SITE INVESTIGATION SCOPE OF WORK
C.M CHRISTIANSEN COMPANY
SEPTEMBER 1994

FACILITY ID#: WID988639035

I. Project Description

A. This scope of work sets forth the requirements for conducting a site investigation of the environmental contamination in the study area surrounding the C.M. Christiansen site.

Site Location: SW ¼ of Section 35 and SE ¼ of Section 35
Township 42N, Range 11E, Town of Phelps
Vilas County, Wisconsin

B. The C.M. Christiansen site is a non-operational pole dipping facility. The site is located on a 150 acre parcel owned by the C. M. Christiansen Company. P.C. Christiansen is President and Chief Executive Officer. The dipping operation is located on the western one-third of the property. The property is split by Military Creek and the pole dipping operation is located on the west side of the property. The site operated from 1954 until 1981. Wooden poles were dipped into a 5% pentachlorophenol solution with number two fuel oil as the carrier.

The well-defined drainage pattern is from the pole drip pad, downhill to the actual tank dipping area and Military Creek. The site is split by Military Creek and its associated wetlands. In general, the site slopes to the east toward Military Creek. A large portion of the western moraine has been excavated which has reduced the steepness of the hillside. Near the wetlands of Military Creek, the terrain flattens out to a 5% slope. There is a gravel road that leads into the site directly off Highway E just past the Military Creek bridge.

Presently there are no buildings remaining at the site. The southern perimeter of the site is gated with a cable and signed with no-trespassing signs.

C. Site geology consists of glacial outwash moderately well-sorted. The area is bordered by wetlands to the east, Military Creek to the southeast and located within 1000 feet of North Twin Lake.

D. Groundwater is encountered between 15 feet and 20 feet below the surface.

E. Site specific information is available in the WDNR Rhinelander District Office. Both the Environmental Repair Program and the Superfund Program have relevant reports and files.

II. Site Investigation Goal

A. Define the hydrogeologic and stratigraphic conditions or characteristics of the study area.

B. Document vertical and horizontal groundwater flow conditions.

C. Document the horizontal and vertical extent of contamination. Characterize the sources of contamination. Identify the nature of the waste. At a minimum, this should address:

1. Define areas of operation for wood treating, chemical storage and treated wood storage.

2. Define the degree and extent of contamination for the following parameters.

a. Pentachlorophenol
b. Total Volatile Organics
c. Polynuclear Aromatic Hydrocarbons
d. Dioxans/Furans
e. RECRA Metals

3. Define the degree and extent of contamination in the following media.

a. Surface Soils
b. Subsurface Soils
c. Groundwater

d. Wetland Areas
e. Surface Waters
f. Stream Sediments
g. Lake Sediments

D. Prepare and submit to the Department a Remedial Investgation (RI) Report, which defines the degree and extent of contamination at the C.M. Christiansen site. The RI should evaluate and recommend a remedial alternative(s) to address the above parameters and media.

III. Consultant Responsibilities

A. The consultant agrees to provide the services necessary to adequately investigate the environmental contamination at or from the C.M Christiansen site. The consultant will be required to prepare a Draft and a Final Workplan and Historical Review, conduct the investigation, compile the information into a Draft and a Final Site Investigation Report, and submit two copies of the draft and final reports to the Wisconsin Department of Natural Resources (WDNR) Rhinelander District Office and 2 copies to the Bureau of Solid and Hazardous Waste in Madison. The reports shall be prepared using currently accepted hydrogeologic and engineering methods and shall be in conformance with the provisions of the NR 500, 600, and 700 series, Wis. Adm. Code, and other appropriate rules unless otherwise specified.

B. If in the course of this project soil is disrupted to a significant degree, site erosion control measures will be undertaken as outlined in applicable portions of the document entitled Wisconsin Construction Site Best Management Practice Handbook (WR-222-89).

C. In addition the consultant may be called upon to provide testimony in a legal action. Any costs associated with such testimony shall be contracted for separately.

D. The consultant shall obtain access agreements from the property owner and adjacent property owners (as necessary) for continued access for the WDNR to allow the installation of borings and installation and maintenance of monitoring wells, etc., and submit these agreements to the WDNR. The WDNR access permission form is attached in Appendix A.

E. The work under this contract shall consist of performing those phases or portions of the investigation for the project necessary or incidental to accomplish the project, and which are elsewhere herein specified.

The consultant shall furnish all services and labor necessary to conduct and complete the work, and shall furnish all materials, equipment, supplies, and incidentals other than those which are hereinafter designated to be furnished by others.

The work under this contract shall at all times be subject to the review and approval of the WDNR, shall be under the direction of its authorized representative, and shall be in accordance with the requirements contained in the WDNR's guidance documents.

The consultants principal contact with the WDNR shall be through the Rhinelander District Office.

The consultant shall from time to time during the progress of the work confer with the WDNR and shall prepare and present such information and studies as may be pertinent and necessary or as may be required by the WDNR to enable it to pass judgement on the features of the work. The consultant shall make such changes, amendments, or revisions in the detail of the work as may be required by the WDNR. The WDNR receives the right to select the alternative to be used and may request additional alternatives be studied.

At the request of the WDNR, and during the progress of the work, the consultant shall furnish such maps, portions of reports, or other information or data relating to this work under this contract as may be required to enable the WDNR to carry out or to proceed with related phases of the project not covered by this contract, or which may be necessary to enable the WDNR to furnish information to the consultant upon which to proceed further with the work.

Work by the consultant shall proceed continuously and expeditiously through the completion of each phase.

Unless the contract has been terminated prior to the completion of the work, the contract shall not be considered terminated upon the completion and acceptance of the work, or upon final payment thereof, but shall be considered to be in full force and affect for the purposes of requiring the consultant to make such revisions or corrections in the work as are necessary to correct errors made by the consultant in the work, or for the purposes of having the consultant make revisions in the work at the request of the WDNR as a "change order."

F. The consultant shall commence work within 30 days of the WDNR awarding the contract.

G. The consultant shall notify the WDNR project manager at least 5 working days prior to the start of any drilling or sampling activities.

IV. Project Proposal

A. Prior toWDNR awarding the contract, the consultant shall submit a project proposal based on the elements identified in this scope of work. The proposal shall identify key personnel employed by the consultant who will be working on the project and an organizational chart of the project team. A summary of each key employee's educational and work experience shall be provided.

B. The proposal shall contain a schedule for completing the major elements of the project.

C. A meeting with the WDNR project manager is required before submitting a proposal.

D. The consultant shall identify all subcontractors who will be working on the project. Substitutions of key personnel or subcontractors will not be allowed without written request from the consultant and written approval from the WDNR.

E. A cost estimate shall be included for the proposal that itemizes the following for each work effort:

1. labor (staff position, title, and labor rates)
2. time
3. materials
4. travel costs
5. equipment and other rental costs

F. Reimbursement requests shall be made on the State of Wisconsin Department of Natural Resources Invoice for Professional Services (Appendix B). Requests shall itemize costs following the format of item IV.E. above.

V. Workplan

A. Historical Review

1. The consultant shall review all existing reports, logs, surveys, and analytical data. Reports available through the WDNR, can be reviewed at the Rhinelander District Office. All WDNR documents reviewed shall be listed and identified by title, date of publication, and author. The results of previous reports shall be interpreted and utilized for scoping this investigation.

B. Workplan

The workplan shall be prepared in accordance with the requirements of s. NR 716.09, Wis. Adm. Code, and any additional information provided in this scope of work.

During and upon completion of the Historical Review, the consultant shall complete a Draft Workplan based on the review and understanding of this Scope of Work and the site investigation goals.

Two copies shall be submitted to the WDNR Rhinelander District Office. Following receipt of WDNR comments, a Final Workplan shall be prepared and distributed in a like manner within 30 days.

The Workplan shall include:

1. General Information

An introduction describing the study area and purpose of the workplan. A locational map identifying potential sources of hazardous substances, known receptors, and proposed sampling locations. A discussion of the regional and local geology and hydrogeology.

2. Site Investigation Plan

This plan shall describe, with sufficient detail, the investigative techniques such as geotechnical, geochemical, or geophysical, to be performed according to the requirements of Section VI., below.

3. Field Sampling Plan

This plan shall specify the proposed horizontal and vertical sampling strategy including both boring and monitoring well locations, materials and construction specifications, and sampling intervals. The plan shall identify the sampling objectives, sample location and frequency, sample designation, analytical methods, and sampling equipment and procedures.

4. Quality Assurance Plan

This plan shall be prepared in accordance with the requirements of s. NR 711.13(11) Wis. Adm. Code. The plan shall include but not be limited to methods of sample preservation techniques, chain of custody and shipping procedures. The plan shall identify decontamination procedures used for drilling and sampling equipment. The plan shall provide information on replicate samples, detection limits, field and trip blanks, and matrix spike analysis. The plan shall also identify the proposed laboratory(ies) to be contracted for analyses.

5. Site Safety Plan

A site safety plan shall be developed and followed by the consultant and subcontractors. This plan shall reference all current Occupational Health and Safety Administration (OSHA) standards for worker safety. Appendix C is an example site safety plan, provided for general reference. The consultant is solely responsible for site safety of its personnel, subcontractors, and any bystanders. The consultant is not responsible for liability, claims and costs arising from activities of WDNR personnel or its agents (see item sixteen (16) of the General Terms and Conditions). Receipt of this plan will be acknowledged, but not approved or disapproved by the WDNR project manager.

6. Investigative Waste Management Plan

A plan addressing investigative waste management shall be developed and followed by the consultant according to the General Interim Guidelines for the Management of Investigative Wastes.

The consultant is responsible for placing wastes into proper containerization and/or storage. The consultant shall determine if the preferred remedy will allow for the treatment of the investigative waste. The consultant shall take into consideration the "Interim Policy for Promoting the In-State and On-site Management of Hazardous Wastes in the State of Wisconsin."

7. Work Schedule

The consultant shall submit a work schedule for conducting the investigation. At a minimum, major tasks such as project start-up, soil boring/monitoring well installation, soil/groundwater sampling, sample analyses and site investigation reports submittal shall be included.

VI. Site Investigation

The site investigation shall be performed in accordance with the requirements of ch. NR 716 Wis. Adm. Code, guidelines provided in the most recent version of the *Guidance for Conducting Environmental Response Actions*, WNDR, PUBL SW-157-92, and any additional information provided in this scope of work.

The purpose of the Site Investigation is to gather sufficient information to properly assess environmental conditions in the study area. One phase of investigative activities is preferred, however, an additional phase will be considered, if necessary. Based on the findings, an *Alternatives Array* of appropriate remedial actions shall be evaluated in terms of successfully restoring the surface and subsurface environment. An analysis comparing the cost effectiveness of each alternative shall be prepared. A recommendation of the most suitable remedial action or actions shall be made by the consultant.

A. Site Surveys

The consultant shall make such surveys as are necessary to accomplish the work under this Scope of Work. Such surveys shall be complete with respect to detail and to such degree of precision and accuracy as necessary to develop the plans for the Site Investigation Report of the project to the usual standards of the WDNR.

1. Utilities - The consultant is responsible for locating all utilities, right-of-ways, etc.. in the vicinity of the study area prior to any investigation activities.

2. Geophysical - Geophysical methods may be used to aid in determining depth to groundwater, bedrock, filled areas, depth to waste, contaminant plumes, buried containers, and buried cultural or natural conduits.

3. Topographic - Upon completion of borings and monitoring wells, a topographic survey shall be completed for vertical and horizontal control of all pertinent study area and investigation features.

4. Ecological - The consultant shall review existing WDNR information and identify if any known state or federally threatened species are located with a one (1) mile radius of the study area.

B. Geologic Borings

1. Borings shall be installed by personnel meeting the requirements of s. NR 712.05 Wis. Adm. Code.

2. A sampling matrix shall be used to adequately define the soil and groundwater conditions. The matrix may utilize a combination of geoprobe, geotechnical boring/sampling, or other appropriate methods. The matrix shall be centered on known "hot spot" locations and radiate outward in an appropriate geometric pattern . The specific matrix geometry and sample locations shall be determined based on information obtained in the historic review and in concurrence with the WDNR Project Manager. The sampling matrix shall define potential pathways of contaminant migration at the study area. Methods for performing the borings shall be included in the Workplan.

3. Samples shall not be composited for testing purposes.

4. Borings shall be installed according to the requirements of c. NR 141 Wis. Adm. Code. A boring log (Form 4400-122) shall be submitted for each boring and/or monitoring well. A copy of Form 4400-122 and associated instructions is included in Appendix D.

5. For geotechnical samples, each major soil layer encountered shall be classified according to the U.S. Department of Agriculture Soil Textural Classification System.

6. The use of mud or drilling fluids other than air will not be permitted without prior Department approval.

7. Field screening techniques may be employed to aid in determining the depth and location of borings, samples, and monitoring wells. These techniques may use screening instruments, or mobile laboratories as deemed appropriate and approved by the WDNR Project Manager. The workplan shall identify if and what type of field screening will be employed.

8. Boreholes not converted to monitoring wells shall be abandoned according to the requirements of s. NR 141, Wis. Adm. Code. Form 3300-5b shall be completed for each abandoned borehole.

9. Samples shall be properly preserved as necessary and retained for a minimum of 120 working days or until the WDNR project manager determines the samples may be discarded. Prior to discarding any samples the WDNR project manager shall be notified in writing at least 10 working days in advance.

C. Monitoring Wells

1. Monitoring wells shall be installed according to the requirements of ch. NR 141 Wis. Adm. Code.

2. A maximum of 20 monitoring wells shall be used to adequately define the soil and groundwater conditions, and potential pathways of contaminant migration in the study area. The monitoring wells shall thoroughly define the horizontal and vertical boundaries of the contaminants.

3. Water table observations wells shall be installed to adequately provide information on the direction of groundwater flow and contaminant concentrations. The length of screen shall be chosen appropriate for the contaminants of concern and the formation to be monitored.

4. Piezometers and well nests shall be installed to assess the vertical components of the groundwater flow regime as well as the vertical extent of groundwater contamination.

5. A water table well and piezometer shall be installed and monitored for background water quality.

6. Installation of bedrock wells shall follow ch. NR 141 Wis. Adm. Code requirements and any other guidance particular to bedrock wells provided by the WDNR.

7. The locations of the individual wells and nests may be determined according to the results of a geophysical survey and/or field screening techniques as deemed appropriate. Analytical groundwater data of the wells shall be evaluated to verify the results of any screening or surveys performed.

8. Perched aquifers, if present, shall be identified. Groundwater elevations and monitoring results of any perched aquifers shall be evaluated and related to water table conditions in the study area.

9. Monitoring wells shall be screened at those depths where contaminants are most likely located. Screens shall be placed such that individual wells only monitor one lithostratigraphic unit. Construction techniques shall be fully described and diagrammed in the workplan.

10. For each well installed and/or sampled the WDNR Monitoring Well Construction Form (4400-113A), Monitoring Well Development Form (4400-113B), and Groundwater Monitoring Well Information Form (4400-89) shall be completed per instructions on the forms. A copy of these forms and instructions, as well as other instructions regarding groundwater quality monitoring, is included in Appendix D. If a variance to the requirements of ch. NR 141, Wis. Adm. Code, is believed to be necessary, an application for a variance shall be submitted to the Department Project Manager, prior to installation.

D. Chemical Analyses

1. The analyses of samples shall be performed in accordance with the requirements of s. NR 716.13 Wis. Adm. Code.

2. The consultant shall collect and analyze samples to determine contaminant concentrations in all affected media.

Surface Soil
Subsurface Soils
Groundwater
Wetland Areas
Surface Waters
Surface Water Sediments
Lake Sediments

All soil or sediment sample results shall be reported in units of mg/kg on a dry weight basis. All water sample results shall be reported in units of ug/L.

3. Soil/Sediment/Waste Samples

Samples shall be analyzed for the presence of:

a. Pentachlorophenol
b. Pesticides
c. Total Volatile Organics
d. Polynuclear Aromatic Hydrocarbons
e. Dioxans/Furans
f. RECRA Metals

Copies of analytical results shall be submitted to the WDNR within 5 days of receipt by the consultant. Copies of any field screening results shall be submitted within 30 days of completion of field activities.

4. Groundwater/Surface Water/Private Well Samples

Samples shall be analyzed for the presence of
a. Pentachlorophenol
b. Total Volatile Organics
c. Polynuclear Aromatic Hydrocarbons
d. Dioxans/Furans
e. RECRA Metals.

Copies of analytical results and infield conditions shall be submitted to the WDNR project manager within 5 working days of receipt by the consultant. Four rounds of groundwater samples taken three months apart shall be collected at the study area. The first round of sampling shall take place after a minimum of one week after well installation.

VII. Site Investigation Report

The site investigation report shall be prepared in accordance with the requirements of ss. NR 712.07 and NR 716.15 Wis. Adm. Code, guidelines provided in the most recent version of the *Guidance for Conducting Environmental Response Actions*, WNDR, PUBL SW-157-92, and any additional information provided in this scope of work. The report shall be printed on recycled paper and both sides of the pages should be utilized, if possible.

A. Narrative

The report shall follow the format outlined in c. NR 716.15(3) Wis. Adm. Code. The report shall include a discussion of potential remedial action alternatives. An analysis comparing the cost effectiveness of each alternative shall be prepared. A recommended remedial action should be identified and the reason for its selection given. If not, a discussion describing any additional requirements for further study shall be presented.

B. Plan Sheets Section

Visual aids shall be prepared in accordance with the requirements of s. NR 716.15(3)(h) Wis. Adm. Code, guidelines provided in the most recent version of the *Guidance for Conducting Environmental Response Actions*, WNDR, PUBL SW-157-92, and any additional information provided in this scope of work.

1. A base plan sheet shall be prepared. This shall be a detailed topographic survey of the study area. The scale of this plan and the contour interval shall be sufficient to show relief and pertinent features. A permanent on-site benchmark shall be established for both vertical and horizontal control and all elevations shall be related to U.S. Geological Survey data. A facility survey grid and its relationship to the state plane coordinate system shall be indicated. The contaminated soil/sediment area as well as a general estimate on the extent of groundwater contamination shall be delineated. The boundaries of the study area, property boundaries and ownership, filled areas, buildings, water supply wells, underground utilities, manmade features, surface depressions, discolorations of soil and standing water, surface waters, soil borings, groundwater monitoring wells and other pertinent information shall be included. This plan sheet shall include a complete legend, north arrow, bar scale, and transects of the cross sections.

2. Geologic cross sections shall be constructed through all appropriate monitoring wells along and across transects which include major geologic, geomorphic, and cultural features (if appropriate). The geologic cross-sections shall indicate horizontal and vertical heterogeneities within hydrostratigraphic units. The vertical distribution of contaminants shall be shown. Water table, perched aquifers, and potentiometric surfaces shall be included as appropriate. For monitoring wells, the screened interval shall be indicated and for borings, discrete sampling intervals shall be identified. Cross-sections should be chosen in a manner which best describes the site geology and movement of contaminants on and away from the site and, if only two are drawn, should be perpendicular to each other. At least one cross section should be parallel to the groundwater flow direction. As appropriate, flow lines and equipotential lines shall be included to indicate local or regional flow regimes. Each cross section shall include reduced versions of the plan sheet that identifies locations of the transects.

3. Water table contour maps shall be drawn based on stabilized water levels. Water level measurements shall be recorded on the same day and each map shall indicate water table conditions at least three months apart. The base plan sheet shall be used as a basis for these maps. These plan sheets and the water table maps shall be at the same scale. Any significant seasonal water table fluctuations shall be addressed for the purpose of identifying seasonal fluctuations in the flow regime.

4. Additional plan sheet(s) shall be drawn indicating contaminant isoconcentration contours for the parameters which most accurately depict the degree and extent of contamination. The concentration for that parameter shall be presented for each well or boring. This map shall also have the same scale as the base plan sheet.

C. Technical Data Section

1. All technical data such as boring logs, well construction details, geophysical data, WDNR well construction, development, and abandonment forms, well information forms, aquifer test results, water level measurements, soil and groundwater sampling results including summary statistics, soil tests, chain of custody documentation, etc., shall be included in the report.

2. Aquifer(s) property information shall be presented in both tabular and graphic formats.

3. All physical and chemical analytical results and water level measurements shall be presented in tabular format and presented in the report.

4. Soil and groundwater quality monitoring data shall be recorded in ASCII 3½ inch IBM (MSDOS) formatted diskettes in a data format supplied by the WDNR (Appendix D). Four copies of the data shall be submitted to the WDNR. Two of the four copies shall be on 3½ inch IBM formatted diskettes; two copies shall be the data on paper or hard copy.

D. Report Submittal

The consultant shall prepare a Draft Site Investigation Report and submit two copies to the WDNR Rhinelander District Office and two copies to the WDNR Bureau of Solid and Hazardous Waste Management in Madison. Following receipt of WDNR comments, a Final Site Investigation Report will be prepared and distributed in like manner.

The Draft Site Investigation Report shall be submitted within 45 days of completion of initial field activities. Subsequent groundwater monitoring results shall be submitted as an addendum to the Final Report

VIII. Progress Reports

Progress reports shall be submitted with each reimbursement request that details the accomplishments for the time period of the request. These reports shall describe activities undertaken during each time period. These shall include but not be limited to: material review, subcontractor bidding, surveys performed, site preparation, borings and wells installed, samples collected, problems encountered and/or resolved, progress on report preparation, etc..

IX. WDNR Responsibilities

The State of Wisconsin through the WDNR agrees to provide the following support:

A. The WDNR will assign a project manager to serve as an official representative of the WDNR who will resolve in writing any problems of policy and procedure issues and will provide information on the site.

B. The WDNR project manager will be able to conduct on-site inspections with the consultant prior to proposal preparation and during site investigation activities.

C. The WDNR will be responsible for all public information activities associated with the project. The WDNR retains sole rights to all data collected for this study. No data may be used by the consultant for any other purposes until the final report is released to the public by the WDNR.

D. The WDNR retains the right to request a change of consultant's personnel if it determines that existing personnel cannot adequately perform the required tasks. Any such request will be submitted in writing to the consultant. Within 7 days of receipt of such request, the consultant will provide the WDNR with a list of proposed individuals and their qualifications. The WDNR will evaluate the list and choose a suitable replacement within 7 days. If the WDNR deems that none of the proposed substitutions are acceptable the contract will be declared void and the contractor dismissed. The contractor will be reimbursed for time and materials expended to that point. All data collected will be turned over to the WDNR.

X. Consultant Evaluation

At the completion of the project, the WDNR may conduct a consultant evaluation. The following criteria will be evaluated:

A. Ability to meet project schedules and budgets.
B. Accuracy & completeness of contract documents or construction work based on contract specifications.
C. Responsiveness to field observations and recommendations by the WDNR Project Manager.
D. Overall professional responsibilities demonstrated.
E. Satisfactory administration of contract billing, proposal preparation, and construction documentation as evidenced by timeliness and completeness.

XI. Attachments

Appendix A	Access Permission Form
Appendix B.	State of Wisconsin Department of Natural Resources Invoice for Professional Service
Appendix C.	Example Site Safety Plan
Appendix D.	Groundwater Quality Monitoring Data Instructions

9/30/94

To: Scott Watson - NCD
From: Dick Kalnicky - SW/3

I've reviewed the SI Scope of Work for C.M. Christiansen. Overall, it looks very good. I've made some comments on the draft and they are enclosed.

Other than some typographical changes, I'm suggesting:

1) referencing an example site safety plan and including it as an Appendix,
2) including the entire packet of groundwater monitoring instructions and forms as Appendix D, and
3) not using the term "cost benefit analysis" — an analysis comparing the cost effectiveness should suffice.

I also corrected some of the code references — the standard contract language probably was based on earlier drafts of the codes.

I've asked Greg Parker to prepare a consultant selection list. I'll ship that out to you and Connie when it's available. Sometime next week I'll call you to set up a time for the consultant selection phone call.

Hope you had a nice vacation. If you have any questions on these comments, call me at 608-267-7554.

SITE INVESTIGATION SCOPE OF WORK
C.M CHRISTIANSEN COMPANY
SEPTEMBER 1994

FACILITY ID#: WID988639035

I. Project Description

A. This scope of work sets forth the requirements for conducting a site investigation of the environmental contamination associated in the study area surrounding the C.M. Christiansen site.

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B. The proposal shall contain a schedule for completing the major elements of the project.

C. A meeting with the WDNR project manager is required before submitting a proposal.

D. The consultant shall identify all subcontractors who will be working on the project. Substitutions of key personnel or subcontractors will not be allowed without written request from the consultant and written approval from the WDNR.

E. A cost estimate shall be included for the proposal that itemizes the following for each work effort:

1. labor (staff position, title, and labor rates)
2. time
3. materials
4. travel costs
5. equipment and other rental costs

F. Reimbursement requests shall be made on the State of Wisconsin Invoice for Professional Service (Appendix B). Requests shall itemize costs following the format of item IV.E. above.

Department of Natural Resources

V. Workplan

A. Historical Review

1. The consultant shall review all existing reports, logs, surveys, and analytical data. Reports available through the WDNR, can be reviewed at the Rhinelander District Office. All WDNR documents reviewed shall be listed and identified by title, date of publication, and author. The results of previous reports shall be interpreted and utilized for scoping this investigation.

B. Workplan

The workplan shall be prepared in accordance with the requirements of s. 716.09, Wis. Adm. Code, ~~s. NR 716.07~~ and any additional information provided in this scope of work.

During and upon completion of the Historical Review, the consultant shall complete a Draft Workplan based on the review and understanding of this Scope of Work and the site investigation goals.

Two copies shall be submitted to the WDNR Rhinelander District Office. Following receipt of WDNR comments, a Final Workplan shall be prepared and distributed in a like manner within 30 days.

The Workplan shall include:

1. General Information

An introduction describing the study area and purpose of the workplan. A locational map identifying potential sources of hazardous substances, known receptors, and proposed sampling locations. A discussion of the regional and local geology and hydrogeology.

2. Site Investigation Plan

This plan shall describe, with sufficient detail, the investigative techniques such as geotechnical, geochemical, or geophysical, to be performed according to the requirements of Section VI., below.

3. Field Sampling Plan

This plan shall specify the proposed horizontal and vertical sampling strategy including both boring and monitoring well locations, materials and construction specifications, and sampling intervals. The plan shall identify the sampling objectives, sample location and frequency, sample designation, analytical methods, and sampling equipment and procedures.

4. Quality Assurance Plan

This plan shall be prepared in accordance with the requirements of s. 716.13(11), ~~s. NR 711.(11)~~ Wis. Adm. Code. The plan shall include but not be limited to methods of sample preservation techniques, chain of custody and shipping procedures. The plan shall identify decontamination procedures used for drilling and sampling equipment. The plan shall provide information on replicate samples, detection limits, field and trip blanks, and matrix spike analysis. The plan shall also identify the proposed laboratory(ies) to be contracted for analyses.

5. Site Safety Plan

A site safety plan shall be developed and followed by the consultant and subcontractors. This plan shall reference all current Occupational Health and Safety Administration (OSHA) standards for worker safety. The consultant is solely responsible for site safety of its personnel, subcontractors, and any bystanders. The consultant is not responsible for liability, claims and costs arising from activities of WDNR personnel or its agents (see item sixteen (16) of the General Terms and Conditions). Receipt of this plan will be acknowledged, but not approved or disapproved by the WDNR project manager.

6. Investigative Waste Management Plan

A plan addressing investigative waste management shall be developed and followed by the consultant according to the General Interim Guidelines for the Management of Investigative Wastes.

The consultant is responsible for placing wastes into proper containerization and/or storage. The consultant shall determine if the preferred remedy will allow for the treatment of the investigative waste. The consultant shall take into consideration the "Interim Policy for Promoting the In-State and On-site Management of Hazardous Wastes in the State of Wisconsin."

7. Work Schedule

The consultant shall submit a work schedule for conducting the investigation. At a minimum, major tasks such as project start-up, soil boring/monitoring well installation, soil/groundwater sampling, sample analyses and site investigation reports submittal shall be included.

VI. Site Investigation

The site investigation shall be performed in accordance with the requirements of ~~chs. NR 712 and NR 716.09~~ ch. NR 716 Wis. Adm. Code, guidelines provided in the most recent version of the *Guidance for Conducting Environmental Response Actions*, WNDR, PUBL SW-157-92, and any additional information provided in this scope of work.

The purpose of the Site Investigation is to gather sufficient information to properly assess environmental conditions in the study area. One phase of investigative activities is preferred, however, an additional phase will be considered, if necessary. Based on the findings, an *Alternatives Array* of appropriate remedial actions shall be evaluated in terms of successfully restoring the surface and subsurface environment. An ~~A cost-benefit~~ analysis comparing the cost effectiveness of each alternative shall be prepared. A recommendation of the most suitable remedial action or actions shall be made by the consultant.

A. Site Surveys

The consultant shall make such surveys as are necessary to accomplish the work under this Scope of Work. Such surveys shall be complete with respect to detail and to such degree of precision and accuracy as necessary to develop the plans for the Site Investigation Report of the project to the usual standards of the WDNR.

1. Utilities - The consultant is responsible for locating all utilities, right-of-ways, etc.. in the vicinity of the study area prior to any investigation activities.

2. Geophysical - Geophysical methods may be used to aid in determining depth to groundwater, bedrock, filled areas, depth to waste, contaminant plumes, buried containers, and buried cultural or natural conduits.

3. Topographic - Upon completion of borings and monitoring wells, a topographic survey shall be completed for vertical and horizontal control of all pertinent study area and investigation features.

4. Ecological - The consultant shall review existing WDNR information and identify if any known state or federally threatened species are located with a one (1) mile radius of the study area.

B. Geologic Borings

1. Borings shall be installed by personnel meeting the requirements of s. NR 712.05 Wis. Adm. Code.

2. A sampling matrix shall be used to adequately define the soil and groundwater conditions. The matrix may utilize a combination of geoprobe, geotechnical boring/sampling, or other appropriate methods. The matrix shall be centered on known "hot spot" locations and radiate outward in an appropriate geometric pattern . The specific matrix geometry and sample locations shall be determined based on information obtained in the historic review and in concurrence with the WDNR ~~Department~~ Project Manager. The sampling matrix shall define potential pathways of contaminant migration at the study area. Methods for performing the borings shall be included in the Workplan.

3. Samples shall not be composited for testing purposes.

A copy of Form 4400-122 and associated instructions is included in Appendix D.

4. Borings shall be installed according to the requirements of ch. NR 141 Wis. Adm. Code. A boring log (Form 4400-122) shall be submitted for each boring and/or monitoring well.

put comma here rather than semicolon

5. For geotechnical samples, each major soil layer encountered shall be classified according to the U.S. Department of Agriculture Soil Textural Classification System.

6. The use of mud or drilling fluids other than air will not be permitted without prior Department approval.

7. Field screening techniques may be employed to aid in determining the depth and location of borings, samples, and monitoring wells. These techniques may use screening instruments, or mobile laboratories as deemed appropriate and approved by the WDNR Project Manager. The workplan shall identify if and what type of field screening will be employed.

8. Boreholes not converted to monitoring wells shall be abandoned according to the requirements of ch. NR 141, Wis. Adm. Code. Form 3300-5b shall be completed for each abandoned borehole.

9. Samples shall be properly preserved as necessary and retained for a minimum of 120 working days or until the WDNR project manager determines the samples may be discarded. Prior to discarding any samples the WDNR project manager shall be notified in writing at least 10 working days in advance.

C. Monitoring Wells

1. Monitoring wells shall be installed according to the requirements of ch. NR 141 Wis. Adm. Code.

2. A maximum of 20 monitoring wells shall be used to adequately define the soil and groundwater conditions, and potential pathways of contaminant migration in the study area. The monitoring wells shall thoroughly define the horizontal and vertical boundaries of the contaminants.

3. Water table observations wells shall be installed to adequately provide information on the direction of groundwater flow and contaminant concentrations. The length of screen shall be chosen appropriate for the contaminants of concern and the formation to be monitored.

4. Piezometers and well nests shall be installed to assess the vertical components of the groundwater flow regime as well as the vertical extent of groundwater contamination.

5. A water table well and piezometer shall be installed and monitored for background water quality.

6. Installation of bedrock wells shall follow ch. NR 141 Wis. Adm. Code requirements and any other guidance particular to bedrock wells provided by the WDNR.

7. The locations of the individual wells and nests may be determined according to the results of a geophysical survey and/or field screening techniques as deemed appropriate. Analytical groundwater data of the wells shall be evaluated to verify the results of any screening or surveys performed.

8. Perched aquifers, if present, shall be identified. Groundwater elevations and monitoring results of any perched aquifers shall be evaluated and related to water table conditions in the study area.

9. Monitoring wells shall be screened at those depths where contaminants are most likely located. Screens shall be placed such that individual wells only monitor one lithostratigraphic unit. Construction techniques shall be fully described and diagrammed in the workplan.

10. For each well installed and/or sampled the WDNR Monitoring Well Construction Form (4400-113A), Monitoring Well Development Form (4400-113B), and Groundwater Monitoring Well Information Form (4400-89) shall be completed per instructions on the forms. If a variance to the requirements of ch. NR 141, Wis. Adm. Code, is believed to be necessary, an application for a variance shall be submitted to the Department Project Manager, prior to installation.

A copy of these forms and instructions, as well as other instructions regarding groundwater quality monitoring, is included in Appendix D.

D. Chemical Analyses

1. The analyses of samples shall be performed in accordance with the requirements of s. 716.13 ~~c. NR 716.11~~ Wis. Adm. Code.

2. The consultant shall collect and analyze samples to determine contaminant concentrations in all affected media.

Surface Soil
Subsurface Soils
Groundwater
Wetland Areas
Surface Waters
Surface Water Sediments
Lake Sediments

All soil or sediment sample results shall be reported in units of mg/kg on a dry weight basis. All water sample results shall be reported in units of ug/L.

3. Soil/Sediment/Waste Samples

Samples shall be analyzed for the presence of:

a. Pentachlorophenol
b. Pesticides
c. Total Volatile Organics
d. Polynuclear Aromatic Hydrocarbons
e. Dioxans/Furans
f. RECRA Metals

Copies of analytical results shall be submitted to the WDNR within 5 days of receipt by the consultant. Copies of any field screening results shall be submitted within 30 days of completion of field activities.

4. Groundwater/Surface Water/Private Well Samples

Samples shall be analyzed for the presence of
a. Pentachlorophenol
b. Total Volatile Organics
c. Polynuclear Aromatic Hydrocarbons
d. Dioxans/Furans
e. RECRA Metals.

Copies of analytical results and infield conditions shall be submitted to the WDNR project manager within 5 working days of receipt by the consultant. four rounds of groundwater samples taken three months apart shall be collected at the study area. The first round of sampling shall take place after a minimum of one weeks after well installation.

VII. Site Investigation Report

The site investigation report shall be prepared in accordance with the requirements of ~~chs.~~ NR 712.07 and NR ~~716.13~~ Wis. Adm. Code, guidelines provided in the most recent version of the *Guidance for Conducting Environmental Response Actions*, WNDR, PUBL SW-157-92, and any additional information provided in this scope of work. The report shall be printed on recycled paper and both sides of the pages should be utilized, if possible.

A. Narrative

The report shall follow the format outlined in c. NR 716.13(3) Wis. Adm. Code. The report shall include a discussion of potential remedial action alternatives. ~~A cost-benefit~~ analysis comparing the cost effectiveness of each alternative shall be prepared. A recommended remedial action should be identified and the reason for its selection given. If not, a discussion describing any additional requirements for further study shall be presented.

B. Plan Sheets Section

Visual aids shall be prepared in accordance with the requirements of c. NR 716.13(3)(h) Wis. Adm. Code, guidelines provided in the most recent version of the *Guidance for Conducting Environmental Response Actions*, WNDR, PUBL SW-157-92, and any additional information provided in this scope of work.

1. A base plan sheet shall be prepared. This shall be a detailed topographic survey of the study area. The scale of this plan and the contour interval shall be sufficient to show relief and pertinent features. A permanent on-site benchmark shall be established for both vertical and horizontal control and all elevations shall be related to U.S. Geological Survey data. A facility survey grid and its relationship to the state plane coordinate system shall be indicated. The contaminated soil/sediment area as well as a general estimate on the extent of groundwater contamination shall be delineated. The boundaries of the study area, property boundaries and ownership, filled areas, buildings, water supply wells, underground utilities, manmade features, surface depressions, discolorations of soil and standing water, surface waters, soil borings, groundwater monitoring wells and other pertinent information shall be included. This plan sheet shall include a complete legend, north arrow, bar scale, and transects of the cross sections.

2. Geologic cross sections shall be constructed through all appropriate monitoring wells along and across transects which include major geologic, geomorphic, and cultural features (if appropriate). The geologic cross-sections shall indicate horizontal and vertical heterogeneities within hydrostratigraphic units. The vertical distribution of contaminants shall be shown. Water table, perched aquifers, and potentiometric surfaces shall be included as appropriate. For monitoring wells, the screened interval shall be indicated and for borings, discrete sampling intervals shall be identified. Cross-sections should be chosen in a manner which best describes the site geology and movement of contaminants on and away from the site and, if only two are drawn, should be perpendicular to each other. At least one cross section should be parallel to the groundwater flow direction. As appropriate, flow lines and equipotential lines shall be included to indicate local or regional flow regimes. Each cross section shall include reduced versions of the plan sheet that identifies locations of the transects.

3. Water table contour maps shall be drawn based on stabilized water levels. Water level measurements shall be recorded on the same day and each map shall indicate water table conditions at least three months apart. The base plan sheet shall be used as a basis for these maps. These plan sheets and the water table maps shall be at the same scale. Any significant seasonal water table fluctuations shall be addressed for the purpose of identifying seasonal fluctuations in the flow regime.

4. Additional plan sheet(s) shall be drawn indicating contaminant isoconcentration contours for the parameters which most accurately depict the degree and extent of contamination. The concentration for that parameter shall be presented for each well or boring. This map shall also have the same scale as the base plan sheet.

C. Technical Data Section

1. All technical data such as boring logs, well construction details, geophysical data, WDNR well construction, development, and abandonment forms, well information forms, aquifer test results, water level measurements, soil and groundwater sampling results including summary statistics, soil tests, chain of custody documentation, etc., shall be included in the report.

2. Aquifer(s) property information shall be presented in both tabular and graphic formats.

3. All physical and chemical analytical results and water level measurements shall be presented in tabular format and presented in the report.

4. Soil and groundwater quality monitoring data shall be recorded in ASCII 3½ inch IBM (MSDOS) formatted diskettes in a data format supplied by the WDNR (Appendix C). Four copies of the data shall be submitted to the WDNR. Two of the four copies shall be on 3½ inch IBM formatted diskettes; two copies shall be the data on paper or hard copy.

D. Report Submittal

The consultant shall prepare a Draft Site Investigation Report and submit two copies to the WDNR Rhinelander District Office and two copies to the WDNR Bureau of Solid and Hazardous Waste Management in Madison. Following receipt of WDNR comments, a Final Site Investigation Report will be prepared and distributed in like manner.

The Draft Site Investigation Report shall be submitted within 45 days of completion of initial field activities. Subsequent groundwater monitoring results shall be submitted as an addendum to the Final Report

VIII. Progress Reports

Progress reports shall be submitted with each reimbursement request that details the accomplishments for the time period of the request. These reports shall describe activities undertaken during each time period. These shall include but not be limited to: material review, subcontractor bidding, surveys performed, site preparation, borings and wells installed, samples collected, problems encountered and/or resolved, progress on report preparation, etc..

IX. WDNR Responsibilities

The State of Wisconsin through the WDNR agrees to provide the following support:

A. The WDNR will assign a project manager to serve as an official representative of the WDNR who will resolve in writing any problems of policy and procedure issues and will provide information on the site.

B. The WDNR project manager will be able to conduct on-site inspections with the consultant prior to proposal preparation and during site investigation activities.

C. The WDNR will be responsible for all public information activities associated with the project. The WDNR retains sole rights to all data collected for this study. No data may be used by the consultant for any other purposes until the final report is released to the public by the WDNR.

D. The WDNR retains the right to request a change of consultant's personnel if it determines that existing personnel cannot adequately perform the required tasks. Any such request will be submitted in writing to the consultant. Within 7 days of receipt of such request, the consultant will provide the WDNR with a list of proposed individuals and their qualifications. The WDNR will evaluate the list and choose a suitable replacement within 7 days. If the WDNR deems that none of the proposed substitutions are acceptable the contract will be declared void and the contractor dismissed. The contractor will be reimbursed for time and materials expended to that point. All data collected will be turned over to the WDNR.

X. Consultant Evaluation

At the completion of the project, the WDNR may conduct a consultant evaluation. The following criteria will be evaluated:

A. Ability to meet project schedules and budgets.
B. Accuracy & completeness of contract documents or construction work based on contract specifications.
C. Responsiveness to field observations and recommendations by the WDNR Project Manager.
D. Overall professional responsibilities demonstrated.
E. Satisfactory administration of contract billing, proposal preparation, and construction documentation as evidenced by timeliness and completeness.

XI. Attachments

~~attach:~~ Appendix A. ~~Access Permission Form~~ State of Wisconsin Department of Natural Resources
Appendix B. ~~Invoice for Professional Service~~
Appendix C. ~~ASCII Data Format~~ Example Site Safety Plan
Appendix D. Groundwater Quality Monitoring Data Instructions