Permit No. 3-NO-99-64019UW

Dear Ms. Nesta:

This is confirmation of notice delivered by telephone today pursuant to the above-referenced permit that construction activities at the C.M. Christiansen Co., Inc. former poleyard have been completed.

Please do not hesitate to contact me if you have any questions or concerns.

Very truly yours,
C. M. CHRISTIANSEN CO., INC.

Eric Christiansen,
President

cc: Mr. P.C. Christiansen
Ms. Elizabeth Gamsky Rich – Frazier, Schapiro & Rich
Ms. Laurie Parsons – Natural Resource Technology, Inc.
Mr. Chris Saari - Wisconsin DNR
Mr. Fred Hegemann – Vilas County Zoning

Rec'd 11/22/99
Brule

Natural Resource Technology, Inc.
N R T

November 16, 1999
(1226/4.4)

Mr. Jim Hansen
Area Wastewater Specialist
Wisconsin Department of Natural Resources
875 South 4th Avenue
Park Falls, WI 54552

RE: **Discharge Monitoring Report**
C.M. Christiansen Company, Former Wood Treatment Site, Phelps, Wisconsin
Ref: WID998639035, BRR Case # 02-64-000068

Dear Mr. Hansen:

On behalf of C.M. Christiansen Co., Inc. (CMC), Natural Resource Technology Inc. (NRT) is submitting this report to satisfy requirements of the WPDES General Permit No. WI-0046566-3 for discharge of treated groundwater from remedial action operations. The Discharge Monitoring Report (DMR) Form, summarizing discharge flows and results of analyzed effluent samples is included as Attachment A. Laboratory analytical reports are included as Attachment B. The site location is shown on Figure 1. A summary of the project, results of the effluent monitoring and conclusions are presented below.

**Project Summary and Treatment System Operation**

As presented in the permit application, soil remedial action operations involved short-term dewatering of contaminated groundwater from soil excavations at a former wood pole treatment facility. The primary contaminants at the site were fuel oil and pentachlorophenol (PCP). Approximately 3,300 cubic yards of soil were excavated from the five excavation areas at the site. In four of the areas, soil was excavated to depths of 1 to 2 feet below the groundwater table. Groundwater was pumped from these areas (1 through 4) to control contaminated water and fine soils disturbed during the excavations. Attached Plate 1 shows the locations of excavation areas and the seepage cell.

Extracted groundwater was treated on-site through oil/water separation, bag filtration, and granular activated carbon. The flowrate through the treatment system remained at or below 10 gallons per minute. Oil/water separation was achieved by using oil sorbent pads and pillows within the excavation areas and in storage tanks that held the water prior to treatment. Storage tanks ranged in volume from 1,000 to 1,500 gallons. Solids were removed by sedimentation within the storage tanks and also by a 36-inch bag filter. Bag sizes were reduced from 100 micron to 25 micron during the course of the discharge, due to the significant amount of fine particulates in the groundwater. There was no excessive clogging of the system and at no time was treatment bypassed. Groundwater was pumped through two 55-gallon drums of granular activated carbon, in series, at approximately 10 gallons per minute for contaminant removal.

Treated groundwater was discharged to the ground surface through a constructed seepage cell. Depth to groundwater below the seepage cell is approximately 22 feet, and the base of the seepage cell was completed approximately 3 feet below surface grade. As stated in the permit application, the seepage cell was located hydrogeologically upgradient of contaminated groundwater in excavation area 1, as represented by MW-7.

**Discharge Monitoring Results**

Two effluent samples (EFF-1 and EFF-2) were collected over a total discharge period of seven-days as required by the permit. EFF-1 exceeded permit limits for PCP and lead and these results were verbally reported to you on October 20, 1999. Sample EFF-2 contained no detectable quantities of contaminants. The effluent samples did not contain an odor or sheen. Only slight turbidity was noted. Carbon usage rates were originally estimated based on data for MW-7 (see Figure 2). At the estimated usage rate of 0.1 pounds/day, contaminant break-through was not expected and likely did not occur. The two 200-lb units (operated in series) were more than adequately sized for the short discharge duration. Iit is unlikely that the activated carbon was spent and the EFF-1 concentrations are attributed to the sorption of contaminants to suspended solids in the sample.

Due to laboratory turn-around times and short duration discharge period, laboratory results could not be used to effect timely changes to the treatment system. Visual inspections were our best immediate indication of system performance and we made every effort to improve the suspended solids removal by reducing the bag filter size as previously discussed.

Finally, surface soil sampling was performed at the base of the seepage cell to evaluate potential impacts of the discharge. Prior to discharge, PCP was detected at a concentration of 0.7 mg/kg in a surface soil at the base of the seepage cell. A second sample collected at the completion of the discharge, in approximately the same area within the seepage cell, had a PCP concentration of less than 0.2 mg/kg, indicating that no environmental impact occurred as a result of the discharge.

**Conclusions**

The combined remedial actions performed at the site improved overall environmental quality. Source areas were removed to mitigate future impacts to groundwater. In addition, significant measures were also taken to protect the wetland area and nearby Military Creek. A full documentation report supporting this conclusion is forthcoming.

The groundwater seepage cell was purposely located in an area where the discharge would occur within an impacted zone and where there was a significant separation distance to groundwater. Although one sample exceeded effluent limits, this exceedance resulted in no threat to human health or the environment considering the following:

- The concentrations of PCP and total recoverable lead in sample EFF-1 were relatively low and likely associated with suspended solids which would be readily filtered within the unsaturated soil zone;
- The seepage cell was located upgradient of the area of highest concentrations of PCP and dissolved lead, where most of the groundwater extraction occurred. A temporary exemption from NR 140 limits for infiltration during remediation under NR 140.28(5) was not requested for this remedial action because of the small volumes and short duration. However, a temporary exemption would have been appropriate given the circumstances and location of the discharge area.
- Measures were taken during the system operation to reduce the potential for exceeding effluent limits.
- Soil sampling from the base of the seepage cell indicated no adverse impacts to soil quality as a result of the discharge.

We trust this letter provides the necessary information required by the permit. Please do not hesitate to call should you have any questions as you review this summary and attached DMR. As we have discussed, additional groundwater monitoring will continue to generate small amounts of purge water that will need to be managed. We will be contacting you in the next several weeks to review treatment/disposal options for the purge water. We would also be willing to meet with Chris Saari, case manager for the project, and yourself should you want to review the discharge reporting and/or future disposal options in greater detail. We appreciate your assistance with this project.

Sincerely,

NATURAL RESOURCE TECHNOLOGY, INC.

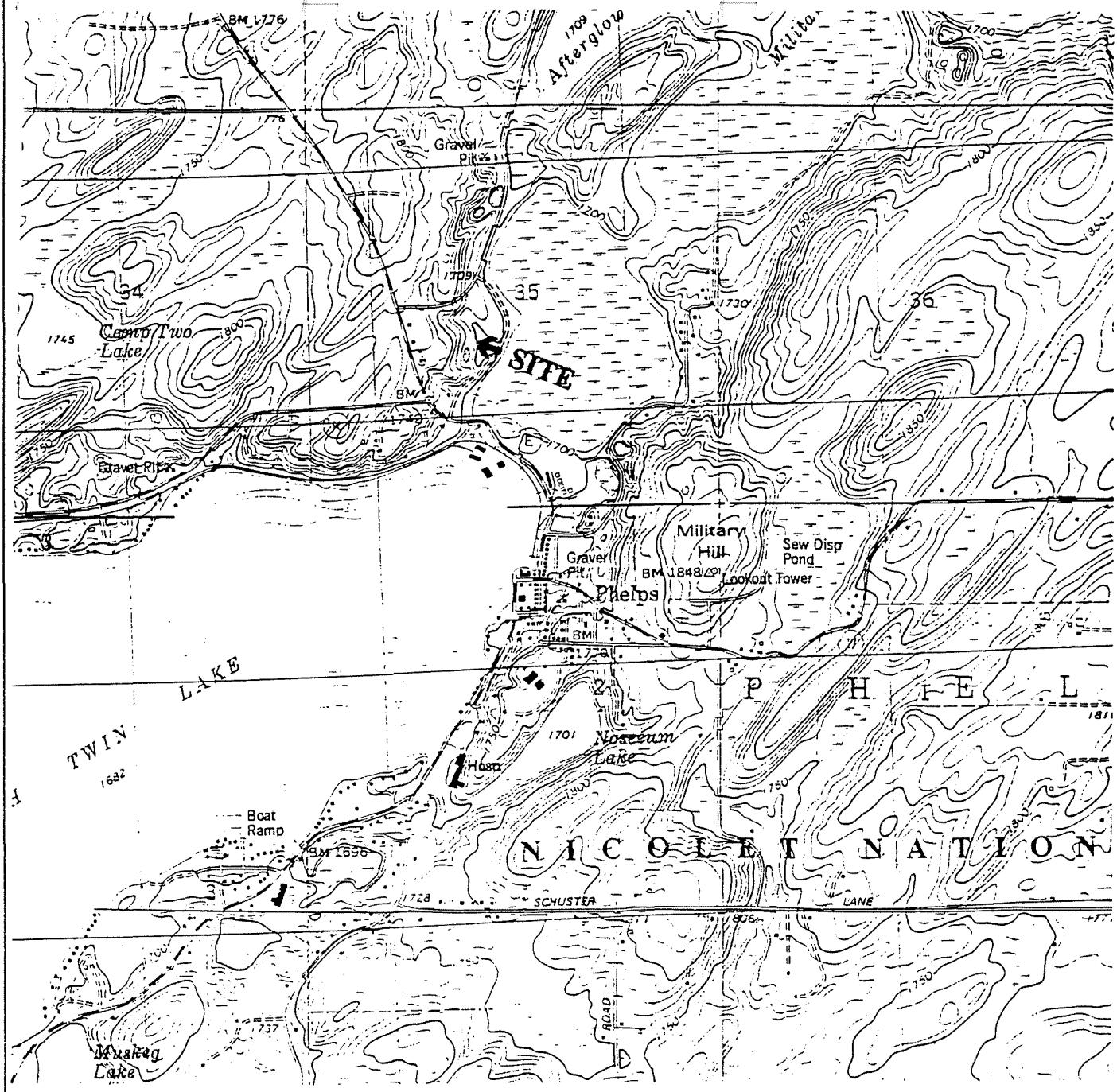
Spiros L. Fafalios, P.E.
Project Engineer

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

Encl: Figure 1 – Site Location Map
Plate 1 – Remedial Construction Plan
Figure 2 – PCP Concentrations in Groundwater
Figure 3 – Water Table Elevations
Attachment A - Discharge Monitoring Report Form
Attachment B - Laboratory Analytical Results

cc: Mr. Chris Saari, Wisconsin Department of Natural Resources, Brule Office
Ms. Elizabeth Gamsky Rich, Frazer, Schapiro & Rich, S.C.
Mr. Eric Christiansen, C. M. Christiansen Co., Inc.

[W:Permits\1226WPDES Disch Mon Rpt.ltr.doc]




SOURCE: USGS 7.5 MINUTE QUADRANGLE, PHELPS. DATED 1981.


QUADRANGLE LOCATION

N

0 2000 4000

SCALE IN FEET

CONTOUR INTERVAL 10 FEET

Natural Resource Technology

N R T

# SITE LOCATION MAP

C.M. CHRISTIANSEN COMPANY, INC.
FORMER POLE TREATMENT FACILITY
PHELPS, WISCONSIN

DRAWN BY: TAS APPROVED BY: LJP DATE: 5/15/98

PROJECT NO. 1226-SR

DRAWING NO. 1226-A01

FIGURE NO. 1

## LEGEND

- ESTIMATED EXCAVATION EXTENT
- ESTIMATED 6" CAPPING AREA
- EXTENT OF GRUBBING AND CLEARING
- SILT FENCE OR STRAW BALE FENCE
- B-15 (0.14) — BORING WITH PCP RESULTS
- MW-12 (0.005) — BORING/MONITORING WELL WITH PCP RESULTS
- PMW-14 — PIEZOMETER
- HA-34 (0.77) — HAND AUGER BORING WITH PCP RESULTS
- S-1 (1700) — SURFACE SOIL SAMPLES WITH PCP RESULTS
- TP-1 — TEST PIT (BY NRT)
- PCP — PENTACHLOROPHENOL
- REL. B.E. — RELATIVE BASE ELEVATION
- FENCE
- APPROXIMATE TREE LINE OR NEW GROWTH
- SURFACE ELEVATION CONTOURS
- WETLANDS
- 100N 500E — CONSTRUCTION GRID SURVEY POINT

N

0 25 50 100

SCALE IN FEET

PROPERTY BOUNDARY

BENCHMARK EL=1706.39

FORMER GATE

SCATTERED TREES & BRUSH IN CLEARING

UPPER WETLANDS AREA

LOWER WETLANDS AREA

AREA #4
4-6' DEPTH

AREA #5
1-3' DEPTH

AREA #1
6-14' DEPTH

AREA #3
2-5' DEPTH

AREA #2A
5' DEPTH

AREA #2B
1' DEPTH

B-19 (0.059)

B-22 (0.03)

B-16 (0.013)

HA-15 (30)

HA-7 (44000)

MW-13 (1200)

B-15 (0.14)

B-18 (0.990)

B-17 (73)

B-11 (120)

B-14 (0.034)

MW-8 (B-12A) B-12 (340)

B-20 (0.009)

B-13 (14)

B-21 (0.009)

APPROXIMATE LOCATION OF CONSTRUCTED SEEPAGE CELL FOR TREATED GROUNDWATER AND WATER TREATMENT EQUIPMENT (SEE FIGURE 8 FOR DETAIL)

MW-9 (ND)

HA-19 (260)

HA-30 (1300)

PMW-14

MW-12 (0.005)

B-8 (0.004)

FORMER 30,000 GAL WOOD TREATMENT ABOVE GROUND STORAGE TANK

B-7 (1300)

HA-29 (80)

HA-34 (0.77)

TP-1 TP-2 TP-3

(B-7A) B-7 (0.012)

(B-HA-17A) HA-17 (82000)

MW-17

PMW-17

MATERIAL PROCESSING AND SOIL STAGING AREA

MW-2

MW-7

MW-6 (0.78)

FORMER PUMP HOUSE

(B-9A) B-9 (0.023)

(B-3A) B-3 (68)

(B-10A) B-10 (5)

(B-1A) B-1 (24)

FORMER BOILER HOUSE

HA-2 & S-1 (1700)

MW-5 (0.056)

MW-1

FORMER POLE DIPPING TANK

HA-3 (16)

HA-27 (360)

(B-2A) B-2 (1.2)

MW-3

PMW-1

MW-10 (0.12)

MW-4

BORROW AREA

MILITARY CREEK

APPROXIMATE AREA OF EMBANKMENT REPLACEMENT ALONG MILITARY CREEK

MIDDLE THREAD

LOCATION OF SANDBAGS IN MILITARY CREEK

COUNTY TRUNK HIGHWAY E

RIGHT-OF-WAY

GATE

CENTER LINE

LOCATION OF CONSTRUCTION FENCE

MW-18 PMW-18

~APPROXIMATE FIRE HYDRANT LOCATION~

NOTES:
1. BASE MAP SURVEY COMPLETED BY CEC WITH ADDITIONAL INFORMATION OBTAINED FROM USDA-ASCS HISTORICAL AERIAL PHOTOGRAPHS, A 7/7/95 SITE VISIT WITH C M CHRISTIANSEN CO., AND A 5/21/96 FIELD INSPECTION. HAND AUGER BORINGS AND SURFACE SOIL SAMPLES OUTSIDE AREAS OF ESTIMATED EXCAVATION NOT SHOWN.
2. WETLAND AREA APPROXIMATELY INTERPRETED FROM WISCONSIN WETLAND INVENTORY MAP AND IS NOT FIELD VERIFIED.
3. CAPPING AREAS ARE APPROXIMATE AND WILL BE CONFIRMED DURING REMEDIATION ACTIVITIES.
4. CONSTRUCTION GRID SURVEY POINTS WITH ORIGIN AT SW 1/16 SECTION CORNER, IRON PIPE LOCATION BASED ON EAGLE LANDMARK SURVEY.

CONTRACTOR NOTES:
1. CONTRACTOR SHALL VERIFY ALL FIELD LOCATIONS PRIOR TO ANY CONSTRUCTION WITH OWNER OR ENGINEER.
2. CONTRACTOR SHALL LOCATE ALL UTILITIES WITH DIGGER'S HOTLINE, AND RELOCATE AS NEEDED.
3. CONSTRUCTION FENCE SHALL BE 4-5 FOOT HIGH INSTALLED AT THE NORTH AND SOUTH ACCESS WAYS OF THE WORK ZONE.
4. EROSION CONTROL FENCE SHALL BE INSTALLED ON LOCATIONS AS SHOWN ON DOWN SLOPE SIDE OF EACH DISTURBED AREA.
5. SANDBAGS FOR EROSION CONTROL IN MILITARY CREEK TO BE INSTALLED WITH 1 FOOT FREEBOARD AT/NEAR SHORELINE.
6. LOCATIONS EXCAVATED WITHIN 20 FEET OF MILITARY CREEK IN AREA 2B TO BE REPLACED WITH TOPSOIL OR SIMILAR AND CAPPED WITH NONWOVEN FABRIC AND 2-INCH CLEAR STONE.
7. GRUBBING AND CLEARING AREAS SHOWN EXTENDIN 10 FEET FROM EDGE OF EXCAVATION AND CAPPING AREAS.
8. EXCAVATION SIDEWALLS SHALL BE SLOPED 1:2 OR AS NECESSARY FOR SLOPE STABILITY. EXCAVATIONS 1-4 BASE SHALL BE 1-2 FEET BELOW WATER TABLE.
9. EXCAVATED MATERIAL TO BE PLACED IN MATERIAL PROCESSING AND STAGING AREA. SPILLAGE FROM LOADING/DUMPING SHALL BE SCRAPED ON A DAILY BASIS. AREA TO BE LINED WITH 2 LAYERS OF 6 MIL POLY SHEETING OR EQUIVALENT WITH 6-INCH BERM AROUND PERIMETER.
10. CONTRACTOR TO ARRANGE USE OF FIRE HYDRANT FOR DECONTAMINATION.
11. BACKFILL AND CAPPING MATERIAL TO BE OBTAINED FROM ONSITE BORROW SOURCE.

SOURCE NOTES:
THIS MAP WAS MODIFIED FROM DRAWING BY COLEMAN ENGINEERING COMPANY (CEC), IRON MOUNTAIN, MICHIGAN, DATED FEBRUARY 1997, JOB NO. 95042 A7, AND A SURVEY BY EAGLE LANDMARK SURVEYING, INC., EAGLE RIVER, WISCONSIN, DWG. NO. E1292, DATED 1-06-98, REVISED ON 5-13-99.

Natural Resource Technology
N R T

# REMEDIAL CONSTRUCTION PLAN

DESIGN REPORT ADDENDUM
C.M. CHRISTIANSEN COMPANY, INC.
FORMER POLE TREATMENT FACILITY, PHELPS, WISCONSIN

| DRAWN BY: TAS | CHECKED BY: SLF | APPROVED BY: LJP |
|---|---|---|
| DATE: 09/10/99 | DATE: 09/10/99 | DATE: 09/10/99 |

PROJECT NO. 1226/DR/4.3

DRAWING NO. 1226-D10

PLATE 1

PCP CONCENTRATIONS IN GROUNDWATER

C.M. CHRISTIANSEN COMPANY, INC.
FORMER POLE TREATMENT FACILITY
PHELPS, WISCONSIN

| | | |
|---|---|---|
| DRAWN BY: TAS | CHECKED BY: SLF | APPROVED BY: LJP |
| DATE: 07/08/99 | DATE: 07/08/99 | DATE: 07/08/99 |

AUTOCAD FILE: 1226-B11.DWG

PCP (µg/L)
ND
ND
ND
ND
NS
ND

PCP (µg/L)
0.18
0.73
27
4.8
NS
1.3

PCP (µg/L)
0.12
0.56
0.42
0.58
NS
0.12

PCP (µg/L)
NI
NI
ND
0.45
NS
ND

PCP (µg/L)
NI
NI
ND
ND
NS
ND

PCP (µg/L)
3.3
1.2
0.40
0.74
NS
0.42

PCP (µg/L)
NI
NI
0.15
0.14
NS
0.089

PCP (µg/L)
NI
NI
350
2.5
NS
0.20

PCP (µg/L)
0.12
0.67
0.48
0.30
NS
0.12

PCP (µg/L)
NI
NI
820
720
1,300
170

PCP (µg/L)
ND
0.084
ND
ND
NS
ND

PCP (µg/L)
1,500
5,200
NS
NS
NS
NS

PCP (µg/L)
1,300
32
21
10
NS
1.9

PCP (µg/L)
NI
NI
34
7.5
17
4.6

PCP (µg/L)
NI
NI
NI
NI
NI
ND

PCP (µg/L)
NI
NI
NI
NI
NI
ND

PCP (µg/L)
NI
NI
NI
NI
NI
NI
0.54

PCP (µg/L)
NI
NI
NI
NI
NI
NI
0.15

MW-1 MW-2 MW-3 MW-4 MW-5 MW-6 MW-8 MW-9 MW-10 MW-12 MW-13 MW-17 MW-18
PMW-11 PMW-14 PMW-17 PMW-18

UPPER WETLANDS AREA
LOWER WETLANDS AREA
SCATTERED TREES & BRUSH IN CLEARING
SMALL GROWTH
GATE
GATE
COUNTY TRUNK HIGHWAY E
RIGHT-OF-WAY
CENTER LINE
MILITARY CREEK
STREAM FLOW

ESTIMATED ZONE OF GROUNDWATER ABOVE NR 140 ENFORCEMENT STANDARD FOR PCP (1µg/L)

## LEGEND

- MW-12 BORING/MONITORING WELL
- PMW-14 PIEZOMETER
- ESTIMATED EXTENT OF FREE PRODUCT
- APPROXIMATE TREE LINE OR NEW GROWTH

| | |
|---|---|
| PCP | PENTACHLOROPHENOL |
| µg/L | MICROGRAMS PER LITER |
| ND | NOT DETECTED |
| NI | NOT INSTALLED |
| NS | NOT SAMPLED |

| DATE SAMPLE TAKEN |
|---|
| 9/95 |
| 12/95 |
| 7/96 |
| 11/96 |
| 11/97 |
| 5/99 |

N

0 50 100 200

SCALE IN FEET

SOURCE NOTES:
THIS MAP WAS MODIFIED FROM DRAWING BY COLEMAN ENGINEERING COMPANY (CEC), IRON MOUNTAIN, MICHIGAN, DATED FEBRUARY 1997, JOB NO. 95042 A7, AND A SURVEY BY EAGLE LANDMARK SURVEYING, INC., EAGLE RIVER, WISCONSIN, DWG. NO. E1292, DATED 1-08-98, REVISED ON 5-13-99.

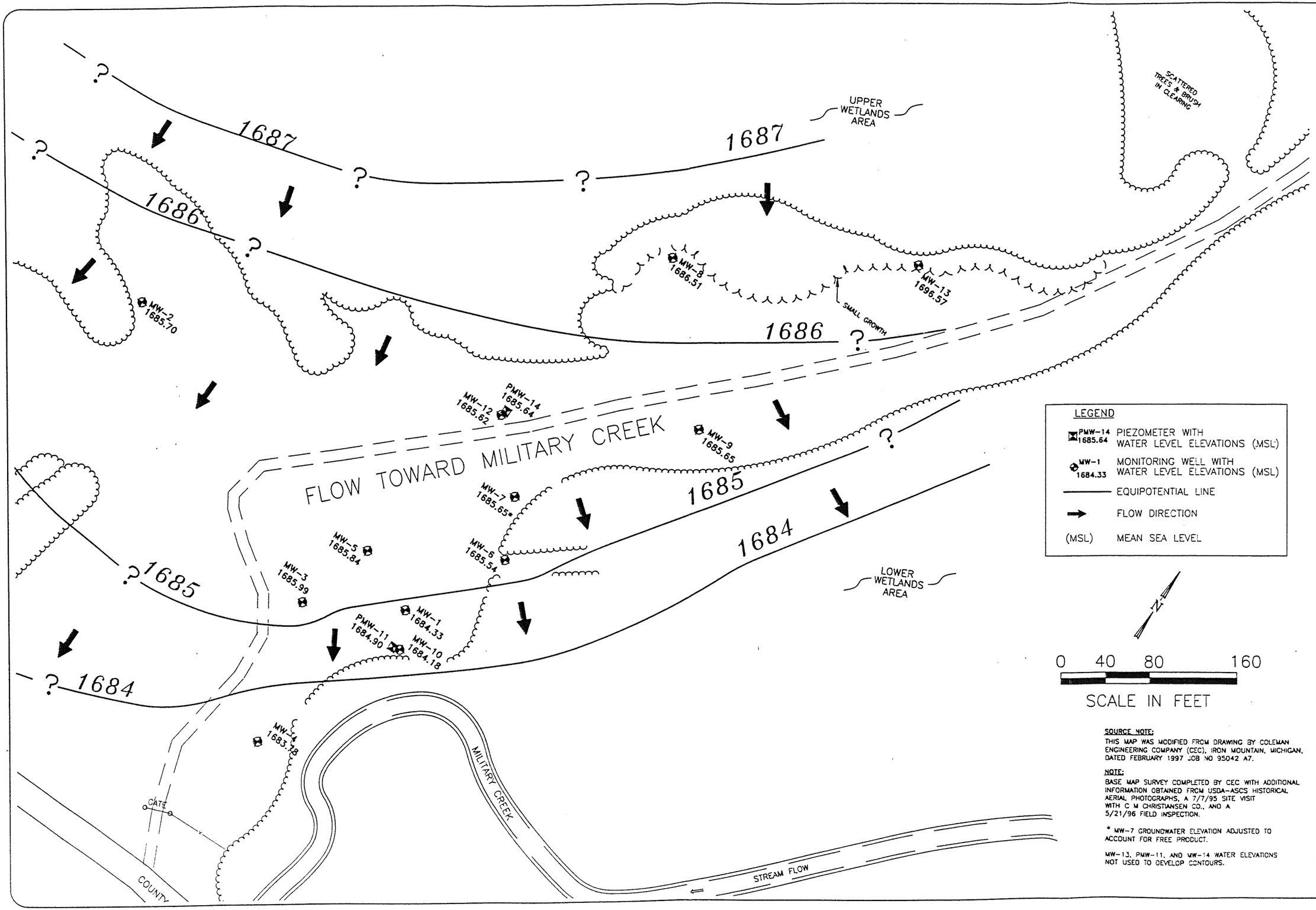
NOTES:
BASE MAP SURVEY COMPLETED BY CEC WITH ADDITIONAL INFORMATION OBTAINED FROM USDA-ASCS HISTORICAL AERIAL PHOTOGRAPHS, A 7/7/95 SITE VISIT WITH C M CHRISTIANSEN CO., AND A 5/21/96 FIELD INSPECTION.

Natural Resource Technology

PROJECT NO. 1226-DC-5.1

DRAWING NO. 1226-B11

FIGURE NO. 2




SOURCE NOTE:
THIS MAP WAS MODIFIED FROM DRAWING BY COLEMAN ENGINEERING COMPANY (CEC), IRON MOUNTAIN, MICHIGAN, DATED FEBRUARY 1997 JOB NO 95042 A7.

NOTE:
BASE MAP SURVEY COMPLETED BY CEC WITH ADDITIONAL INFORMATION OBTAINED FROM USDA-ASCS HISTORICAL AERIAL PHOTOGRAPHS, A 7/7/95 SITE VISIT WITH C M CHRISTIANSEN CO., AND A 5/21/96 FIELD INSPECTION.

* MW-7 GROUNDWATER ELEVATION ADJUSTED TO ACCOUNT FOR FREE PRODUCT.

MW-13, PMW-11, AND MW-14 WATER ELEVATIONS NOT USED TO DEVELOP CONTOURS.

# WATER TABLE ELEVATIONS SEPTEMBER 4, 1996

SOIL REMEDIAL ACTION OPTIONS REPORT
C.M. CHRISTIANSEN COMPANY, INC.
FORMER POLE TREATMENT FACILITY
PHELPS, WISCONSIN

| | | |
|---|---|---|
| DRAWN BY: TAS | DATE: 5/15/98 | |
| CHECKED BY: JAG | DATE: 5/15/98 | |
| APPROVED BY: LJP | DATE: 5/15/98 | |
| AUTOCAD FILE: 1226-B04.DWG | | |

Natural Resource Technology

PROJECT NO. 1226-SR-3.4

DRAWING NO. 1226-B04

FIGURE NO. 3

# DISCHARGE MONITORING REPORT FORM - (Contaminated Groundwater)

PERMIT NO. WI-0046566-3

Time Period Covered: 9/22/99 - 10/5/99

Facility Name
C.M. Christiansen Co., Inc.

**Permittee:**
Eric Christiansen
P.O. Box 100
Phelps, WI 54554

**Consultant:**
Laurie Parsons / Natural Resource
23713 W. Paul Rd.
Pewaukee, WI 53072

| PARAMETER NAME | Flow | Naphthalene | | Lead | | Arsenic | | Pentachlorophenol | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER UNITS | GPD | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| SAMPLING POINT | Effluent | Influent | Effluent | Influent | Effluent | Influent | Effluent | Influent | Effluent | Influent | Effluent |
| MONTH (list date sampled) | | | | | | | | | | | |
| 9/22/99 | 1457 | | | | | | | | | | |
| 9/23/99 | 2197 | | | | | | | | | | |
| 9/27/99 | 3390 | | | | | | | | | | |
| 9/28/99 | 5322 | | <2.1 | | 3.8 | | 2.9 | | 36 | | |
| 9/30/99 | ~1931 | | <0.42 | | <2.5 | | <2.7 | | <3.7 | | |
| 10/4/99 | ~1931 | | | | | | | | | | |
| 10/5/99 | ~1932 | | | | | | | | | | |
| | | | | | | | | | | | |
| MONTHLY AVERAGE | 2594 | | | | | | | | | | |
| | | | | | | | | | | | |
| MONTHLY AVG. LIMIT | 72000 | | 8 | | 1.5 | | 5 | | / | | |
| SAMPLE TYPE | Total Daily | GRAB | | GRAB | | GRAB | | GRAB | | GRAB | |
| SAMPLE FREQUENCY | See Permit | See Permit | | See Permit | | See Permit | | See Permit | | See Permit | |

Page 1 of

Unless noted under parameter name, each daily value entered must be the highest value of all sample types analyzed for that day.

WISCONSIN STATUTE 147.08

RETURN REPORT NO LATER THAN:
15TH OF THE MONTH FOLLOWING
THE COMPLETED REPORTING PERIOD

SEND 1 COPY TO :

DEPARTMENT OF NATURAL RESOURCES

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED IN THIS DOCUMENT AND ALL ATTACHMENTS AND THAT, BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THAT THE INFORMATION IS TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINES AND IMPRISONMENT. (40 CFR 122.5). I ALSO CERTIFY THT THE VALUES BEING SUBMITTED ARE THE ACTUAL VALUES FOUND IN THE SAMPLES; NO VALUES HAVE BEEN MODIFIED OR CHANGED IN ANY MANNER. WHEREVER I BELIEVE A VALUE BEING REPORTED IS INACCURATE, I HAVE ADDED AN EXPLANATION INDICATING THE REASONS WHY THE VALUE IS INACCURATE.

Signature of Person Completing Form

Daniel V. Plonsil

Signature of Principal Exec. Officer or Authorized Agent — Title

president

# ATTACHMENT B

# LABORATORY ANALYTICAL RESULTS

ENCHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : CM CHRISTIANSEN

Project Number : 1226

Client: NATURAL RESOURCE TECHNOLOG

WI DNR LAB ID : 405132750

| Sample No. | Field ID | Collection Date | Sample No. | Field ID | Collection Date |
|---|---|---|---|---|---|
| 895730-001 | A4-W3 | 9/27/99 | | | |
| 895730-002 | A4-W4 | 9/27/99 | | | |
| 895730-003 | A4-B1 | 9/27/99 | | | |
| 895730-004 | A4-B2 | 9/27/99 | | | |
| 895730-005 | A5-W2 | 9/27/99 | | | |
| 895730-006 | A5-W4 | 9/27/99 | | | |
| 895730-007 | A5-B2 | 9/27/99 | | | |
| 895730-008 | A1-W5 | 9/27/99 | | | |
| 895730-009 | EFF-1 | 9/28/99 | | | |
| 895730-010 | A3-W1 | 9/28/99 | | | |
| 895730-011 | A3-B1 | 9/28/99 | | | |

Please visit our Internet homepage at: www.encheminc.com

The "Q" flag is present when a parameter has been detected below the LOQ. This indicates the results are qualified due to the uncertainty of the parameter concentration between the LOD and the LOQ.

Soil VOC detects are corrected for the total solids, unless otherwise noted.

I certify that the data contained in this Final Report has been generated and reviewed in accordance with approved methods and Laboratory Standard Operating Procedure. Exceptions, if any, are discussed in the accompanying sample comments. Release of this final report is authorized by Laboratory management, as is verified by the following signature. Reported results shall not be reproduced, except in full, without the written approval of the lab. The sample results relate only to the analytes of interest tested.

Approval Signature

10/12/99
Date

# En Chem Inc.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
Fax: 920-469-8827


## - Analytical Report -

**Project Name :** CM CHRISTIANSEN
**Project Number :** 1226
**Field ID :** EFF-1
**Lab Sample Number :** 895730-009
**WI DNR LAB ID :** 405132750

**Client :** NATURAL RESOURCE TECHNOLOGY, INC
**Report Date :** 10/12/99
**Collection Date :** 9/28/99
**Matrix Type :** SOIL

## Inorganic Results

| Test | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Prep Method | Analysis Method | Analys |
|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 2.9 | 2.8 | 8.9 | | ug/L | Q | 10/8/99 | SW846 7060A | SW846 7060A | *MD |
| Lead - Recoverable | 3.8 | 0.73 | 2.3 | | ug/L | | 10/6/99 | SW846 3020M | SW846 7421 | *MD |

## Organic Results

PAH (HPLC) LIST - SEMIVOLATILES — Prep Method: SW846 3510 — Prep Date: 10/1/99 — Analyst: ARO

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Naphthalene | < 2.1 | 2.1 | 6.7 | | ug/L | | 10/4/99 | SW846 8310 |
| 9,10-Diphenylanthracene | 388 | | | | %Recov | | 10/4/99 | SW846 8310 |

## Organic Results

SPECIAL SEMI-VOLATILE LIST — Prep Method: SW846 3510 — Prep Date: — Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl | 93 | | | | %Recov | | 10/8/99 | SW846 8270 |
| Pentachlorophenol | 36 | 3.7 | 12 | | ug/L | | 10/8/99 | SW846 8270 |
| 2-Fluorophenol | 61 | | | | %Recov | | 10/8/99 | SW846 8270 |
| Phenol-d5 | 47 | | | | %Recov | | 10/8/99 | SW846 8270 |
| 2-Chlorophenol-d4 | 91 | | | | %Recov | | 10/8/99 | SW846 8270 |
| 1,2-Dichlorobenzene-d4 | 96 | | | | %Recov | | 10/8/99 | SW846 8270 |
| Nitrobenzene-d5 | 88 | | | | %Recov | | 10/8/99 | SW846 8270 |
| 2,4,6-Tribromophenol | 107 | | | | %Recov | | 10/8/99 | SW846 8270 |
| Terphenyl-d14 | 82 | | | | %Recov | | 10/8/99 | SW846 8270 |

All soil results are reported on a dry weight basis unless otherwise noted.

EN CHEM INC.

☒ 1241 Bellevue St., Suite 9, Green Bay, WI 54302, 920-469-2436 • 1-800-736-2436, FAX 920-469-8827

☐ 525 Science Drive, Madison, WI 53711, 608-232-3300 • 1-888-536-2436, FAX: 608-233-0502

☐ 1423 N. 8th Street, Suite 122, Superior, WI 54880, 715-392-5844 • 1-800-837-8238, FAX 715-392-5843

# CHAIN OF CUSTODY

43680

Page 1 of 1

P.O. # 1226 Quote #

Company Name: NRT

Branch or Location: Pewaukee, WI

Project Contact: Spiro Fafalios

Telephone: (414) 523-9000

Project Number: 1226

Project Name: CM Christiansen

Project State: WI

Sampled By (Print): Dan Plovnick

Regulatory Program *(circle)*: UST RCRA CLP SDWA NPDES/WPDES CAA NR_____ Other _____

Mail Report To: Spiro Fafalios

Company: NRT

Address: 23713 West Paul Rd Pewaukee, WI 53072

Invoice To: " "

Company:

Address:

Mail Invoice To:

| FIELD ID | SAMPLE DESCRIPTION | COLLECTION DATE | COLLECTION TIME | PENTACHLOROPHENOL (8270) | PAHs (8270) | PVOCs (8260) | Tot. Organic Carbon (9060) | VOCs (8260) | NAPHTHALENE - 8310 | ARSENIC (7060) | TOT. REC. LEAD (7421) | FIELD SCREEN | MATRIX | GOOD COND. | TOTAL BOTTLES | COMMENTS | LABORATORY NUMBER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ANALYSES REQUESTED | | | | | | | | | | | | | SHADED AREA FOR LABORATORY USE ONLY | | | |
| | FILTERED? (YES/NO) | | | N | | | | | | | | | | | | | |
| | PRESERVATION (CODE)* | | | A | A | F | A | F | A | D | D | | | | | | |
| A4-W3 | standard turn | 9/27 | 1000 | X | X | X | X | | | | | 9.4 | soil | ✓ | 2 | 8oz 8oz 250ml | 001 |
| A4-W4 | | | 1200 | X | X | | | | | | | 7.2 | | | 2 | 8oz 8oz | 002 |
| A4-B1 | | | 1030 | X | | | | | | | | 5.1 | | | 1 | 8oz | 003 |
| A4-B2 | | | 1145 | X | | | | | | | | 6.5 | | | 1 | 8oz 1-250ml | 004 |
| A5-W2 | | | 1610 | X | X | | X | X | | | | 4.5 | | | 2 | 8oz 1-250ml | 005 |
| [illegible] | | | | | | | | | | | | | | | | | |
| A5-W4 | | | 1655 | | X | | | [illegible] | | | | 10.6 | | | 1 | 8oz | 006 |
| A5-B2 | | | 1640 | X | | | | | | | | 9.4 | | | 1 | 8oz | 007 |
| A1-W5 | | 9/27 | 0820 | X | | | | | | | | | | | 1 | | 008 |
| EFF-1 | | 9/28 | 0800 | X | | | | / | X | X | X | — | W | | 2 | 1 Trizma 1 Trizma | 009 |
| A3-W1 | | | 0945 | X | X | X | X | | | | | | | | 2 | 250ml 1-250ml | 010 |
| A3-B1 | | | 0950 | X | | | | / | | | | | | | 1 | 8oz | 011 |
| | | | | | | | | | | | | | | | | | 012 |

*Preservation Code
A=None B=HCL C=H2SO4
D=HN03 E=EnCore F=Methanol**
G=NaOH O=Other (Indicate)

**If not using En Chem's methanol, indicate volume of methanol added and mark the appropriate samples.

| Relinquished By: | Date/Time: | Received By: | Date/Time: |
|---|---|---|---|
| Dan Plovnick | 9/28/99 1100 | Dunham Express | 9/28/99 1100 |
| | | | |
| | | | |
| Dunlap | 9/29/99 800 | Rachele Jacobs | 9/29/99 |

En Chem Project No. 895730

Sample Receipt Temp. 10.1

Sample Receipt pH (Waters) pH <2 ok

Custody Seal

ENCHEM INC.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
FAX: 920-469-8827

# - Analytical Report -

Project Name : CMC CO, INC

Project Number : 1226

Client: NATURAL RESOURCE TECHNOLOG

WI DNR LAB ID : 405132750

| Sample No. | Field ID | Collection Date | Sample No. | Field ID | Collection Date |
|---|---|---|---|---|---|
| 895844-001 | EFF-2 | 9/30/99 | | | |
| 895844-002 | A2A-W4 | 9/30/99 | | | |

Please visit our Internet homepage at: www.encheminc.com

The "Q" flag is present when a parameter has been detected below the LOQ. This indicates the results are qualified due to the uncertainty of the parameter concentration between the LOD and the LOQ.

Soil VOC detects are corrected for the total solids, unless otherwise noted.

I certify that the data contained in this Final Report has been generated and reviewed in accordance with approved methods and Laboratory Standard Operating Procedure. Exceptions, if any, are discussed in the accompanying sample comments. Release of this final report is authorized by Laboratory management, as is verified by the following signature. Reported results shall not be reproduced, except in full, without the written approval of the lab. The sample results relate only to the analytes of interest tested.

J. Duracceau — Approval Signature

10/18/99 — Date

# En Chem Inc.

1795 Industrial Drive
Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
Fax: 920-469-8827


## - Analytical Report -

Project Name : CMC CO, INC
Project Number : 1226
Field ID : EFF-2
Lab Sample Number : 895844-001
WI DNR LAB ID : 405132750

Client : NATURAL RESOURCE TECHNOLOGY, INC
Report Date : 10/18/99
Collection Date : 9/30/99
Matrix Type : WATER

## Inorganic Results

| Test | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Prep Method | Analysis Method | Analys |
|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | < 2.7 | 2.7 | 8.6 | | ug/L | | 10/13/99 | SW846 3015 | SW846 7060A | *MD |
| Lead - Recoverable | < 2.5 | 2.5 | 8.0 | | ug/L | | 10/13/99 | SW846 3005A | SW846 6010B | *MD |

## Organic Results

PAH (HPLC) LIST - SEMIVOLATILES  Prep Method: SW846 3510  Prep Date: 10/4/99  Analyst: ARO

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| Naphthalene | < 0.42 | 0.42 | 1.3 | | ug/L | | 10/5/99 | SW846 8310 |
| 9,10-Diphenylanthracene | 132 | | | | %Recov | | 10/5/99 | SW846 8310 |

## Organic Results

SPECIAL SEMI-VOLATILE LIST  Prep Method: SW846 3510  Prep Date:  Analyst: *MD

| Analyte | Result | LOD | LOQ | EQL | Units | Code | Analysis Date | Analysis Method |
|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl | 91 | | | | %Recov | | 10/9/99 | SW846 8270 |
| Pentachlorophenol | < 3.7 | 3.7 | 12 | | ug/L | | 10/9/99 | SW846 8270 |
| 2-Fluorophenol | 53 | | | | %Recov | | 10/9/99 | SW846 8270 |
| Phenol-d5 | 36 | | | | %Recov | | 10/9/99 | SW846 8270 |
| 2-Chlorophenol-d4 | 101 | | | | %Recov | | 10/9/99 | SW846 8270 |
| 1,2-Dichlorobenzene-d4 | 95 | | | | %Recov | | 10/9/99 | SW846 8270 |
| Nitrobenzene-d5 | 90 | | | | %Recov | | 10/9/99 | SW846 8270 |
| 2,4,6-Tribromophenol | 96 | | | | %Recov | | 10/9/99 | SW846 8270 |
| Terphenyl-d14 | 69 | | | | %Recov | | 10/9/99 | SW846 8270 |

# CHAIN OF CUSTODY RECORD

Natural Resource Technology

NRT

Sample Collectors(s)/Signature(s): Dan Plavnick (SOF) Fran Sup

NATURAL RESOURCE TECHNOLOGY, INC.
PEWAUKEE, WISCONSIN

Laboratory Samples are Being Submitted To: ENCHEM

Quote Number/Addendum Number: Proj 1226 Attached: YES __ NO X

Site Name: CMC Co, Inc

Site Address: Phelps, WI

Send Report To:
Project Manager: S. Fabalos
Natural Resource Technology, Inc.
23713 W. Paul Road
Pewaukee, WI 53072
Telephone (414) 523-9000 Fax (414) 523-9001

Project Number: 1226

Task Number: 4.3

Temperature of temperature blank _____

If sample(s) were received on ice and there was ice remaining, you may report the temperature as "received on ice". If all of the ice was melted, the temperature of the melt may be substituted for a temperature blank.

I hereby certify that I received, properly handled, and maintained custody of these samples as noted below:

| Relinquished By (Signature) | Date/Time | Received By (Signature) | Date/Time |
|---|---|---|---|
| [signature] | 10/1/99 1000 | [signature] | 10/1/99 1000 |
| [signature] | 10/1/99 1:00 | [signature] | 10/1/99 1325 |
| [signature] | 10/1/99 1655 | | |

| Field ID Number | Date Collected | Time Collected | Sample Media | Sample Device | Location / Description | PID Reading | Field Comments | Preserv. Type | # of Cont. | Naphthalene (8310) | Arsenic (7060) | Total Lead (7420) | RCP (8270) | Lab ID Number | Sample Conditions @ Laboratory |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EFF-2 | 9/30 | | W | | | | 2 L Amber 2-250ml | various | 4 | X | X | X | X | 001 | |
| A2A-WL | 9/30 | | S | | Area 2 | | 1 8oz Amber | none | 1 | | | | X | 002 | |

Lab Use Only: 895844

SPECIAL INSTRUCTIONS

STD TURN INV. OK

NOT PHYSB

Laboratory shall retain samples for 30 days after issuing analytical report unless indicated otherwise below:
__ Return __ Other _____

PT 1 - ORIGINAL-WHITE PT 2 - LABORATORY COPY-YELLOW PT 3 - NRT FIELD COPY-PINK

This form is based on the WDNR LUST Program Chain of Custody Record (Form 4400-151)

W:\FORMS\CUSTODY.CHN

Recd 11/29/99
Brule

# C.M. CHRISTIANSEN CO., INC.

P.O. Box 100
PHELPS, WI 54554
TEL: (715) 545-2333
FAX: (715) 545-2334

ERIC R. CHRISTIANSEN
*PRESIDENT*

November 24, 1999

Mr. Don Miller
Wisconsin Department of Natural Resources
107 Sutliff Avenue
P.O. Box 818
Rhinelander, WI 54501

Re: Variance Request for Soil Remediation Project
Former Wood Treatment Site, Phelps, WI
EPA ID #WIR 000009789
WID998639035
FID # 76414980

Dear Mr. Miller:

We hereby formally withdraw the above-referenced request for variance. We understand this will close the respective file and that the Draft Conditional Approval in respect of the same will be withdrawn and removed from the public record.

Please don't hesitate to contact me if you have any questions or concerns.

Very truly yours,

C.M. CHRISTIANSEN CO., INC.

Eric R. Christiansen,
President

cc: P.C. Christiansen
Chris Saari (DNR)
Laurie J. Parsons (NRT)
Elizabeth Gamsky Rich (FSR)

# PHONE CONVERSATION RECORD

**DATE:** 11/23/99
**TIME:** 1551 hrs.

**CONVERSED WITH:** Laurie Parsons
NRT
262/523-9000

**SUBJECT/PROJECT:** C. M. Christiansen

**UNIQUE ID#.:** 02-64-000068

I returned a call to Parsons. Paisens said she wanted to provide me with a project update.

Parsons said the next round of groundwater sampling will hopefully be completed by the end of the month, but may need to be pushed into early December. I said that should be OK.

Parsons brought up the PCP exceedance in the wastewater discharge, as described in the DMR. Passons said she would like to discuss the exceedance with Jim Hansen before any decisions are made. Eric Christiansen apparently fears an enforcement action, so they'd like to discuss. Parsons also ~~said~~ asked if I'd heard of any concerns yet; I explained that Hansen and I are supposed to talk once we both have the DMR. Parsons said in retrospect she would have asked for an NR140 reinfiltration variance. Parsons then repeated that she would be calling Hansen.

Parsons then mentioned that purge water from the monitoring wells

Signature: Christopher A Lau
(please write legibly)

-over-

may be run through carbon and temporarily stored in a tank until results are back. For now, the water will be stored in double-lined 55 gal drums, which will be kept at the other CMC property.

We then discussed the review of the remedial action report. Parsons said they are shooting for submitting the report by the end of December, but it may be available until early January. I suggested that Parsons contact me prior to report submittal so I can find out if a fee would be needed.