460145200

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

AUG 18 1997

Thomas Wentland
Waste Management Engineer
Remediation and Redevelopment Team
Wisconsin Department of Natural Resources
4041 North Richards Street, Box 12436
Milwaukee, WI 53212-0436

RE: **ARARs for the Sheboygan River and Harbor Superfund Site**

Dear Tom:

In response to your letter of July 14, 1997 (attached), I am sending back to you, all the State correspondence/documentation related to existing ARARs for the site that I could find. Please review the list and modify it as necessary to comply with current requirements that are specific to the Sheboygan River site. U.S. EPA is looking forward to discussing these potential ARARs in the near future.

Thank you for your assistance in this matter. Please feel free to call me if you have any questions regarding this matter at 312-353-6755.

Sincerely,

Steven J. Padovani,
Response Project Manager (RPM)

cc: R. Nagle, ORC
L. Talbot, WDNR

12IED

WISCONSIN
DEPT. OF NATURAL RESOURCES

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Tommy G. Thompson, Governor
George E. Meyer, Secretary
Gloria L. McCutcheon, District Director

Southeast District Annex
4041 N. Richards Street, Box 12436
Milwaukee, WI 53212-0436
TELEPHONE 414-229-0800
FAX 414-229-0810

July 14, 1997

Mr. Steven Padovani
U.S.EPA Region 5
77 West Jackson Blvd. HSR W-6J
Chicago, IL 60604

SUBJECT: ARARs for the Sheboygan River and Harbor Superfund Site

Dear Steve,

In response to your June 6, 1997 letter, my notes of our May 14, 1997 meeting indecate that EPA would provide the Department with a list of existing ARARs for this site. We would then review that list and modify it as needed to comply with our current requirements.

Please prove us with the current ARAR as soon as possible.

Sincerely,

Thomas A. Wentland
Waste Management Engineer
Remediation and Redevelopment Team

cc: Linda Talbot WM/2

REPORT

ALTERNATIVE ARRAY DOCUMENT

Tecumseh Products Company

Sheboygan Falls, Wisconsin

July 1992

BLASLAND & BOUCK ENGINEERS, P.C.
BLASLAND, BOUCK & LEE
ENGINEERS & GEOSCIENTISTS

SECTION 4 - DEVELOPMENT AND SCREENING OF POTENTIAL REMEDIAL ALTERNATIVES

4.1 General

This section presents the development of potential remedial alternatives that could be used to mitigate the potential risks associated with the site. Specifically, this section identifies potential remedial measures that should be considered and eliminates those that are inappropriate for further evaluation. The development of remedial alternatives was performed using USEPA's "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (USEPA 1988) as a reference. The objective of this process is to develop a manageable range of remedial alternatives, which will be subjected to detailed evaluation in the Feasibility Study (FS). The evaluation process presented in this document consists of the following six general steps:

- Development of remedial action objectives (RAOs);
- Development of general response actions that may be taken to satisfy the RAOs;
- Identification of volumes or areas of media to which general response actions may be applied;
- Identification and initial screening of remedial technologies and process options to determine those that cannot be implemented technically at the site;
- Evaluation of technology process options based on effectiveness, implementability, and cost; and
- Assembling selected representative technologies into media specific remedial alternatives for detailed analysis.

term) of the Tecumseh Products Company (TPC) property these facilities currently occupy. However, this should not preclude the use of the CTF or SMF during remediation efforts which may be performed.

4.2.2b Flood Plain Soil

There were no carcinogens or noncarcinogens with unacceptable human health or environmental risk levels identified in the flood plain soil as a result of RI sampling. Subsequent PCB flood plain sampling as described by the ASRI Report (1992) also did not reveal any concentration levels that would pose potentially unacceptable human health risk (as defined in the endangerment assessment). Since PCB levels in excess of 50 ppm have been observed in select flood plain soil, TSCA disposal requirements would apply if soil greater than 50 ppm PCBs were removed in the future. Therefore, an RAO for flood plain soil was developed to minimize the potential for future mismanagement of soil with greater than 50 ppm PCBs.

4.2.2c General

The "general" category was included to address overall remedial goals. As Applicable or Relevant and Appropriate Requirements (ARARs) have not been specified for the site, they cannot be specifically addressed in this document. Compliance with ARARs will be included as a criteria for detailed evaluation of potential remedial alternatives in the Feasibility Study.

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

101 South Webster Street
Box 7921
Madison, Wisconsin 53707

SUPERFUND/SOLID WASTE FAX 608-267-2768
DIRECT DIAL 608-264-6012

Carroll D. Besadny
Secretary

November 9, 1992

Bonnie Eleder
U.S. EPA
HSRW-6J
77 W. Jackson
Chicago, IL 60604

Dear Bonnie,

I have enclosed comments and materials provided to me by the hazardous waste people in the department. These deal specifically with action levels for removed sediment. These numbers raise the question in my mind as to how you see the decision process being implemented. The PCB sediment criteria numbers that we have previously provided to you will specify fairly low numbers for sediment removal. In other words, PCB concentrations in sediment will not need to be very high in order to threaten public health, welfare or the environment. However, if those sediments are removed, they may be land spread at levels significantly above the action levels for removal. But these levels, will, in some cases, be lower than the concentrations of PCBs in some sediment. Thus, I assume that some sort of treatment would be required for some sediments, but that treatment would have as an endpoint some concentration above the action level for removal of the sediment in the first place. Thus, there is created a possible two tier system of cleanup numbers. Is this what you will envision happening, and if not why not?

Thank you for the site tour last week. It was very informative and productive. I look forward to hearing from you about when we can set up a meeting to talk about how EPA will develop sediment numbers, monitoring concerns, and the development of an ecological risk assessment.

Sincerely,

Tom

Thomas L. Eggert
Superfund Enforcement Specialist
Department of Natural Resources

cc: Jane Lemcke
Tom Janisch, Linda Talbot, Scott Redman WR/2
Tom Wentland SED

CORRESPONDENCE/MEMORANDUM

State of Wisconsin
Department of Natural Resources
Bureau of Solid & Hazardous Waste Management

DATE: November 5, 1992 FILE REF: 4430

TO: Tom Eggert - SW/3

FROM: Tim Mulholland - SW/3

SUBJECT: PCB ARAR Review of Alternative Array Document for the Sheboygan River and Harbor Superfund Site

At your request, I have reviewed the Alternative Array Document for the Sheboygan River and Harbor Superfund Site. Based on this review, I've prepared comments on what I believe to be the applicable or relevant and appropriate requirements (ARARs) from the perspective of Wisconsin PCB regulations. These comments echo the various alternatives and then briefly comment, as appropriate, on the applicable or relevant Wisconsin PCB regulations, as found in ch. NR 157, Wis. Adm. Code.

ALTERNATIVE A: **No Action/Monitoring** - I recognize that this is an alternative that CERCLA always considers as a baseline. If this was strictly a PCB case (not CERCLA), since there has been a release to the environment of PCBs, HWM would normally apply Spills Statute and then PCB regulations and guidance to obtain remediation.

Attached to this memo is a copy of memorandum regarding PCB contamination at <50 ppm. Within this guidance, you will find Appendix C on developing remedial goals. In this appendix, the Department's policy is that responsible parties should remediate PCB contamination to 5 ppm. Specific situations may warrant a higher PCB concentration. At no time, though, are soil PCB concentrations permitted to remain at concentrations greater than 25 ppm. I consider this guidance to be applicable to this situation.

ALTERNATIVE B: **Institutional Controls** - Same comments as regard Alternative A.

ALTERNATIVE C: **In-Place Containment Technologies** - When soil/sediment is excavated, it becomes a "solid waste." If PCBs are found in a solid waste, then the requirements of ch. NR 157, Wis. Adm. Code, can be applied. Strict application of NR 157 would require disposal of PCBs in a PCB landfill or incineration in a PCB incinerator. Therefore, to reduce any potential regulatory burdens and conflicts, minimize the quantity of contaminated soil/sediment excavated.

ALTERNATIVE D: **In-Situ Treatment Technologies** - As with Alternative C, if this project excavates PCB-contaminated soil, then the contaminated soils should be handled as a PCB waste. When combined with in-place containment, no additional requirements appear applicable.

ALTERNATIVE E: Sediment/Soil Removal Technologies - In and of themselves, these sediment/soil removal technologies do not appear to trigger any Wisconsin PCB ARARs. However, when contaminated sediments/soils are disposed or treated, then the applicable portions of s. NR 157.07, Wis. Adm. Code, would apply.

ALTERNATIVE F: Sediment Dewatering Technologies - See comments for Alternative E, but apply to sediment dewatering technologies.

ALTERNATIVE G: Sediment/Soil Treatment Technologies - State and Federal regulations require that PCB wastes be either interred in landfill or incinerated. However, a project proponent may request consideration of alternative treatment technologies, such as those described in this alternative. You will find alternative treatment requirements at s. NR 157.07(5)(b), Wis. Adm. Code, and at 40 CFR 761.60(e). *Typically,* USEPA takes the lead on alternative requirements, so you should be in contact with the Federal project coordinator and consider the Federal requirements with the USEPA-Region V Office of TSCA.

ALTERNATIVE H: Sediment/Soil Disposal Technologies - The requirements of s. NR 157.07(3), Wis. Adm. Code, PCB Landfill Facilities, would apply for disposal alternatives.

If I can be of further assistance, please contact me at 266-0061. All Future requests for ARAR reviews should be routed through Ed Lynch.

cc: E. Lynch - SW/3
R. Schmidt - SW/3
J. Quast - SW/3

TSM14\PCB\SHEBOYGN.MEM

PCB LF should comply with NR 157.07(3), which requires compliance w/ NR 660. (HW LF reg)

See also 157.07(5)(b) p. 4-30 E 1.

CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

DATE: February 17, 1987

FILE REF: 4430
Attn: ADD - EP

TO: District Directors

FROM: Lyman Wible - AD/5

SUBJECT: Regulation of Waste Containing PCB in Concentrations Less Than 50 Parts Per Million

Attached is a memo which provides guidance for regulating wastes containing less than 50 ppm PCB. This guidance is necessary to provide consistent statewide administration of Chapter NR 157, Wis. Adm. Code. This guidance will remain in effect until July 1, 1988, unless revisions to Chapter 157 are completed prior to that date, in which case the new rules will govern.

A draft of this memo was sent to you on September 26, 1985. This memo reflects the comments we received on the draft guidance from field staff, and the regulated community. Thank you for your assistance.

Please contact Mark Williams, 608/266-7278, if you have any questions.

LW:MW:jd/5821T
Attachment

cc: Solid Waste Coordinators
Hazardous Waste Specialists/Solid Waste Investigators
Rick Schuff - SW/3
Don Theiler - AM/3
Carl Blabaum - WW/2
Bob Krill - WS/2
Bruce Baker - WS/2
Lloyd Lueschow - TS/2
Bob Roden - WZ/6
Stan Druckenmiller - EA/6
Jim Kurtz - LC/5
Richard O'Hara - SW/3
Mark Giesfeldt - SW/3
Mark Williams - SW/3
Paul Didier - SW/3
Ted Amman - SW/3
Barb Zellmer - SW/3

CORRESPONDENCE/MEMORANDUM — STATE OF WISCONSIN

DATE: February 17, 1987 FILE REF: 4430

TO: Lyman Wible - AD/5

FROM: Paul Didier - SW/3
Don Theiler - AM/3

SUBJECT: Regulation of Solid Waste Containing PCBs in Concentrations Less Than 50 Parts Per Million (ppm)

This memo provides guidance on how sections 144.79 and 144.44(9), Stats., and Chapter NR 157, Wis. Adm. Code, should be interpreted and applied when regulating the transportation, treatment, storage, and disposal of wastes containing PCBs in concentrations less than 50 parts per million (ppm). This guidance will remain in effect until July 1, 1988, unless revisions to Chapter NR 157 are completed prior to that date, in which case the new rules will govern. In this guidance, we are interpreting existing laws and regulations. This guidance document should not be cited as authority for any required action. When necessary, Chapter NR 157, or Section 144.79 or 144.44(9), Stats., as appropriate, must be cited.

This guidance is organized into several sections. The first section discusses the general requirements of the Wisconsin Statutes and Wisconsin Administrative Code. The remaining sections deal with typical PCB waste management activities regulated on a day-to-day basis, specifically, waste oil, transformers, transformer recyclers, and cleanup of PCB spills.

Copies of sections 144.44(9) and 144.79, Stats., Chapter NR 157, Wis. Adm. Code, and 40 CFR 761 (the Federal PCB regulations) are attached for your reference.

I. GENERAL REQUIREMENTS OF WISCONSIN'S STATUTES AND ADMINISTRATIVE CODE FOR WASTES CONTAINING PCBs IN CONCENTRATIONS BELOW 50 PPM.

Disposal: Wastes containing PCBs in concentrations less than 50 ppm may be disposed in several ways. First, these wastes may be disposed in accordance with federal regulations for PCBs in concentrations above 50 ppm contained in 40 CFR 761.60. This includes incineration in approved PCB incinerators, incineration in high efficiency boilers, landfilling in an EPA-approved chemical waste landfill, or any other method specifically approved by EPA. Under the provisions of section NR 157.07, the Department may also permit PCB waste disposal in licensed hazardous waste landfills or incineration in licensed hazardous waste incinerators.

We may also approve, on a case-by-case basis, other methods for PCB disposal under section NR 157.07(5)(b). This could include disposal in a NR 180-approved landfill with an operating leachate collection system. The disposer must specifically request approval from the Department and the facility owner or operator for landfilling in a NR 180 approved landfill.

Appendix A contains a list of NR 180 approved landfills which may be considered at this time for accepting wastes containing PCBs in concentrations less than 50 ppm. Landfill operators accepting wastes containing PCB must comply with any operating conditions specified by the Department. Suggested operating conditions are included in Appendix A.

The Department recommends that, if practicable, all PCB waste should be placed in containers before disposal in a landfill. Rags, paper, sawdust, wood, soil, demolition material or oil absorbents contaminated with PCBs should be placed in drums and sealed prior to disposal. Containers of liquids with PCBs should be drained, whenever possible, and the solid and liquids disposed separately. Leaky containers should be placed in overpack drums and surrounded by an absorbent.

Chapter NR 157 places the responsibility for proper disposal of PCB wastes on either the generator of the waste or the licensed full service contractor hired by the generator.

Transportation: Wastes containing PCB in any concentration may be transported by the waste generator in vehicles owned by the generator without obtaining a hazardous waste transportation license. Other transporters of waste containing PCB in any concentration must be licensed to transport hazardous waste under Chapter NR 181 (See section NR 157.04). Licensed full service contractors may also transport PCB waste since the full service contractor license incorporates the hazardous waste transporters license. All transporters (including generators) must be equipped to contain and clean up spilled PCB waste.

The generator or full-service contractor must make provisions for disposal of the PCB waste prior to transportation (see sections NR 157.03(2)(a) and NR 157.05(1) and (2)). Section NR 157.03(2) requires the waste generator to determine that the transporter has the required DNR license.

Sections NR 181.38 and NR 181.39 contain general requirements and qualifications for operating transportation equipment. District staff should insure these requirements are being met through formal contact with PCB waste haulers. Federal standards contained in 49 CFR 100-177 and 49 CFR 390-397 have vehicle standards for PCB waste haulers. These standards are enforced through routine vehicle inspections by the Wisconsin State Patrol. If you have specific questions about the federal vehicle standards and their applicability, please contact a State Patrol district office.

Storage: Storage requirements differ for waste generators and commercial PCB facilities and are controlled by section 144.44(9), Stats., Chapters NR 157 and NR 180 of the Wisconsin Administrative Code, and 40 CFR 761, in the federal regulations.

Section NR 157.03(1) applies to generators of PCB wastes. The Department may require written handling and storage plans from a PCB waste generator if the generator disposes of more than 500 pounds of PCB annually, or if the Department determines that the PCB waste, in any amount, is being handled and stored in an environmentally unsound manner, that is, "inadequate to prevent losses to the environment." Requirements for the handling and storage plans are listed in NR 157.03(1) and include inspections for leaks, spill containment and cleanup, equipment for collecting and containing PCBs, equipment and material for spill cleanups, and equipment for storage of PCBs. (A discussion of the physical facilities needed for proper storage of PCBs is found on page 10 of this guidance.)

Section 144.44(9), Stats., applies to commercial PCB storage and treatment facilities. As defined in the statute, "commercial" means providing services to persons other than the owner or operator. A commercial PCB storage and treatment facility is a facility which provides a service to others for the collection, transportation, treatment, or storage of wastes containing PCBs. This definition appears to cover most persons who handle PCBs other than landfill operators and PCB waste generators. (Landfills are not covered under section 144.44(9) because they must already meet the standards created by other statutory provisions.)

Under the provisions of s. 144.44(9), a commercial PCB storage or treatment facility may not be established after May 7, 1982 unless the Department receives and approves a feasibility study and plan of operation for the storage or treatment of PCB wastes, and issues a solid waste operating license under s. 144.44(4), Stats. The feasibility study and plan of operation have to meet the requirements of NR 180.07.

The provisions of s. 144.44(9) do not apply to a commercial PCB storage or treatment facility established prior to May 7, 1982. However, since PCBs are classified as solid waste, the requirements of NR 180.07 are applicable. The issuance of a solid waste facility operating license is required.

The Department has the discretionary authority under s. 144.44(9), Stats., to exempt a commercial PCB storage or treatment facility from the requirements of the site approval process in section 144.44, Stats., and licensing. Exemption decisions are made on a case-by-case basis. Factors which should be considered when reviewing an application for an exemption include the characteristics and type of waste containing PCBs, the concentration of PCBs in the waste, the potential for release of PCB to the environment, the final disposal of the waste, and the manner in which the facility is operated. (A related discussion on commercial PCB facilities is found in Section IV, TRANSFORMER SALVAGERS, page 8 of this guidance.)

The federal regulations found in 40 CFR 761.65 contain requirements for isolation and containment of PCBs during storage and plans for spill response, but these requirements only apply to the storage of wastes containing more than 50 ppm PCB.

Recordkeeping: Under section NR 157.03(2)(c), the PCB waste tracking form (DNR Form 3200-45; copy attached) must be initiated by the PCB waste generator and accompany the waste. Each responsible party must complete applicable portions of the tracking forms. The completed form must be returned to the generator for filing and retention. We recommend these records be kept for at least 3 years. These forms must be available for DNR inspection upon request of the Department. The Department will allow use of the federal uniform hazardous waste manifest in lieu of the PCB tracking form.

Small Quantities of Household PCB Waste: Occasionally, we receive inquiries from the general public about the disposal of small quantities of PCBs generated by a household. For the purpose of determining what is a small quantity of household-generated PCB waste, we suggest using the definition of small quantity waste found in NR 181.13 (i.e., a household generates small quantities of PCB waste if the total waste generated or stored does not exceed 220 pounds of waste containing PCB per month). The most common household PCB wastes encountered are small capacitors from appliances, radios, and televisions, and small transformers used in ham radio systems. This area of PCB management has not been thoroughly addressed in guidance on state PCB regulations. We should not regulate under NR 157 small quantities of PCB waste generated in a household, but this exemption should be limited to the types of waste described above. In these cases, we should advise residents to place the waste in a metal container, such as an old paint can, and surround the waste item with sand, oil dry, or other absorbent and dispose of it with the rest of the residence's trash. We should also encourage residents to take PCBs to Clean Sweep programs, if such a program will accept PCB waste.

II. WASTE OIL CONTAINING PCBs IN CONCENTRATIONS BELOW 50 PPM

General Requirements: We should generally regulate waste oil containing PCB in any concentration. However, the current practical limit of detection for PCBs in waste oil is 10 ppm. Therefore, only oils with 10 ppm or more of PCBs are regulated. If deliberate mixing of waste oil and PCBs is known, we will regulate the resulting mixture as a PCB containing waste regardless of resultant concentrations.

No waste oil (whether it contains any detectable amount of PCBs or not) should be dumped on the ground or otherwise spread to the general environment. In any case, where waste oil (containing PCB or not) has been spilled, the discharger is responsible for removing the oil and cleaning the site.

Disposal: We assume the major source of PCB contamination of waste oil is transformer oil. We should reduce the introduction of PCBs to the waste oil stream by encouraging utilities generating electricity to use transformer oils containing less than 50 ppm PCB as secondary fuels in their utility boilers. We have in the past advised representatives of several utility companies that incineration of waste oil containing PCBs in any concentration would need review and approval under s. 144.44(9), Stats., and NR 157.07(2). However, recent investigations by Technical Services, the Bureaus of Air Management and Solid Waste Management, and Lake Michigan District, have concluded that when proper conditions are met, the incineration of small amounts of PCBs in low concentration should not cause adverse environmental impacts. Standards for burning small quantities of PCBs in low concentration will be included in revisions to Chapter NR 157. In the interim, we may allow utilities, or other industrial furnaces used for electricity or steam generation, to burn transformer oils containing PCBs in concentrations less than 50 ppm pursuant to s. NR 157.07(5)(b). Appendix B contains technical requirements which should be met when these transformer oils are burned as a secondary fuel.

An air pollution control permit should not be required prior to a facility's burning of waste oil containing PCBs. In general, the Bureau of Air Management concludes that the potential increase of PCB emissions from burning oil containing less than 50 ppm PCB would not of itself require a permit or a permit modification provided the Appendix B criteria are met. However, when the Bureau of Air Management issues a mandatory permit for the facility the burning of waste oil containing PCBs will be considered at that time.

We may also allow waste oil, including transformer dielectric oils, with a PCB concentration below 50 ppm to be mixed with other waste oils and resold as a secondary fuel for use in industrial furnaces or boilers. However, this practice should be allowed only if the criteria contained in Appendix B are met. Waste oil containing PCBs should not be used for residential heating purposes.

Appendix B contains a partial listing of acceptable and nonacceptable uses of waste oil as a secondary fuel when PCBs are present.

District field staff should determine which utilities or industries are burning waste oils containing PCBs as secondary fuels, to ensure that the attached operational criteria listed in Appendix B are met. This may be done through informal district staff contacts with the waste oil recyclers, utilities, and industries.

Open burning of waste oil with any detectable PCB concentration is strictly prohibited by Chapter NR 429. Violations of this prohibition are handled by District Air Management staff.

The Department should discourage the use of waste transformer oil with concentrations below 50 ppm to fill other transformers which are being recycled. This can be accomplished through informal district staff contacts with transformer recyclers and utilities. The oil may be used for servicing on-line transformers (under NR 157.05(2) and 40 CFR 761.30(m)).

Transportation: Transporters of waste oil containing PCBs must be licensed hazardous waste transporters (NR 157.04). NR 181.38 and 181.39 contain general requirements and qualifications for operating transportation equipment. District staff should insure that the vehicle and staffing requirements of NR 181.38 and 181.39 are being met.

Waste dielectric fluid containing PCBs may be transported in intact transformers or other electrical equipment. The transformers or electrical equipment must be secured when being moved. The transporter must be equipped to handle spillage.

Storage: The Department has the option to require that all commercial facilities storing waste oil containing any detectable amount of PCB be licensed under NR 180.07. However, s. 144.44(9)(f), Stats., allows the Department to exempt persons from the site approval and licensing requirements for commercial PCB storage and treatment facilities. We should generally not require storage licenses for waste oil storage tanks which hold oil containing less than 50 ppm PCB. Storage licenses are not required for the storage of waste oil containing PCBs in any concentration when stored by the waste oil generator. However, if the PCB concentration exceeds 50 ppm the EPA storage requirements must be met. (Note: If the waste oil contains hazardous waste or exhibits hazardous waste characteristics, the storage requirements of NR 181.43 must be met.)

Recordkeeping: Under s. NR 157.04(2), a PCB waste tracking form (Form 3200-45) must be filled out and properly transferred for all waste oil containing PCBs. If the waste oil is mixed with other waste oils for use as a secondary fuel, the waste oil hauler may be considered the final disposer even though the waste oil may be delivered through other parties before reaching an industrial furnace. The purpose of this new recommendation is to eliminate excessive paper work to track small quantities of waste oil containing low concentrations of PCB. The waste oil hauler must return the tracking form to the waste generator. Utilities do not need to use the tracking form for their waste transformer oils containing less than 50 ppm if the oil is being transported to the utility's furnaces or boilers for use as a secondary fuel.

The Department is proposing to prohibit the disposal of bulk fluids in landfills. For this reason, we should discourage the disposal of waste oil containing PCBs (or any waste oil, for that matter) in NR 180 landfills. However, in some cases, it may be necessary to dispose small quantities of waste oil containing less than 50 ppm PCB in landfills. These situations should be considered on a case-by-case basis.

III. TRANSFORMERS

Disposal: Transformers are classified according to the concentration of the PCB content in the transformer's dielectric fluid. Consistent with past advice given to district staff and utilities, transformers which contain, or contained, oil with PCB concentrations less than 50 ppm can be disposed of in compliance with any of the EPA approved methods, by landfilling in an NR 181 approved landfill, or by landfilling in an approved NR 180 site with an operating leachate collection system. These transformers may also be rebuilt, or sold for salvage or reuse. Any transformer disposed in an NR 180 landfill must be drained prior to disposal.

The disposal of transformers which contain between 50 and 500 ppm PCBs is not regulated by the EPA if the transformers are drained of all free flowing fluids (See 40 CFR 761.60(b)(2)). Until now, we have not defined how long it takes to drain a transformer of all free flowing fluids. We recommend that the transformer be drained twice with a minimum of 12 hours between each draining. Once drained of all free flowing fluids, these transformers may be disposed in an approved hazardous waste landfill, or by any of the approved EPA methods. Under the provisions of NR 157.07(5)(b), the Department may approve other disposal options which include disposal in a NR 180-approved landfill with an operating leachate collection system.

Transformers containing greater than 500 ppm PCBs must be disposed of in accordance with 40 CFR 761.60(b) which requires incineration in an approved PCB incinerator, or if drained and solvent rinsed, the transformer may be disposed in an EPA-approved chemical landfill.

Salvaging: Transformers which contain less than 500 ppm PCB may be sold for salvage or reuse. Undrained transformers should be sold or given only to salvagers who are licensed commercial PCB facilities under s. 144.44(a), Stats. Transformers containing greater than 500 ppm PCB may not be salvaged, but must be disposed in accordance with EPA regulations.

Transportation: Transporters of transformers which contain or contained PCBs need to be licensed under NR 181.31 and NR 181.55 even if the transporter is a transformer salvager transporting transformers for recycling or salvaging. Generators of waste transformers which contain or contained PCBs may transport transformers without a hazardous waste transporters license.

Storage: Owners of storage facilities for waste transformers which contain more than 500 ppm PCB, or more than 50 ppm, if not drained, need to comply with the provisions of 40 CFR 761.65. EPA enforces these storage requirements through routine inspections.

Generators of waste transformers may store the transformers without obtaining an operating license. Under the provisions of NR 157.03(1), the Department may require the generator to submit handling and storage plans. The decision to require handling and storage plans is left to District discretion.

All facilities not owned by a waste generator where undrained waste transformers are stored for disposal, or where transformers are worked on for salvage or resale must be licensed in accordance with section 144.44(9), Stats., or under NR 180.07. In some instances, the storage area may be exempted under section 144.44(9)(f), Stats. The decision to exempt a facility under the provision will be made by District staff. Storage plans, plans of operation, and license application are to be submitted to and reviewed by the Districts.

Storage areas for transformers which are drained, intact, not leaking, and which are being stored or sold for reuse do not need storage licenses.

Recordkeeping: Under ss. NR 157.03(2)(c), NR 157.04(2) and NR 157.05(4), a PCB tracking form must be filled out and retained for every transformer or lot of transformers provided the lot is kept intact. If the transformers are recycled, the recycler should complete box VIII on the PCB tracking form, noting that the transformer(s) is being recycled or salvaged; and return the tracking forms to the generator. Tracking forms are not needed if the transformer is sold for reuse.

IV. TRANSFORMER SALVAGERS

License Requirements: Transformer salvagers are subject to several licensing requirements. The first is the transportation license. It is generally assumed that a transformer salvager accepts transformers for the purposes of recycling parts or all of the transformers and, therefore, is responsible for proper disposal of the waste. If the transformer salvager drains, opens, repairs, tears apart, or otherwise services transformers, the salvager must be licensed as a full service contractor under sections NR 181.33 and 181.55. If the salvager takes only drained transformers strictly for resale, a hazardous waste transporters license is sufficient.

A person who transports transformers strictly as an agent for the generator to a buyer for reuse needs no hazardous waste transportation license.

An operating license is required by s. 144.44(9)(e), Stats. for commercial PCB storage and treatment facilities. Transformers salvagers "provide a service" to the waste generators regardless of whether they pay for the transformer, are paid to take them, or receive them free from the generator. Therefore, transformer salvagers are considered to be commercial PCB storage or treatment facilities and are subject to the

provisions of s. 144.44(9), Stats. Any transformer salvager established and approved by the Department prior to May 7, 1982 will not be required to comply with the requirements of s. 144.44(9), Stats. However, we can require the salvager to submit a feasibility report and plan of operation which complies with the requirement of NR 180.07, provided we have not issued any prior approval for the salvaging facility. Salvage operations established after May 6, 1982, are subject to the requirements of s. 144.44(9) Stats., unless exempted by the Department. The decision to grant an exemption or to require a feasibility report and plan of operation for a specific facility will be left to the District's analysis of the operation at the facility.

There are three categories of salvagers. Two of these can usually be exempted from the licensing requirements of 144.44(9), the third should normally be licensed. These categories are:

Category 1 - These are salvagers, or salvage yards, that deal with many salvage items, including transformers and who have established salvage ('junk') yards. This salvager should typically be exempt for licensing, provided they accept only drained transformers.

Category 2 - These are transformer salvagers who accept only drained transformers strictly for resale or salvage. These salvagers do not work on the transformers. Typically, a license should not be required.

Category 3 - These are transformer salvagers who deal with transformers for the purpose of rebuilding the transformer for resale, selective material salvage, or who accept undrained transformers. Typically, we should license the operation of these facilities.

We should require licenses in any situation where the handling of transformers may be causing the spread of PCB into the general environment.

Finally, the operating license is issued for a specific facility and site. Therefore, each new site established by a transformer salvager must comply with all the provision of s. 144.44(9), Stats.

Recordkeeping: Under ss. NR 157.04(2) and NR 157.05(4), the transformer salvager must obtain a copy of the PCB tracking form from the original transformer owner. This form must be passed with the transformers if the transformers are disposed. If the transformer is salvaged, the salvager completes the "service facility" box on the form and returns the form to the waste generator.

Physical Facilities for Transformer Salvagers: Under s. NR 157.05(3), a transformer salvager must be properly equipped to contain PCB waste and to cleanup spilled PCB material. Necessary physical facilities are listed below. These facilities requirements are also appropriate for PCB waste generators if we require a handling and storage plan under s. NR 157.03.

1. All transformer salvaging should be performed on impervious, continuous concrete pads. The pads should be surrounded by containment curbs. The containment curb should be large enough to contain the volume of liquids which is expected to be contained in the transformers being salvaged.

2. The salvagers must have oil absorbent and cleaning materials readily on hand to cleanup spilled PCB materials.

3. The salvager must have barrels or other suitable containers for holding PCB waste materials and PCB-contaminated cleanup materials. Barrels for liquid PCB should be 17E containers under 49 CFR 178.116, and for nonliquid PCB should be 17C containers under 49 CFR 178.115.

4. The transformer recycling operation should be protected from the elements. Preferably, the operation should be conducted inside a building.

5. The facility should not be located in or near a floodplain, nor near a sensitive environment.

V. CLEANUP OF SPILLED PCB WASTES

All wastes generated by cleaning up spilled PCB material must be disposed as described in this memo. A major question with cleanup of PCB contaminated material is how clean is clean?. The following discussion suggests some minimum goals for cleanup and provides directions for determining the actual levels of cleanup, on a case-by-case basis. The U.S. EPA is currently developing national guidelines for PCB cleanups. We anticipate draft guidelines will be published for review in the Federal Register in the near future. Our cleanup guidelines given in this memo will be reviewed and reevaluated in light of the national guidelines when released by EPA. In all cases, we ask the Districts to discuss PCB cleanups with the Bureau's PCB coordinator to insure consistent cleanup objectives are being established statewide.

Surfaces contaminated by spilled PCB fluids, or fluids containing PCBs, should be cleaned to the extent practical. The level of cleanup effort varies, however, with the type and age of the spill. Recent spills can be divided into two categories: high PCB content and low PCB content. High PCB content fluids consist of askarels or pure PCB fluids, and for

lack of better definition at this time, all fluids containing more than 500 ppm PCB. Low PCB content fluids are fluids containing less than 500 ppm PCBs.

Recent spills of high PCB content fluids on any exposed surface where routine human contact is possible should be cleaned to a residual PCB concentration of less than 50 micrograms per 100 cm^2. Any exposed surface which is not routinely contacted by the public, but where some human contact is possible, should be cleaned to a residual PCB level of less than 100 micrograms per 100 cm^2. In all cases, wipe tests should be performed to measure the effectiveness of cleaning. If, after repeated cleaning, the above concentrations cannot be met, the surface should be removed or sealed with epoxy or other material which will effectively isolate the PCBs.

Cleanup of historical PCB spills, or long-term surface contamination by PCBs, should follow the same procedures listed above for recent spills of high PCB content fluids.

Recent spills of low PCB content fluids (<500 ppm) should be detergent washed and rinsed with solvents, until all visible traces of the spilled fluids have been removed from the surface. No sampling for residual PCB levels on the surface is necessary.

Soils contaminated by PCB must be excavated and the concentration of PCB reduced to the extent practicable. Our overall objective for PCB soil cleanup should be to reduce the residual concentration to 5 ppm. However, this level of cleanup may not be necessary or appropriate in all cases. Each incident should be individually reviewed and an appropriate cleanup objective established. Procedures for establishing appropriate cleanup objectives are contained in Appendix C.

The appropriate cleanup level for aquatic sediments needs to be determined on a case-by-case basis. However, all sediment removal projects should explore lowering the PCB concentrations to the lowest extent practicable since these sediments are already available to the lower level of the food chain.

The responsible dischargers of PCBs are required to promptly notify the DNR when a spill occurs. If a spill is caused by a licensed hazardous waste transporter, the Department should work with the transporter to effect the cleanup. If the transporter is nonresponsive, the District staff should attempt to identify the generator of the PCB waste. Under the provisions of NR 157.03, the generator is responsible to ensure proper disposal of the PCB wastes. In a spill situation, we can hold the generator responsible for cleanup. The following spill notifications are necessary:

1. Chapter NR 158 requires any spill be reported to the DNR.

2. The Toxic Substances Control Act requires any spill involving more than 10 lbs. of PCB be reported to EPA. Region V interprets this to mean any spill involving more than 10 lbs. of PCB-contaminated fluid (i.e., containing more than 50 ppm) must be reported. One gallon of fluid weighs about 10 lbs.

3. The reportable quantity for PCB under CERCLA is 10 lbs. of PCB. Under CERCLA, spills are reported to the National Response Center.

VI. SUMMARY TABLE

Appendix D is a table which summarizes the applicable regulations for many PCB collection and disposal situations.

Approved:

Richard E. O'Hara
Richard E. O'Hara - SW/3

Dean G Packard
Dean Packard - AM/3

James A. Kurtz - LC/5

5821T
02/11/87

APPENDIX A:

Landfills Which May be Considered for Approval to Accept
Wastes Containing PCB
in Concentrations Less Than 50 ppm
October, 1986

Facility	County	District
[redacted]	[redacted]	[redacted]
Brown County - East	Brown	LM
Brown County - West	Brown	LM
Dane County - Landfill Site #2	Dane	SD
Door County Sanitary Landfill	Door	LM
Eau Claire County - Seven Mile Creek	Eau Claire	WC
Green County Solid Waste Disposal Site	Green	SD
Kewaunee County Solid Waste Balefill	Kewaunee	LM
Marathon County Landfill	Marathon	NC
Outagamie County	Outagamie	LM
Portage County Landfill	Portage	NC
Sauk County Sanitary Landfill	Sauk	SD
Winnebago County	Winnebago	LM
Consolidated Paper Wis. Riv. Div.	Portage	NC
Consolidated Paper - WQC	Wood	NC
City of Abbotsford Landfill	Marathon	NC
City of Menomonie Landfill	Dunn	WC
City of Superior - Moccasin Mike Site	Douglass	NW
Greidanus Sanitary Landfill	Walworth	SE
James River Corp. - Ashland Mill	Ashland	NW
James River Norwalk - Northland	Brown	LM
Nekoosa Paper - WW Treatment Res.	Wood	NC
Rock County - City of Janesville Landfill	Rock	SD
Scott Paper Company Landfill	Oconto	LM
Shawano Paper Mills Landfill	Shawano	LM
Thilmany Pulp & Paper Company	Outagamie	LM
Tork Landfill Corporation	Wood	NC
Waste Management - Pheasant Run	Kenosha	SE
Waste Management of Wisconsin - Omega Hills	Washington	SE
" " - Ridge View	Manitowoc	LM
" " - Metro	Milwaukee	SE
" " - Muskego	Waukesha	SE
Wausau Paper Mills Landfill	Marathon	NC

Suggested Conditions for Disposal:

1. Large items of wastes containing PCB's, such as drained transformers, should not be disposed within 10 feet of the landfill base.

2. Large loads or items of wastes such as drained transformers and uncontained capacitors, or contaminated demolition material shall be immediately encapsulated with clay when disposed.

3. Small items which have been placed in containers and surrounded by absorbent may be mixed with other wastes.

4. Contaminated soil may be mixed with other wastes, but should not be placed within 10 feet of the landfill base.

5. Districts should document to the files, with a copy to the central office, disposal of wastes which contain PCB's. Documentation should state the estimated volume and type of waste, and the PCB concentration. The name of the landfill should be given and the approximate location of the wastes in the landfill stated or shown in a drawing. The approximate depth of the wastes burial should also be stated.

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APPENDIX B
SUGGESTED OPERATION AND DESIGN CRITERIA FOR FURNACES AND BOILERS
BURNING LIQUIDS CONTAINING PCBS IN CONCENTRATIONS
BELOW 50 PPM

Combustion Criteria

1. Furnaces - combustion characteristics:

   Dwell time and temperature: 1.2 second dwell time with minimum combustion temperature of 1200° C ± 1%
   or
   1.5 second dwell time with minimum combustion temperature of 1100°C ± 1%.

   Persons proposing to burn waste oils containing PCBs in concentrations less than 50 ppm shall prepare engineering calculations showing the relationship between combustion temperatures and dwell times in the furnace. The Department shall review the calculations and judge the efficiency of the furnace for destroying PCBs.

2. Boiler ratings: Units must be able to continuously deliver at least 50 million BTU per hour to the boiler section for liquid fuel boilers. Solid fuel boilers must continuously deliver 100 million BTU to the boiler section.

3. Stack gas characteristics: Stack gas must contain a minimum of 3 percent excess oxygen for liquid or solid fuel systems.

Operation Criteria

1. Fuel flow: PCB fluids may not be fed into a furnace or boiler during on-off cycling (or start-up and shut-down). The minimum dwell time and temperature listed above must be achieved when fluids containing PCBs are being fed to the furnace or boiler. At no time shall more than 10% of the total heat input to the furnace or boiler be derived from fluids containing PCBs.

   Fluids containing PCBs should not exceed 10 percent, by volume, of the fuel feed.

2. Stack gas conditions: Whenever the O_2 concentration listed above is not achieved, the operator shall immediately adjust the airflow to maintain 3% excess O_2 in the stack. Flow of PCBs to the furnace or boiler shall be stopped if the proper stack O_2 concentration cannot be maintained.

3. Operation Plans: District staff should review standard operating procedures for furnaces or boilers burning fluids containing PCBs. If proper instructions are lacking for furnace control when PCBs are burned, those procedures should be developed. The District may require a contingency plan to be submitted and approved prior to allowing PCBs to be burned.

Physical Facility Requirements

1. Fuel containing PCBs must be stored in separate fuel tanks.

2. Manual controls for controlling the flow of waste oil containing PCBs must be installed.

3. Monitoring and recording equipment for measuring internal furnace temperatures and O_2 in stack gas must be properly installed, calibrated, and maintained.

Furnace and Boiler Types (Some Examples)

1. Acceptable for burning fuels with PCB concentrations below 50 ppm.

   Steam generating units for electricity generation
   Industrial furnaces used for space heating or process heating
   Turbine driven electrical generators

2. Acceptable for burning fuel with low PCB concentrations.

   In some instances, stationary large bore diesel engines, but a Departmental analysis of PCB destruction potential may require additional controls. District discretion.

3. Unacceptable for burning fuels containing any level of PCB.

   Furnaces used for space heating of homes, schools, institutions, or commercial establishments.

   Asphalt plants.

   Mobile diesel engines.

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APPENDIX C:

Establishing Cleanup Objectives for PCB Spills

PCB cleanups should follow the repair approach established in NR 550.33(1) for determining repair goals and objectives. The goal of PCB cleanups is to reduce or eliminate the health and environmental risks resulting from PCB contamination. The cleanup objective for soils should be 5 ppm residual PCB, in the worse-case situations. This objective may be relaxed depending on site and spill characteristics. In no case, however, should the residual PCB level be greater than 25 ppm.

Table 1 is a list of factors to consider when determining cleanup objectives for a specific situation. The Table also discusses the influence each factor should have on the cleanup objective.

Following Table 1 is a series of examples showing how these factors might be applied on a given situation. Some of these examples are based on actual PCB contamination or spill incidents we have recently encountered.

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EXAMPLES

Example 1:

Contamination Source: Buried PCB capacitors

Location: Industrial property with limited access. Burial site, however, is located adjacent to a surface water.

Facts:

- Site was used for capacitor disposal during the late 1960's, early 1970's.
- Data is available to reasonably conclude some PCB contamination of the stream sediment has occurred.
- Disposal site does not have any means to prevent future PCB migration.

Cleanup Objective: Capacitors should be exhumed and redisposed in accordance with EPA requirements. The cleanup objective should be 5 ppm because of the proximity to a surface water.

Example 2:

This example is a variation of Example 1. In this case, the burial site is an industrial site with limited access. The burial site is isolated from human contact and is not near any sensitive environment. Groundwater is not a factor. The site owners are agreeable to exhume the wastes, remove the surface soils, and cap the site with clean backfill. Future uses of the site will remain industrial.

Cleanup Objective: In this case, the residual PCB levels could be set at 25 ppm. The expense of obtaining lower level of PCB cannot be justified because of migration of PCB to a sensitive environment. This objective appears consistent with expected EPA cleanup guidelines.

Example 3:

Contamination Source: Spilled mineral oil from a transformer.

Location: The spill occurs in a suburban setting, the spill site is readily accessible to residents, but is more than 50 feet to the nearest house.

Facts:

- Utility responds immediately (within 36 hours) to spill

- After removing the contaminants soil , the spill site is covered with clean backfill.

Cleanup Objective: Remove visible staining plus 6 inches of underlaying and adjacent soil.

Backfill with clean soil. No residual PCB analysis required.

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TABLE 1

Factors	Comments/Effects on PCB Residual Levels
	Lower PCB Levels Allowed to Remain → Higher PCB Levels Allowed to Remain
Locational	
- Existing Landuse	Residential → Commercial → Industrial
- Future Landuse	(Same as for Existing Landuse)
- Distance to Sensitive Environment	Close → Far
- Intervening Slope	Steep → Flat
- Soil Type	Gravel → Sand → Loam → Silt → Clay → Organic
- Distance to Property Lines	Close → Far
- Environmental Setting	Urban → Suburban → Rural
- Site Isolation	Not Isolated → Isolated
- Run-off Potential	High Run-off Potential → Low Run-off Potential
- Site Security	Open Access → Limited Access
Environmental Effects	
- Type of Sensitive Environments	Wetlands → Rivers, Streams, Lakes → No Exposure
- Potential for Uptake into Foodchain	High Potential → Low Potential
- Potential for Human Exposure	High Potential → Low Potential
Total Mass of PCB's	Large Mass → Small Mass
Cost and Technical Practicability of Clean-up	Low cost per PCB unit → High cost per PCB unit
Age of Contamination	Recent → Historic
Type of Material Causing Contamination	For recent mineral oil transformer spills, cleaning visible traces and six inches of soil is sufficient. No sampling necessary.
Background PCB Levels	In industrial settings, clean-up should not lower PCB levels to below background levels in area.

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PCB REGULATORY SUMMARY

WASTE	PCB CONCENTRATION	INCINERATION	LANDFILLING	ALTERNATE DISPOSAL METHODS	TRANSPORTATION	STORAGE	RECYCLING
Liquid PCBs (mainly dielectric or hydraulic fluids)	> 500 ppm	Required 40 CFR 761.60(a)(1)	Not acceptable	NONE	Vehicle standards 49CFR 100-177 & 390-397 License - NR181.33 & 181.55	Technical Standards in 40 CFR 761.65 License - 180.07 or s.144.44(9)	N/A
	> 50 < 500 ppm	Acceptable 40 CFR 761.60(a)(2)&(3)	Chemical Landfill 40 CFR 761.60(a)(2)	NONE	Vehicle standards 49CFR 100-177 & 390-397 License - NR181.33 & 181.55	Technical Standards 40 CFR 761.65 Licensed, 180.07 or s.144.44(9)	N/A
	< 50 ppm	EPA approved methods or if approved by DNR under NR157.07(2)	EPA approved or NR181 approved landfill	NR180 approved landfill with leachate system or other DNR approval, 157.07(5)	Vehicle standards 49CFR 100-177 & 390-397 License - NR181.33 & 181.55	Licensed under NR180.07 or s.144.44(9)	If approved under NR157.07(5)
Waste Oil Containing PCBs	> 500 ppm	Required 40 CFR 761.60(a)(1)	Not acceptable	NONE	Vehicle standards 49CFR 100-177 & 390-397 License - NR181.33 & 181.55	Technical Standards 40 CFR 761.65 Licensed, 180.07 or s.144.44(9)	N/A
	> 50 < 500 ppm	Acceptable 40 CFR 761.60(a)(2)&(3)	Chemical Landfill 40 CFR 761.60(2)	NONE	Vehicle standards 49CFR 100-177 & 390-397 License - NR181.33 & 181.55	Technical Standards 40 CFR 761.65 Licensed, 180.07 or s.144.44(9)	N/A
	> 10 < 50 ppm	EPA approved methods or meeting technical standards of guidance	EPA approved or NR181 approved landfill	NR180 approved landfill with leachate system or other DNR approval, 157.07(5)	Vehicle standards 49CFR 100-177 & 390-397 License - NR181.33 & 181.55	Exempt, this guidance under 144.44(9)(F)	Use as secondary fuel in industrial type boilers
Non-Liquid PCBs (soils, rags, debris)	> 500 ppm	Acceptable 40 CFR 761.60(a)(4)	Acceptable 40 CFR 761.60(a)(4)	NONE	Vehicle standards 49CFR 100-177 & 390-397 License - NR181.33 & 181.55	Technical Standards 40 CFR 761.65 Licensed, 180.07 or s.144.44(9)	N/A
	> 50 < 500 ppm	Acceptable 40 CFR 761.60(a)(4)	Acceptable 40 CFR 761.60(a)(4)	NONE	Vehicle standards 49CFR 100-177 & 390-397 License - NR181.33 & 181.55	Technical Standards 40 CFR 761.65 Licensed, 180.07 or s.144.44(9)	N/A
	< 50 ppm	EPA approved methods or DNR approved under 157.07(2)	EPA approved or NR181 approved landfill	NR180 approved landfill with leachate system or other DNR approval, 157.07(5)	Vehicle standards 49CFR 100-177 & 390-397 License - NR181.33 & 181.55	Licensed 180.07 or s.144.44(9)	N/A
Transformers	> 500 ppm	Required if not drained 40 CFR 761.60(b)(1)	Acceptable if drained & solvent rinsed. Chemical landfill 40 CFR 761.60(a)(1)	NONE	Vehicle standards 49CFR 100-177 & 390-397 License - NR181.33 & 181.55	Technical Standards 40 CFR 761.65 Licensed, 180.07 or s.144.44(9)	N/A
	> 50 < 500 ppm	EPA approved methods or DNR approved under 157.07(2)	If drained, no EPA reg. NR181 approved landfill	NR180 landfill if approved by DNR under NR157.07(5)	Vehicle stds.49CFR 100-177 & 390-397. License-NR181.33 & 181.55. Trans.Recyclers 'FSC'	Technical Standards 40 CFR 761.65 Licensed, 180.07 or s.144.44(9)	Recycled if drained and decontaminated
	< 50 ppm	EPA approved methods or DNR approved under 157.07(2)	No EPA regulation. NR181 approved landfill	NR180 landfill with leachate system under NR157.07	Vehicle stds.49CFR 100-177 & 390-397 License-NR181.33 & 181.55 Trans.Recyclers 'FSC'	Licensed 180.07 or s.144.44(9)	OK

PCB REGULATORY SUMMARY

WASTE	PCB CONCENTRATION	INCINERATION	LANDFILLING	ALTERNATE DISPOSAL METHODS	TRANSPORTATION	STORAGE	RECYCLING
Dredged Solids	> 500 ppm	Acceptable 40 CFR 761.60(a)(5)	Acceptable in chemical landfill 40 CFR 761.60(a)(5)	If approved by EPA under 40 CFR 761.60(a)(5)	Vehicle standards 49CFR 100-177 & 390-397 License - NR181.33 & 181.55		N/A
	> 50 < 500 ppm	Acceptable 40 CFR 761.60(a)(5)	Acceptable in chemical landfill 40 CFR 761.60(a)(5)	If approved by EPA under 40 CFR 761.60(a)(5)	Vehicle standards 49CFR 100-177 & 390-397 License - NR181.33 & 181.55		N/A
	< 50 ppm	EPA approved methods or DNR approved under NR 157.07(2)	EPA approved or NR181 approved landfill	NR180 landfill or other, if approved under NR157.07(5)	Vehicle standards 49CFR 100-177 & 390-397 License - NR181.33 & 181.55		N/A
Municipal Sludges	> 500 ppm	Acceptable 40 CFR 761.60(a)(5)	Acceptable in chemical landfill 40 CFR 761.60(a)(5)	If approved by EPA under 40 CFR 761.60(a)(5)	N/A		N/A
	> 50 < 500 ppm	Acceptable 40 CFR 761.60(a)(5)	Acceptable in chemical landfill 40 CFR 761.60(a)(5)	If approved by EPA under 40 CFR 761.60(a)(5)	N/A		N/A
	< 50 ppm	EPA approved methods or DNR approved under NR 157.07(2)	EPA approved NR181 approved landfill	NR180 approved landfill under NR157.07(5) Landspreading, NR204	N/A		N/A

PCB CLEAN UP STANDARDS

Non-Liquid PCBs (soils,rags,debris)	CONTAMINATED SOILS: Soils contaminated should be removed to the extant practicable. Cleanup objective for soils is 5ppm. Actual cleanup determined using Appendix B, this guidance. CONTAMINATED SURFACES: Recent spills - Low PCB content; Removal of all visible traces of spill. - High PCB content; Routine public exposure: maximum residual PCBs - 50 micrograms/100 sq-cm, or sealed or removed. Non-routine exposure: maximum residual PCBs - 100 micrograms/100 sq-cm. Historical spills - Surface cleanup same as for recent high PCB content spills.
Transformers. > 500 ppm only	Decontamination using EPA and DNR approved technologies.
Dredged Solids	Sediments containing PCBs should be removed to the extant practicable. Acceptable residual PCB concentrations will be established on a case-by-case basis.

WISCONSIN
DEPT. OF NATURAL RESOURCES
Carroll D. Besadny
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December 17, 1992

Bonnie Eleder
U.S. EPA
HSRW-6J
77 W. Jackson
Chicago, IL 60604

Dear Bonnie,

I have completed my review of the Alternatives Array Document and offer the following ARARs and comments. My comments do not incorporate comments received from other programs, but I have included all comments from other programs received to date. The most significant omission are the ARARS from the Bureau of Water Regulation and Zoning, but I have included a good rough first cut of the ARARS from this program. In addition, Linda Meyer, the attorney for the Bureau of Water Regulation and Zoning has provided comments, and corrections to my interpretation of their requirements.

I will present my comments on the document first, and will conclude with ARARs that are designed to complement and supplement those that you have received from other programs, and those which you will receive by Dec. 18th. I have broken my comments up into general comments and specific comments.

GENERAL COMMENTS

The evaluation section discusses alternative treatment technologies for contaminated sediment and contaminated floodplain soil. However, virtually every discussion characterizes floodplain soil as having rocks, roots and debris, thereby making floodplain soil a poor candidate for application of the particular technology. The possibility of separating the rocks, roots and debris from the floodplain soil is never considered. It seems to me that there are relatively inexpensive ways to separate soil from rocks, roots and debris. Why weren't these considered? Was it because the rocks, roots and debris themselves are contaminated? Even so, do the rocks, roots and debris constitute a high percentage of the volume of the floodplain soils? If not, it would seem advisable to separate these components of "floodplain soil."

In several places in the alternative array the conclusion is stated that PCBs would be the driving force for any remedial action, and that the technologies analyzed concentrate on PCBs in soil and sediment. After several conversations with our folks in the Bureau of Water Resources Management, it is my conclusion that this position does not

reflect the position of the DNR. Significant concentrations of heavy metals and PAHs exist, at least in the harbor sediments, and merely removing those sediments that are characterized as contaminated with PCBs will in the best case not do anything about separate layers of sediments with high concentrations of heavy metals, and in the worst case will mobilize these sediments or otherwise make the heavy metals more bioavailable than they currently are. Thus, we believe that the characterization of the site problem as a PCB problem only is misleading and may not address the hazardous nature of exposure of environmental receptors to metals and PAHs in the sediments.

We disagree with one potential approach suggested in the document that involves cleaning up the river sediment, but leaving the harbor sediment untreated. Apparently, this approach would lead to decreasing PCB levels in the harbor because of source control. While this may be true, we do not favor an approach that does nothing to cleanup existing contamination and hopes for the best while monitoring. Harbor sediments are contaminated and should be dealt with on a similar time line with those in the river.

There are several references to the removal of the upper 3-6 inches of floodplain soil. These are inappropriate in this document in that the quantity of soil to be removed is yet to be determined.

In addition, there are several references to "EPA's target risk range" with the implication that some numbers have been finalized. The risk assessment prepared by ATSDR is still in the draft stage, and it is unknown what numbers will come out of this document.

SPECIFIC COMMENTS

A remedial action objective (RAO) is stated on page 4-4 (and elsewhere through the report) that establishes an ARAR for PCB concentrations in floodplain soil of 50 ppm. It is true that this number exists in TSCA. It is also true that the state generally requires cleanup to a lower number (between 5 and 25 ppm) under ch. NR 157, Wis. Adm. Code. Finally a risk assessment (either an ecological risk assessment or a public health risk assessment) may determine that a different number is required. We suggest that all future references be to a number that will be determined by the governments.

On page 4-6, the following statement appears: "This sediment [that has been armored] will not be considered affected media, unless future monitoring indicates that elevated PCB concentrations in the water column can be attributed to the armored sediment." We disagree with this presumption. The armored sediment should continue to be considered a potential source unless EPA determines, based on monitoring results, that the contribution of PCBs from the armored sediments is negligible.

On page 4-25, it is pointed out that aerobic conditions are conducive to total breakdown of PCBs, but there is no discussion as to how to increase the likelihood of aerobic conditions existing in situ. In addition, it should be acknowledged that although biodegradation may work on PAHs, the biodegradation process will have no impact on concentrations of heavy metals, and that the choice of such a process would necessitate a

reanalysis of what contaminants are driving cleanup conditions.

In addition, the science behind natural biodegradation is inconclusive. Laboratory studies indicate the rate of dechlorination in microbial inoculated anaerobic sediments was a function of PCB concentrations. Dechlorination was extensive at an Aroclor level of 700 ppm, slower at 140 ppm, and **unobservable at 14ppm.** A Brown et al. study in 1990 of the upper Acushnet estuary (New Bedford Harbor), did find evidence of dechlorination at sites with elevated PCB concentrations in sediments (approximately 1,000 ppm). However, sediments with PCB concentrations of 1 - 10 ppm in the lower estuary (outer harbor) contained virtually undechlorinated, undetoxified PCBs. It appears that the low PCB concentrations in the lower estuary give rise to water masses that are slightly lower in total PCBs compared to the upper estuary, but higher in toxic congener levels.

Other studies of clay encapsulated dredged sediment in the Hudson River did not find any significant changes in congener concentrations in sediments for various treatments incubated in situ at the site.

Seeding of acclimated microbes and nutrient additions to enhance anaerobic dechlorination of low level in situ PCB deposits has not been demonstrated anywhere to date. Even when biodegradation activity is taking place, several higher chlorinated substituted congeners persist.

> Natural degradation may be fully toxicologically significant only over geologic time. Since PCB contamination has occurred recently with respect to biologic time, environmental PCB contamination today represents an acute, more than chronic biological response problem. Attempts to dismiss the PCB problem as one that will be naturally solved over time dangerously ignores the signs of acute environmental poisoning that are globally evident today. (Hooper, 1990).

On page 4-28, stabilization is given a favorable effectiveness rating. However, there is no discussion on how long such a technology could be expected to last. Providing protection for only 10 or 20 years would not make this technology effective in the long run.

On page 4-58, thermal destruction is characterized as being not very implementable because of the "limited available space on site". The site is 14 river miles long, with space on both banks. There may be some room for a thermal treatment unit in some areas. There is no reason to limit evaluation of available space to the Tecumseh property.

Pages 4-80 and 4-81 present a summary of potential remedial alternatives. However, for lower river and harbor sediment and floodplain soil, no treatment option is summarized. This omission is inconsistent with the statutory preference for treatment.

The following comments are meant to address ARARs for several possible alternatives. Obviously, the most crucial ARAR questions deal with cleanup levels for sediments. Cleanup numbers will need to be established for total PCBs, heavy metals, and PAHs. The sediment quality criteria derived from the water quality standards contained in chs. NR 102 and 105, Wis. Adm. Code, are to be considered by EPA. We have previously supplied you with sediment quality criteria for PCBs and PAHs and have provided you the procedure for the calculation of the heavy metals numbers. These numbers have been reviewed by both water resources management and management in the Emergency and Remedial Response Section, and DNR believes these numbers define appropriate action levels consistent with EPA guidance.

The next most important set of standards deals with disposal numbers for PCBs and PCB contaminated soil and sediment. I have previously sent you a memo for the hazardous waste section outlining their approach to dealing with PCB contamination. Enclosed with the memo is a guidance document put out by the department that specifies cleanup criteria for PCBs as no larger than 25 ppm, and 5 ppm in most cases.

I suspect that one of the more important ARARs that you have not seen yet is the group of ARARs from the Water Regulation and Zoning Bureau. These will deal with what types of activities may be taken in the river or harbor, or in the floodplain, but I suspect that they will be similar to what was provided at Moss American. I have taken the following paragraph from the Moss American ARARs analysis: "While we understand that under the CERCLA on-site permit exemption, state and local permits or approvals may not be required for on-site actions that affect flood elevations, the technical requirements imposed through the state and local approval processes are still applicable. Therefore, analysis and studies on the impact on flood elevations will be required. We would expect the state and local review and approval of the analysis and studies to take place during the remedial design phase of the project, if the selected alternative could have an impact on flood elevations. However, one of the objectives of the Water Resources Program's mitigation criteria (developed because the stream channel was modified) is to maintain existing floodplain backwater profiles. The selected alternative should avoid floodplain impacts, if possible. It should be noted that if easements are required (whether they would be required is not clear), they would have to be obtained from affected property owners" (most notably Kohler). State floodplain and shoreland protection ARARs include: chs. NR 115, 116 and 117, Wis. Adm. Code; ss> 87.30, 59.971 and 144.26, Wis. Stats. State ARARs for navigable waters are found in ch. 30, Wis. Stats.

The Moss comments go on to address Chapter 30 requirements, which I reiterate here:

"As above, while we understand that ch. 30 permits may not be required for on-site actions, the substantive requirements imposed through the permitting process are still applicable. Therefore, the specific technical conditions that would be contained in such permits apply. These conditions would include the Water Resources Program's criteria, the necessary conditions for the project from the Water Regulation Handbook, and any site specific conditions developed after a survey of the river and environs and based on a description of the project. These site specific conditions are expected to be developed

during our review of the draft FS. However, certain conditions may be developed during the remedial design stage, if the project descriptions in the FS are lacking in required detail.

We note that ss. 30.19 and 30.195 are ... applicable to this site... [T]he standards in these statutes and the guidelines for achieving them apply..."

The Moss ARARs analysis also discusses dredging activities. I reiterate those comments here also:

"The Water Resources Program will develop mitigation criteria which are applicable to all site remediation alternatives which include the modification or the relocation of the existing stream channel, floodplain or wetlands. This criteria is to be applied within the context of specific regulatory standards found in the statutes and rules that are applicable to floodplain, channelization, dredging and wetland disturbance projects."

The balance of my comments will relate to the alternatives that are chosen in the alternatives array as representative process options and related ARARs.

Page 4-24 identifies armoring and hydraulic modification as representative in-place containment options. Armoring raises issues on what activities may be allowed within a navigable water and along the banks. These ARARs will be provided by the Bureau of Water Regulation and Zoning. The option of hydraulic modification may not be appropriate as it would be inconsistent with the statutory mandate of overall protectiveness of human health welfare and the environment. Merely creating new areas for sediment deposition is not protective, is not permanent and serves only to concentrates the contaminants in a new area.

Page 4-29 identifies natural biodegradation as the representative in-situ treatment option. The Bureau of Water Resources Management is considering the issues surrounding addition of nutrients to encourage biodegradation. As aerobic biodegradation is the only approach leading to the destruction of PCBs, there may be additional requirements on how sediments are aerated.

Page 4-34 identifies mechanical removal and hydraulic dredging as representative sediment/soil removal technologies. Standards for dredging and filling in navigable waterways exist under both federal and state law. These will be provided to you. The levels that sediment and soil should be removed to are identified in the documents on the development of sediment cleanup levels.

Page 4-40 lists the plate and filter press, the belt filter press and gravity settling as representative sediment dewatering technologies. Issues dealing with the sediment will be dealt with under the sediment/soil treatment technologies section. An issue under this section is what will be done with the water. Treatment would be required prior to discharge to either a surface water or a POTW. Groundwater injection is not an option. The Bureau of Waste Water Management will specify requirements for treatment prior to discharge. I quote again from the Moss-American ARARs analysis: "Discharges to the sanitary sewer must meet the pretreatment standards in ch. NR 211, Wis. Adm. Code, and any standards developed by the local sewerage treatment authority under their pretreatment program. At

a minimum, effluent limits and reporting requirements will be specified." The City of Sheboygan's POTW has a state approved pretreatment program and will regulate the discharge of any wastewater discharged from the site to the sanitary sewer. At least the substantive aspects of the pretreatment permit must be complied with.

Any other discharge to the Sheboygan River are subject to our WPDES program. Our Water Resources Program will develop effluent limits for such a discharge. These limits are applicable to discharges from treatment units as well as discharges of contaminated water from dewatering operations.

Page 4-54 the BEST process is identified as representative of the PCB extraction technologies. Cleanup criteria for sediment from this process have been specified by the hazardous waste program. Standards will be specified for by-products of this process. There may be requirements on this process from the Air Management Bureau, but sufficient information is not available to make this determination.

Page 4-62 identifies APEG-Plus as representative of the PCB destruction technologies. Cleanup criteria for sediment from this process have been specified by the hazardous waste program. Standards will be specified for by-products of this process. There may be requirements on this process from the Air Management Bureau, but sufficient information is not available to make this determination. In addition, if this technology constitutes a thermal treatment unit, it must meet the applicable treatment unit requirements in s. NR 157.07(2) and ss. NR 640 through 670 of the hazardous waste code, in addition to other applicable operating, closure and monitoring requirements in the NR 600 series. Ash or residue must be managed appropriately.

Page 4-66 identifies stabilization/solidification as the representative immobilization sediment/soil treatment technologies. Portland cement is identified as the most likely immobilizing agent. However, the long term effectiveness of such a technology has been unproven. B & B should develop why they believe this technology may survive a screening through the nine criteria.

Page 4-71, the Confined Disposal Facility is retained as the representative option for on-site disposal of sediment. Water Regulation and Zoning and Solid Waste Program ARARs affecting placement will be specified as more information becomes available.

Page 4-78, in addition to the Confined Disposal Facility, a local solid waste landfill is retained as a representative option. Section NR 157.07(3), Wis. Adm. Code, requires that a landfill be licensed, established and operated in compliance with the hazardous waste code requirements in chs. NR 630, 660 and 680 before PCBs or products containing PCBs can be disposed of at that landfill. There are no landfills licensed to receive hazardous waste in Wisconsin at the present time.

Use of activated carbon for treatment of liquid residuals triggers requirements for discharges of treated wastewater to the environment. I have asked the wastewater program to determine what additional requirements need to be met.

This is a preliminary analysis only, and the DNR reserves the right to supplement this list as additional information about the alternatives becomes available. It is our intend to identify all ARARs prior to completion of the FS.

I would request that we discuss your position on this list, prior to sending the list on to Blasland and Bouck.

As I mentioned previously, I have enclosed three memos addressing the alternatives array. The first is from Linda Talbot, the second from Larry Benson from the Bureau of Wastewater Management, and the third is from Tom Janisch. Please call me if you have any questions on any of these. Each of these memos should be treated as if they came from me to you, and should be included in the administrative record. Each is a part of the record that the DNR will base a decision on whether to concur in the ROD, and thus should be included in the administrative record.

Sincerely,

Thomas L. Eggert
Superfund Enforcement Specialist
Department of Natural Resources

cc: Linda Talbot, Tom Janisch, Scott Redman, Dave O'Malley WR/2
Jane Lemcke SW/3
Tom Aartila, Tom Wentland SED
Linda Meyer LC/5

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: December 16, 1992 FILE REF: 3200

TO: Tom Eggert - SW/3

FROM: Linda Talbot - WR/2 Linda

SUBJECT: Alternative Array Document Comments and ARARs

This memo provides you with my comments on the Alternative Array Document. Following those comments is a list of the Wisconsin Statutes and Administrative Codes I have found that would be potentially applicable at the Sheboygan Superfund Site. There will undoubtedly be some redundancy between my list and those prepared by others, but I wanted to <u>try</u> to prepare a comprehensive list, rather than be exclusive and possibly miss something.

<u>AAD Comments:</u>

p.3-16 It is incorrectly stated that Aroclor 1248 is "the source" Aroclor at the site (emphasis added).

p.4-2 PAHs are missing from the list and should be included.

Table 4-1

1) Noncarcinogens should be addressed with other response actions as well.

2) List as a RAO: Reduce other impairments to wildlife, fish and other aquatic life.

3)Environmental risk was not well investigated relative to flood plain soil PCB concentrations.

How are the goals of Remedial Action Objectives reached by "No Action"?

p.4-6 The statement is made that the subdivision between sediment and soil varies. There is also frequent mention in the document of management of floodplain soils that exceed 50 ppm. Flood plain soils should be addressed in the same manner as sediments as they <u>are</u> available either as a sediment substrate during high water or a source of contaminant reintroduction to the river due to erosion, either by rainfall runoff or high water.

p.4-7 Explain the rationale for establishing the depth boundary for the volume estimate for the Navigation Channel at 2 feet below the project depth.

p.4-9 Mention should be made that PCBs may drive the RA for Most deposits but are not the sole contaminant needing remediation and are not necessarily co-located with other contaminants of concern.

p.4-24 DNR staff disagree that monitoring results of armored sediment indicate biodegradation occurred.Biodegradation is not demonstrated in the evaluation and interpretation presented in the ASRI. If biodegradation is eventually convincingly demonstrated at the Sheboygan site, the rate likely would not be acceptable for timely (within 5 years) achieving the clean-up goals of the site.

p.4-35 Describe the chemical conditioning to enhance filterability - what chemicals, what resides with sediments, what passes with water??? Waste streams must meet WPDES Substantive requirements.

p.4-40 Describe the applicability and appropriateness of the "pass paint filter test".

p.4-62 The issues identified for exclusion of thermal destruction are successfully dealt with elsewhere; why not here? Develop and explain rationale.

p.4-71 Explain why CDF is "most appropriate" for high water content sediment and not appropriate for the flood plain soils.

ARARs:

Statutes Chapter 30 governing navigable waters; secs. 144.025, power for enhancement of the quality management and protection of all waters of the State; sec. 144.04 covering treatment facility plan approval; sec. 144.44, review and approval process for solid waste or hazardous waste disposal facilities; sec. 144.64, review and approval of sites and facilities for the transport and disposal of hazardous waste and toxic wastes; sec. 144.79, PCB management; sec. 144.95, laboratory certification program; Chapter 147, establishes the state pollutant discharge elimination system.

Codes NR 102, Water Quality Standards for Wisconsin Surface Waters; NR 103, Water Quality Standards for Wetlands; NR 104, Uses and Designated Standards; NR 105, Surface Water Quality Criteria for Toxic Substances; NR 106, Procedures for Calculating Water Quality Based Effluent Limitations for Toxic and Organoleptic Substances Discharged to Surface Waters; NR 140, Groundwater Quality; NR 149, Laboratory Certification and Registration; NR 157, Management of PCBs and Products Containing PCBs; NR 200, Application for Discharge Permits; NR 219, Analytical Test Methods and Procedures; NR 299, Water Quality Certification; NR 347, Sediment Sampling and Analysis, Monitoring Protocol and Disposal Criteria for Dredging Projects; NR 500-520, Solid Waste Series; NR 181, Hazardous Waste Management (?- or its updated version/series).

cc: Tom Aartila - SED
Tom Janisch - WR/2

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: December 13, 1992 FILE REF: 3430

TO: Tom Eggert SW/3

FROM: Larry Benson WW/2

SUBJECT: The Bureau of Wastewater Management's Identification of ARARs for the Sheboygan River and Harbor Superfund Project Potential Remedial Alternatives

(Note: reference to chapter NR XXX Wisconsin Administrative Code is expressed in the text that follows as NR XXX)

Chapter 147 of the Wisconsin statutes requires that any discharge to waters of the state may occur only under a WPDES permit. Wastewater coming from any treatment of sediment, dewatering of sediment or any carriage return water from dredging activity would be considered a discharge. Suspension of sediment or other disturbance during activities in the river such as dredging are not considered discharges. If any discharge from a chosen remedial alternative is considered to be "onsite" then compliance with the substantive requirements of the WPDES program is required.

Requirements of WPDES permits that authorize a discharge to surface waters include water quality based effluent limits in accordance with chapters NR 102, 104, 105, 106, and 207, and technology based limits (categorical) in accordance NR 220-297. Both apply but the most stringent are, of course, controlling.

Water quality based limits are designed to protect fish and aquatic life, wild and domestic animals and human health. The limits can be established only after site specific information such as discharge flow rates and discharge location is available. Limits for specific substances may be expressed as concentration, mass or both. For the alternatives that have discharges, the substances that would be limited include, but are not limited to, PCBs and metals. In addition, whole effluent toxicity limits and/or monitoring may be required under the water quality rules.

Categorical limits are established by applying "Best Practicable Treatment Technology Currently Available" (BPT) or "Best Available Control Technology Economically Achievable"(BAT) identified under federal law. BPT deals with convention pollutants such as BOD, solids and Ph while BAT deals with non-conventional pollutants (usually referred to as toxics). Chapters NR 221-297 establish procedures for developing BPT/BAT permit limits for specific industrial categories. For industrial categories that do not have defined categorical limits, NR 220.20 authorizes the Department to establish effluent limits using a procedure similar to that used for the categorical industries. This procedure is usually termed "Best Professional Judgement"(BPJ). For any Sheboyan River and Harbor superfund alternatives that require a discharge, it is not likely that any of the industrial categories will be appropriate. BPT/BAT will be applied as BPJ either by establishing limits or simply requiring the application of any appropriate wastewater treatment technology.

Any discharge to groundwater or any wastewater activity that has a potential discharge to groundwater is subject to chapter NR 140 and supporting codes NR 214 and NR 213. NR 140 establishes numerical standards that apply in the groundwater and outlines appropriate requirements if a standard is exceeded. NR 213 requires that all wastewater lagoons be lined to certain specifications intended to prevent exceeding ground or surface water standards. NR 214 identifies requirements for land treatment and disposal of industrial wasetwater. It is not likely that land disposal would be allowed for any of the alternatives that have discharges.

In addition to permit requirements, Chapter 144.04 Wisconsin Statutes and NR 108 require that the Department approve all wastewater treatment and conveyance systems prior to construction. Again, the substantive requirement of this treatment system plan approval process is required for "onsite" activity.

Comments On Alternative Array Document
Sheboygan River Superfund Site.

Tom Janisch
Comments
12/14/92

Page 4-4 It states "there were no carcinogens or noncarcinogens with unacceptable human health or environmental risk levels identified in the flood plain soil as a result of RI sampling"

What environmental risks were evaluated? What about transport of contaminated floodplain soils back to river? What are chances?

Page 3-15 The endangerment assessesament referenced was very superficial as it relates to "environmental receptors." It assume the endangerment assesament ~~was~~ looks at short term immediate toxic effects compared to an ecological risk assesament that considers longer term, chronic effects.

Page 3-16 What are the "several recent studies that show 1248 is much less toxic than 1260"? My understanding is that EPA assumes all Aroclors have toxicity of 1260. What role if any will B&B referenced studies have in any decision making process for remediation?

Page 3-16 It is stated that "PCBs in fish and wildlife suggest that possible adverse effects may be occurring in these species and it is expected that remediation efforts to reduce potential risks to human receptors will contribute to the reduction of any potential effect of this type."

This is entirely to vague to be used for making any remediation decisions and determining appropriate clean-up levels.

Page 4-2 What happened to PAHs as pollutants of concern for the Sheboygan River Superfund site based on our previous discussions and previous lists put together with EPA?

Page 4-2 It is stated that "specific health or environmental risks have not been specifically identified for the majority of the listed pollutants of concern. ~~and~~ The inorganics were included as potential constituents of concern due to their persistence, presence, and elevated concentrations." Again, how can appropriate remediation be selected and designed when it has not been determined whether or not the pollutants of concern are having biological effects that need to be remediated. At this stage in the decision making process, this is too indeterminant about how and whether or not these pollutants need to be dealt with. Any remediation decisions must be based on complete information

and assessment of effects.

Page 3-9 A concentration of PCBs at a "background" designated floodplain soil site was 0.240 ppm. This appears to be ~~on the~~ greater than what would be expected. This value needs to be evaluated to determine if it is representative of an unimpacted flood plain soil site

Page 4-7 Volume determinations are only done on sediment down to 2 feet below the project depth of the Navigation Channel. What if elevated concentrations are left at the exposed face and deeper and need removal. It seems this contingency should be considered ~~at~~ and an estimate made of additional volumes that may need to be removed

LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
STATE STANDARDS, REQUIREMENTS, CRITERIA AND LIMITATIONS
FOR SUPERFUND PROJECTS IN WISCONSIN

Introduction

Amendments to the Comprehensive Environmental Response and Liability Act (CERCLA, commonly known as Superfund) under the Superfund Amendments and Reauthorization Act of 1986 (SARA) included a section on clean-up standards, Section 121. This section requires that any long-term clean-up (i.e., remedial actions) under the Act attain legally applicable or relevant and appropriate standards, requirements, criteria and limitations (ARARs) under state and federal law. Also, U.S. EPA requires that most emergency clean-ups (i.e., removal actions) attain ARARs. State ARARs must be met if they are promulgated and legally applicable. If they are not legally applicable to a Superfund site, but were developed to regulate or protect an environmental media under a different program, they may still be considered relevant and appropriate. State ARARs must be formally promulgated to be required; they may be waived if they are not consistently applied by the state.

State advisories, guidance, policies, etc., may help define and develop the clean-up standards and interpret ARARs. These policies and guidance are known as "to be considered" (TBCs).

To assist persons (i.e., EPA, their contractors, responsible parties and their contractors) the Bureau of Solid and Hazardous Waste Management, Department of Natural Resources (DNR) has prepared this comprehensive listing of all promulgated state ARARs and important TBCs which may apply to Superfund long-term clean-ups. By providing this listing to such persons, Wisconsin is satisfying the requirement of Section 121 to provide timely notice of the ARARs.

The comprehensive listing can be easily matched to specific site responses considered through an alternatives array in a feasibility study. Therefore, it may be used at any Superfund site in Wisconsin by interested persons.

Rules, statutes and program requirements are subject to revisions. As the Bureau of Solid and Hazardous Waste Management becomes aware of them, this listing will be revised.

Explanation and Use of the Listings

Attachment 1 describes the ARARs for site investigation, design and operation and maintenance.

Table 1 is a list of general options for possible remedial actions at Superfund sites. With exception of item D. in the table, it is arranged in a "ascending order" of more comprehensive response activities. For example, the options listed under category A

are generally "easier" or less involved than, say, the options in category C. It is also important to note that more comprehensive options, when used at a site, will generally include less comprehensive options as part of a total site remedial action. For example, the treatment of hazardous substances in-place (B.1.) will usually include the management of extracted substances (A.4.) and monitoring (A.1.) as part of an action.

Table 2 matches all promulgated state ARARs (and TBCs) with the general options described in Table 1. Where no ARAR is given for an option from Table 1, there is no promulgated standard we are aware of. The Table describes the requirement in a general way, lists any important exceptions and specifies regulated activity and media regulated or protected.

Table 3 is a list of construction-related activities associated with the remedial actions listed in Table 1. These activities are not traditionally described in remedial option alternative descriptions, but are often encountered at Superfund construction projects, and are subject to state ARARs. Often, these activities are not identified until detailed design for an action is prepared.

Table 4 matches the promulgated state ARARs with the construction-related activities described in Table 3. The Table describes the requirements in a general way and any important exceptions. Construction contractors who operate in Wisconsin will usually have a good knowledge of these ARARs.

vAppendices 1-10 are the specific requirements, regulations and laws promulgated by the state and administered by the DNR. The Appendices are arranged by each Department program. The names of each specific program contact is provided so interested persons may contact them for further details as a project progresses. Policies and guidelines utilized by DNR in interpreting the requirements, regulations and laws (TBCs) are also provided. Regulations administered by the Department of Industry, Labor and Human Relations may be obtained from the Office of Document Sales, P.O. Box 7840, Madison, Wisconsin 53707 (608-266-3358).

State Permits, Licenses, Plan Approvals and Other Approvals

In order for the listing to be comprehensive, state permit, approval, license and plan approval ARARs are provided. In many instances, technical standards and design or construction requirements are imposed through a license, permit or plan review and approval process. Section 121(e) of SARA states that "on-site" actions are not subject to state "permits". The National Contingency Plan (55 FR 8688, March 8, 1990) discusses the scope of this on-site exemption. Generally, state permits, approvals, licenses, etc., are not required for on-site actions at Superfund sites where the actions are conducted under a federal authority, such as a consent decree signed with U.S. EPA. The exemption does not apply to on-site actions at Superfund sites where the

actions are conducted only under a state authority, such as a spill order or an Environmental Repair contract.

Delegated, Authorized and Primacy Programs

Several federal environmental programs have been delegated to the state for implementation and enforcement. For those programs, the state laws and rules constitute the ARARs instead of the federal laws and regulations. A comparison of the state and federal requirements under these programs is unnecessary, because U.S. EPA considers the state requirements under such programs to be the federal requirements. In Wisconsin, the following programs are delegated to the department:

1. Resource, Conservation and Recovery Act (RCRA) Subtitle C - Hazardous Waste (Authorized Program)

2. Clean Water Act NPDES Discharges - WPDES/Wastewater Program (Authorized Program)

3. Clean Air Act - Air Management Program (Delegated Program)

4. Safe Drinking Water Act - Water Supply Program (Primacy Program)

5. Underground Injection Control - Water Supply Program (Primacy Program)

Wisconsin Environmental Policy Act

Many DNR decisions, such as permits, license and plan approvals are subject to review under the Wisconsin Environmental Policy Act (WEPA), Section 1.11, Stats. and Chapter NR 150, which is provided in Appendix 10. Department decisions involving Superfund sites could be subject to review under these provisions. For some projects, it is possible that an environmental impact statement would have to be written before the project may proceed. Although it is not entirely clear if WEPA will apply at all Superfund sites (on-site actions subject to the SARA §121(e) on-site exemption would likely not fall under the WEPA provisions, since permits, approvals, plan reviews, etc., are not required), it is necessary to mention it so interested persons have been provided with timely notice.

(Revised 6/96)

Attachment 1 - Promulgated Standards and Requirements for Site Investigation, Design and Operation and Maintenance

Investigations

Site investigations, including Superfund Remedial Investigations (RIs) must meet the following requirements:

1. Chapter NR. 700, Wis. Adm. Code, General Requirements, including the definitions that apply to the other applicable chapters, below and the general submittal and sampling and analysis requirements in ss. NR 700.11 and 700.13, Wis. Adm. Code, respectively.

2. Chapter NR. 712, Wis. Adm. Code, Personnel Requirements. Environmental professionals conducting investigations in Wisconsin are expected to meet the qualifications of this chapter.

3. Chapter NR. 716, Wis. Adm. Code, Site Investigations. This chapter contains the comprehensive requirements for all investigations. It should be noted that s. NR 716.11(6), Wis. Adm. Code, requires the proper management of investigation-derived wastes in accordance with wastewater, solid waste and hazardous waste requirements. Guidance on the management of these wastes in included in appendix 3.

4. Chapter NR. 160, Wis. Adm. Code, monitoring and data management requirements.

5. Chapter NR. 141, Wis. Adm. Code, monitoring well requirements.

6. Chapter NR. 149, Wis. Adm. Code, requirements for laboratory certification. All laboratories used for sample analysis are expected to meet these requirements and to be certified under the chapter.

Feasibility Studies and Other Types of Remedial Action Option Reports

Superfund Remedial Feasibility Studies (FSs), Removal Engineering Evaluations/Cost Analysis (EECAs) and any other remedial action option type reports must meet the requirements outlined in ch. NR 722. This chapter outlines the procedures and criteria for selecting remedial actions

Design, Construction Documentation and Operation and Maintenance Manuals

Design, construction documentation and operation and maintenance submittals must be prepared in accordance with ch. NR 724, Wis. Adm. Code. Requirements for construction implementation and operation and maintenance are also outlined in this chapter, and are also described in the tables following this attachment.

Table 1 - General Options for Remediation
(Revised 6/96)

A. Leave hazardous substances in place; and

1. Monitor

   a. Groundwater
   b. Air
   c. Surface water/sediments
   d. Soil gas/subsurface gas migration

2. Contain

   a. Cap, cut-off walls; covers

3. Extract Migrating Substances

   a. Collection trenches/drains
   b. Withdrawal wells
   c. Gas collection
   d. Vapor Extraction

4. Manage Extracted Substances (from 3.)

   a. Discharge to groundwater; with treatment; without treatment

      1) Seepage/infiltration/spray irrigation
      2) Injection wells

   b. Discharge to surface water; with treatment; without treatment

   c. Discharge to publicly owned treatment works; with treatment; without treatment

   d. Release to air; with treatment; without treatment

      1) Vents/flares/stripper tower discharges

   e. Residuals; sludges; etc., generated from above - See C.

B. Manage hazardous substances in place; and

1. Treat/stabilize

    a. Physical treatment/stabilization

        1) Vitrification/heat/electrical/microwave, etc.
        2) In-situ stabilization

    b. Chemical treatment

        1) Chemical addition/flushing, etc.

    c. Biological treatment

        1) In-situ biodegradation
        2) Air sparging

C. Remove hazardous substances; and

1. Manage on-site

    a. Re-disposal; landfill

    b. Treat/stabilize

        1) Physical treatment/incineration
        2) Chemical treatment
        3) Biological treatment
        4) Recycle
        5) Land spread/land treat

    c. Storage

2. Manage off-site

    a. In Wisconsin

        1) Landfill
        2) Treatment - all methods
        3) Recycle
        4) Landspread/land treat
        5) Storage

    b. Out-of-State

D. Water Supply (Does not "Remediate" the Facility Itself)

1. New Public Water Supply

2. New Private Water Supply Well(s)

3. Treat Public Water Supply

   a. Air Stripping Tower
   b. Activated Carbon
   c. Other

4. Treat Private Water Supply(s)

   a. In-house unit(s)

Table 2 - Promulgated Standards/Requirements
Activity and Media Regulated or Protected
General Options for Remediation
(Revised 6/96)

A. Chs. NR 600 - 685: Activity - Any disposal or management in surface impoundments or landfills of hazardous waste (generally, defined the same as RCRA) after August 1, 1981, even if the unit ceased accepting waste before being addressed by the Environmental Repair Program or Superfund, must meet the closure and long-term care requirements (see ss. NR 685.05, 685.06, 660.15, 660.16 and 660.17) as well as groundwater monitoring requirements (See s. NR 635) that are generally consistent with RCRA 40 CFR 264/265 Subpart F, unless the unit or activity is designated as a corrective action management unit (CAMU) under ch. NR 636. Clean closure or closure as a landfill is required for surface impoundments, unless designated as a CAMU. These requirements are applicable to units that accepted hazardous waste after August 1, 1981, and may be relevant and appropriate to units that accepted hazardous waste before that date. Standards for closure and remediation for CAMUs will be set by the Department under NR 636 and must be in compliance with that chapter. Also see A.2.a., below. Media - Soil and groundwater.

A. Chs. NR 500 - 520: Activity - Any solid waste landfill, regardless of when it accepted waste or when it closed, must meet the minimum closure and monitoring requirements the rule. Such landfills, should they have exceedances of Ch. NR 140 standards, must have a cover that meets the requirements of s. NR 504.07 (see A.1.e., A.2.a and A.3.c., below). Media - Soil and groundwater.

A.&B. Chs. NR 105 and NR 106: Activity - Sites with contaminated sediments must be remediated to meet sediment quality criteria to protect surface water quality criteria in accordance with these chapters. See strategy paper on sediment quality criteria. Media - Surface water.

A.&B. Ch. NR 103: Activity - Sites with contamination in wetlands must have the remediation impacts evaluated in accordance with this chapter. Media - Wetlands.

A.1.a. Ch. NR 140: Activity - Legally applicable to all Department regulated activities that may have an impact on groundwater. The rule include groundwater monitoring and sampling frequency standards and specifies the actions required should groundwater standards be exceeded at the point of standards application. Media - Groundwater.

A.1.a.	Ch. NR 141: Activity - Groundwater monitoring well standards. Applies to all Department regulated activities that involve groundwater monitoring. Media - Groundwater.
A.1.a.	Ch. 149: Activity - Use of laboratories for testing of samples from groundwater monitoring.
A.1.a.	Chs. NR 500-520: Activity - Groundwater monitoring at solid waste landfills. See s. NR 508. This also relates to chs. NR 140 and NR 141.
A.1.a.	Ch. NR 809: Drinking water standards for water supplies. The standards include federal MCLs. The standards for maximum contaminant amounts in drinking water supplies are generally considered relevant and appropriate for groundwater at facilities addressed under Superfund. Media: Groundwater.
A.1.a.	Ch. NR 724: Activity - Groundwater monitoring at remediation sites. Monitoring should follow the requirements in ss. NR 724.13 and 724.17. Sampling and analysis requirements in s. NR 716.13, ch. NR 140 and ch. NR 149 also apply. Monitoring and operation and maintenance plans should follow s. NR 724.13. Monitoring wells should be constructed in accordance with NR 141.
A.1.a.-d.	Ch. NR 724: Operation and maintenance and monitoring of any remediation system for any media should follow the requirements of ss. NR 724.13 and 724.17. Operation and maintenance plans should follow s. NR 713.
A.1.b.	Chs. NR 400-499: Media - Air pollution control standards Chs. NR 445 governs hazardous air pollutant emissions
A.1.c.	Chs. NR 500-520: Activity - Surface water monitoring at solid waste landfills. See s. NR 508.04(3).
A.1.c.	Chs. NR 102, NR 104, NR 105, NR 106 and NR 219: Activity - Stream classification/standards and sampling/testing methods. Water quality criteria must be met for surface waters where contaminants from Superfund sites cause exceedances. Discharges from in-place pollutants, such as sediments or contaminated groundwater are included. Media - Surface water and sediments.
A.1.e.	Chs. NR 500-520: Activity - Solid waste disposal landfill gas monitoring

standards. See ss. NR 506.07(3), NR 504.04(4)(e) and NR 508.04(2). Media - Landfill gas in soils.

A.2.a. Chs. NR 500-520: Activity - Solid waste disposal landfill cap standards. See ss. NR 506.08(3), NR 504.07, Ch. 516 and s. NR 514.07. See s. NR 512.18 for borrow source documentation.

A.2.a. Ch. NR 103: Activity - Cover construction and borrow source activities that have the potential to impact wetlands must be evaluated in accordance with this chapter. Media - Wetlands.

A.2.a. Chs. NR 600 - 685: Activity - Hazardous waste disposal landfill cap standards. See ss. NR 660.15 and 660.16. These standards also apply to CAMUs, unless the Department determines otherwise under NR 636.

A.3.a.& b. Ch. NR 103: Activity - Any extraction system that has the potential to impact wetlands must be evaluated in accordance with this chapter. Media - Wetlands.

A.3.b. Ch. NR 812: Activity - Any withdrawal well or combination of wells withdrawing 70 gpm or greater; standards and approvals. Media - Groundwater (drawdown impacts).

A.3.c. Chs. NR 500-520: Activity - Solid waste disposal landfill gas control standards. Media - Landfill gas in soils and the air. See ss. NR 506.08(6), NR 506.07(3) and NR 504.04(4)(e). This also relates to Ch. NR 445, hazardous air pollution control standards. See guidance memos relating to solid waste and air pollution control rules for further details.

A.3.d. See A.4.d.1) for discharges to the air; see C. for management of any condensate, spent carbon, recovered product, etc.

A.4.a.1) and 2) Ch. NR 108: Activity - Wastewater treatment facility plan review and standards.

A.4.a.1) and 2) Chs. NR 140, NR 200, NR 214, NR 219, NR 220 and Ch. 147, Stats.: Activity - Discharge of wastewater to the land (i.e., groundwater) or directly to groundwater through an injection well; effluent limits; discharge permits; sampling/testing methods. Media - Groundwater.

A.4.a.2) Ch. NR 812: Activity - Injection wells. Under s. NR 812.05, injection

wells are allowed for remediation activities only, if approved by the Department. Media - Groundwater.

A.4.b. Ch. NR 108: Activity - Wastewater treatment facility plan review and standards.

A.4.b. Chs. NR 102, NR 104, NR 105, NR 106, NR 200, NR 207, NR 219 and NR 220 and Ch. 147, Stats.: Activity - Discharge of wastewater to surface waters; effluent limits; discharge permits; sampling/testing methods. Media - Surface water.

A.4.b. Ch. NR 103: Activity - Discharges to wetlands must be evaluated in accordance with this chapter. Media - Wetlands.

A.4.c. Ch. NR 108: Activity - Wastewater pretreatment facility plan review and standards.

A.4.c. Ch. NR 211 and Ch. 147, Stats.: Activity - Discharge of wastewater to publicly owned treatment works; effluent limits. Media - Discharges from publicly owned treatment works - surface water/groundwater.

A.4.d.1) Chs. 400-499: Media - Air pollution control standards.
Ch. NR 445 governs hazardous air pollutant emissions.

A.4.e. See C.

B.1.b. Chs. NR 812, NR 140, NR 200, NR 214, NR 219, NR 220 and Ch. 147, Stats.: Activity - Discharge of wastewater to the land (i.e., groundwater) or directly to groundwater through an injection well; provided that a discharge to carry chemicals is used). Use of injection wells to inject chemicals is allowed with Department approval under s. NR 812.05. Media - Groundwater.

B.1.c.1) Same as B.1.b., but applies to nutrients as well as any chemicals.

C.1.&2. Chs. NR 157, NR 500-520, NR 600 - 685 and s. 144.79, Stats.: Activity - Management of PCB contaminated wastes. The treatment, storage, disposal and transportation of PCB wastes are subject to special state requirements and standards. Generally, the standards applied to wastes of concentrations greater than 50 ppm of PCBs follow the federal requirements. For wastes containing less than 50 ppm of PCBs, see the special guidance document in Appendix 3, which is a restatement and clarification of promulgated state standards. Media - Groundwater, soil and air.

C.1.a. Chs. NR 500-520 and s. 144.44, Stats.: Activity - Solid waste disposal licensing process, plan review and standards. Standards are applied through plan review and a siting process which involves local governments and a state siting board. Media - Groundwater, soil.

C.1.a. Chs. NR 600 - 685 and s. 144.44, Stats.: Activity - Hazardous waste disposal licensing process, plan review and standards. Standards are applied through plan review and a siting process which involves local governments and a state siting board. These requirements apply unless the unit or activity is designated by the Department to be a CAMU under NR 636. Media - Groundwater, soil.

C.1.b.1), 2),3) Chs. NR 600 - 685: Activity - Hazardous waste treatment (includes incineration) facilities are subject to a licensing process, plan review and standards. For new facilities, standards are applied through plan review and a siting process which involves local governments and a state siting board. These requirements apply unless the unit or activity is designated by the Department to be a CAMU or part of a CAMU under NR 636. Systems for treating wastewater which discharge to surface water, groundwater, or a publicly owned treatment works pursuant to Ch. 147, Stats., fall under A. or B., above. Media - Air, groundwater and soil.

C.1.b.1) Chs. 400-499: Activity - Emissions from treatment systems/incinerators. Media - Air pollution control. Ch. NR 445 governs hazardous air pollutant emissions.

C.1.b.4) Chs. NR 600 - 685: Activity - Recycling of hazardous waste requires a special written exemption. Standards are applied through plan review of the exemption request. Media - Groundwater and soil.

C.1.b.5) Chs. NR 600 - 685: Activity - Land treatment of hazardous waste is prohibited. These requirements apply unless the unit or activity is designated by the Department to be a CAMU under NR 636. Media - Groundwater and soil.

C.1.b.5) Chs. NR 140, NR 214, NR 200 and NR 219: Activity - Landspreading of wastewater treatment facility sludges (nonhazardous waste sludges) is regulated under the wastewater program rules. Media - Groundwater and soil.

C.1.c. Chs. NR 600 - 685: Activity - Hazardous waste storage facilities are subject to a licensing process, plan review and standards. For new facilities, standards are applied through plan review and a siting

process involving local governments and a state siting board. These requirements apply unless the unit or activity is designated by the Department to be a CAMU under NR 636. Media - Groundwater and soil.

C.2. Chs. NR 600 - 685: Activity - Generation and transportation standards for hazardous waste are specified. They are based on RCRA standards. Manifests must be used for hazardous waste shipments. Transporters must be licensed to haul hazardous waste.

C.2.a.1) Chs. NR 500-520 and s. 144.44, Stats.: Activity - Solid waste disposal licensing process, plan review and standards. For new sites, standards are applied through plan review and siting process which involves local governments and a state siting board. Existing sites must be given special one-time waste disposal approval for solid (nonhazardous) waste disposal (See ss. NR 506.09 through NR 506.14). Media - Groundwater and soil.

C.2.a.1) Chs. NR 600 - 685 and s. 144.44, Stats.: Activity - Hazardous waste disposal licensing process, plan review and standards. For new sites, standards are applied through plan review and siting process which involves local governments and a state siting board. There are currently no existing commercially available sites for hazardous waste land disposal in Wisconsin. Media - Groundwater and soil.

C.2.a.2) Chs. NR 600 - 685: Activity - Hazardous waste treatment (includes incineration) facilities are subject to a licensing process, plan review and standards. For new facilities, standards are applied through a siting process involving local governments and a state siting board. Existing commercially available treatment facilities must be approved (through modification of their existing licenses) for acceptance of new waste streams they are not already approved to accept. Systems for treating wastewater which discharges to surface water, groundwater or a publicly owned treatment works, pursuant to Ch. 147, Stats., fall under A. or B., above. Media - Air, groundwater and soil.

C.2.a.2) Chs. 400-499: Activity - Emissions from treatment systems. Media - Air pollution control. Ch. NR 445 governs hazardous air pollutant emissions.

C.2.a.3) Chs. NR 600 - 685: Activity - Recycling of hazardous waste requires a special written exemption. Standards are applied through plan review of the exemption request. Existing, commercially available recycling facilities must be approved (through modification of their existing written

exemption) for acceptance of new waste streams they are not already approved to accept. Off-site storage licensing may also apply. Media - Groundwater and soil.

C.2.a.4) Chs. NR 600 - 685: Activity - Land treatment of hazardous waste is prohibited. Media - Groundwater and soil.

C.2.a.4) Chs. NR 140, NR 214, NR 200 and NR 219: Activity - Landspreading of wastewater treatment facility sludges (nonhazardous waste sludges) is regulated under the wastewater program rules. Media - Groundwater and soil.

C.2.a.5) Chs. NR 600 - 685: Activity - Hazardous waste storage facilities are subject to a licensing process, plan review and standards. For new facilities, standards are applied through a siting process involving local governments and a state siting board. Existing, commercially available storage facilities must be approved (through modification of their existing licenses) for acceptance of new waste types they are not already licensed to accept. Media - Groundwater and soil.

C.2.b. Note: The Department has recently issued interim guidelines, dated March 14, 1991, for clean-up actions involving hazardous wastes. These guidelines specify that on-site and/or in-state management of hazardous wastes is preferred. These guidelines are not promulgated, so they are not ARARs, but are to be considered (TBC's) during remedy selection.

D.1. See Tables 3 and 4, item B.1.

D.2. See Tables 3 and 4, item B.1.a.

D.3. See Tables 3 and 4, item B.1.a.

D.3.a. Activity - Stripper discharges: See A.4.d.

D.3.b. Activity - Spent Carbon: See C

D.3.c. Activity - Other treatment residuals: See C

D.4. Ch. NR 812: Activity - In-house treatment units must be approved by the Department. See ss. NR 812.15(5) and (6). The property owner is responsible for obtaining the approval. As a matter of policy, the Department will only approve such systems as a method of last resort.

D.4. Chs. ILHR 81-84 (Uniform Plumbing Code): Activity - Plumbing system plans for in-house treatment units must be approved by DILHR. Only DILHR-approved products may be used in such systems. Products must have prior, separate approval. The plumbing code contains technical standards the system must conform to.

D.4. Activity - Spent carbon or other residuals from home treatment units: See C. Household waste may not be subject to chs. NR 600 - 685 requirements.

Table 3 - Construction Related Activities Associated With Options for Remediation

A. Construction Dewatering

1. Withdrawal wells

   a. Discharge to groundwater or surface water of withdrawn water; treated; untreated

2. Other methods of dewatering

   a. Discharge to groundwater or surface water of withdrawn water; treated; untreated

B. Water Supply

1. Potable supply

   a. Well(s)
   b. Surface water withdrawal

2. Nonpotable supply

   a. Well(s)
   b. Surface water withdrawal

C. Sewage/Sanitary Disposal

1. Discharge to surface water - with treatment
2. Discharge to groundwater - with treatment
3. Septic systems/holding tanks
4. Hook-up to local sewers
5. Landspreading/septage

D. Solid Waste Disposal/Dredge Spoil Disposal

1. On-site
2. Off-site

E. Buildings/Structures/Equipment

1. Tanks - flammable materials

a. Below ground
b. Above ground

2. Plumbing

3. Structures

4. Boilers/pressure vessels

5. Refrigeration

F. Floodplain/Shoreland Activities

1. Any construction in the floodplain

a. Incorporated areas, including wetlands
b. Unincorporated areas
c. St. Croix River

G. Surface Water/Sediment Management and Structures

1. Dredging
2. Surface water rerouting
3. Pond construction
4. Filling
5. Dams
6. Bridges
7. Any other structure

H. Wetland/Shoreland Activities

1. Dredging/removal
2. Filling

I. Spills of Hazardous Materials

J. Safety in the Work Place

1. Trenches, excavations and tunnels
2. Noise
3. Compressed air
4. Illumination
5. Fire prevention
6. Dust, fumes, vapors and gases

7. Spray coatings

Table 4 - Promulgated Standards/Requirements
Construction Regulated Activities
Associated with Options for Remediation
(Revised 6/96)

A.1.	Ch. NR 812: Any withdrawal well or combination of wells withdrawing 70 GPM or greater; standards and approvals.
A.1.&2.	Ch. NR 103: Activity - Groundwater withdrawal activities that have the potential to impact wetlands must be evaluated under this chapter. Discharges to wetlands must be evaluated in accordance with this chapter. Media - Wetlands.
A.1.a.	Chs. NR 102, NR 104, NR 105, NR 106, NR 200, NR 207, NR 219, NR 220 and Ch. 147, Stats.: Discharge of wastewater to surface waters; effluent limits; discharge permits; sampling/testing methods. If no pollutants are to be discharged, several of these requirements can be waived.
A.1.a.	Chs. NR 812, NR 140, NR 200, NR 214, NR 219, NR 220 and Ch. 147, Stats.: Discharge of wastewater to land (i.e., groundwater). Use of injection wells of any sort is prohibited. Effluent limits; discharge permits; sampling/testing methods. If no pollutants are to be discharged several of these requirements may be waived.
A.1.a.	Ch. NR 108: Treatment facility (if needed to meet effluent limits) plan review and standards.
A.2.a.	Same as A.1.a.
B.1.a.	Chs. NR 811, NR 812, NR 108 and NR 809: Potable well construction for all applications must meet the ch. NR 812 construction and design standards. For any application withdrawing 70 GPM or more, standards and approvals are required under ch. NR 812. Wells, treatment and distribution systems for community and municipal water supplies must meet the construction and design standards in ch. NR 811, and are subject to the plan approval requirements of ch. NR 108. Potable water quality must meet ch. NR 809 standards.
B.1.b.	Chs. NR 811, NR 812, NR 108 and NR 809: Surface waters may not be used for private water supplies in accordance with ch. NR 812, nor for community supplies per ch. NR 811. They may be used for municipal water supplies; such systems utilizing surface water for a source are subject to the design and construction standards in ch. NR

811, plan approval under ch. NR 108 and the water quality standards in ch. NR 809.

B.2.a. Ch. NR 812: Wells for all applications must meet ch. NR 812 construction and design standards. Any applications withdrawing 70 GPM or more are subject to standards and approvals.

C.1.&2. Chs. NR 110, NR 104, NR 105, NR 106, NR 210, NR 214 and NR 219: Generally, separate sewage treatment facilities are prohibited unless determined to be necessary under s. NR 110.08(5)(c). If allowed, plans and reports are required under ch. NR 110. Effluent limits, permits and sampling/analysis requirements apply under the other rules. Land application is regulated under ch. NR 214.

C.3.&4. Chs. ILHR81-84: Plumbing code requirements apply to the design and construction of septic systems, holding tanks and lateral connections to public sewer systems.

C.5. Ch. NR 113: Septage and holding tank hauling and landspreading requirements, licenses and approvals.

D.1.&2. Ch. 147, Stats.: Confined dredge disposal areas adjacent to surface waters are regulated through a wastewater permit. Plan review, construction and design requirements apply.

D.1. Chs. NR 500-520 and ss. 144.436 and 144.44, Stats., Solid waste disposal landfills licensing process, plan review and standards. Standards are applied through plan review and a siting process than involves local governments and a state siting board. Generally, involves local governments and a state siting board. Generally, under s. 144.436, Stats., open burning of solid waste is prohibited.

D.2. Chs. NR 500-520 and s. 144.44, Stats.: Same as D.1. Off-site commercial or municipal landfills may need a special approval (plan modification) to accept special (nongarbage) wastes. See ss. NR 506.09 through 506.14.

E.1. Ch. IND 8: Tanks, including underground tanks, standards and design.

E.2. Chs. ILHR81-84: Plumbing code (see C.3. and 4.).

E.3. Chs. ILHR50-53 and 64: Building code - design, standards, construction, etc.

E.4. Chs. ILHR41 and 42: Boiler and pressure vessel design, standards, construction, etc.

E.5. ILHR45: Refrigeration design and standards.

F.1. Ch. NR 116: Regulates all construction activities in the floodplain (generally, the 100-year floodplain). Any construction activity must be evaluated for impact on upstream flooding. Generally, no activities are allowed in the "floodway", including solid or hazardous waste disposal.

F.1.a. Ch. NR 117: Requirements (implemented by local zoning) for floodplain activities in incorporated areas.

F.1.b. Ch. NR 115: Requirements for floodplain activities in unincorporated areas.

F.1.c. Ch. NR 118: Requirements for floodplain activities in the St. Croix basin.

G.1. Chs. NR 345-347 and Chapter 30, Stats.: Permits, approvals and technical standards for dredging activities. See the dredge spoil disposal requirements (D., above).

G.2. Ch. 30, Stats.: Permits, approvals, technical standards.

G.3. Ch. 30, Stats.: Permits, approvals, technical standards (if connected to, or within 500 feet of a stream).

G.4. Ch. 30, Stats.: Generally, this activity is prohibited, except for structures.

G.5. Ch. NR 333 and Ch. 31, Stats.: Permits, approvals and standards for construction.

G.6. Ch. NR 320 and Chs. 30 and 31, Stats.: Permits, approvals and standards.

G.7. Chs 30 and 31, Stats.: Permits, approvals and technical standards.

H. Ch. NR 103: Construction activities that have the potential to impact wetlands must be evaluated in accordance with this chapter. Includes construction activities associated with borrow sources and cover construction.

H.2. Chs. NR 115-117: Regulates filling in wetlands that are in the shoreland zone. Generally, implemented by local zoning.

I. Ch. 144.76, Stats. and Ch. NR 158: Spill law. Requires reporting and clean-up of spills of any hazardous substance.

J. Ch. IND1: General safety requirements.

J.1. Ch. IND6: Safety requirements for trenches, excavations and tunnels.

J.2. Ch. IND11: Safety requirements for noise protection.

J.3. Ch. IND12: Safety requirements for compressed air.

J.4. Ch. IND19: Safety requirements related to illumination.

J.5. Ch. IND65: Safety requirements for fire prevention.

J.6. Ch. IND220: Safety requirements for dust, fumes, vapors and gases.

J.7. Ch. IND221: Safety requirements for spray coating operations.

Appendix 1 - General/Permit Primer

Appendix 2 - Water Resources Program Rules

Chapter NR 140 - Groundwater Quality
Contact: David Lindorff, 266-9265 or Mike Lemcke, 266-2104

Chapter NR 141 - Groundwater Monitoring Well Requirements
Note: This code replaces the groundwater well installation and sampling guidelines in appendix 3.
Water Resources Program Guidance: June 30, 1991 general letter on NR 141 revisions and attached forms, including revised boring and well log forms and abandonment forms, April 16, 1992 general letter on NR 141 and NR 812 - Bentonite Products/Borehole & Wellhole Abandonment
Contact: Mike Lemcke, 266-2104

Chapter NR 103 - Water Quality Standards for Wetlands
Water Resources Program Guidance: Water Quality Standards for Wetlands - A Guide to NR 103, dated 9/92
Contact: Pat Trochlell, 267-2453

Chapter NR 102 - Water Quality Standards for Surface Waters

Chapter NR 104 - Classification Standards

Chapter NR 105 - Surface Water Quality Criteria for Toxic Substances

Chapter NR 106 - Procedures for Calculating Toxic Effluent Limits
Water Resources Program Guidance: Present Department Regulations, Policies and Strategies Related to Contaminated Sediments in the State's Surface Water Bodies, dated 3/91
Contact: Duane Schuettpelz, 266-0156

Appendix 3 - Solid Waste/Hazardous Waste Program Rules/Statutes/Guidance

Chapter NR 157 - PCBs
Contacts: District Hazardous Waste Specialists, Ed Lynch, 266-3084, or any Engineer in the Hazardous Waste Section

Chapter NR 158 - Spills

Contact: Robin Schmidt, 267-7569 (This program however, is decentralized to the DNR Districts)

Chapter NR 500-520 - Solid Waste (note: this rule is undergoing comprehensive revisions that should be effective in 1996)
General Contact: Lakshmi Sridharan, 266-0520
Gas and Cover Systems: Dennis Mack, 267-9386
Groundwater Monitoring: Jack Connelly, 267-7574
Solid Waste Program Guidance:
Memorandum dated 9/27/89 and letter dated 11/12/90 to Landfill Owners w/attachments - Guidance on how Solid Waste Rules apply to landfill gas emission control
Landfill Cover Design guidance memo dated 7/26/91
Gas Extraction System Design and Monitoring guidance memo dated 11/19/92
Revised Clay Specifications and Liner Thicknesses Guidance memo dated 6/3/93

Chapters NR 600 - 685 - Hazardous Waste
Contact: Barbara Zellmer, 266-7055, or Ed Lynch, 266-3084

Chapter NR 700 Series - Remediation and Redevelopment Program
(Note: Several comprehensive guidance documents for the implementation of the NR 700 series are currently under development and are expected to be in interim final or final form in 1996)
Contact: Mark Giesfeldt, 267-7562
Program Guidance:
Landfill ARARs Training Document dated 4/12/90
Interim Policy for Promoting the In-State and On-Site Management of Hazardous Wastes in Wisconsin, dated 3/14/91

Chapter NR 144, Stats., - Solid Waste, Hazardous Waste, PCBs, and Spills

PCB Guidance (Based on promulgated rules and Statutes)
Contacts: District Hazardous Waste Specialists, Ed Lynch, 266-3084, or any Engineer in the Hazardous Waste Section

Appendix 4 - Wastewater Program Rules/Statutes

General Explanation
Contact: Sue Bangert, 266-0014 or Dave Hantz, 266-1198

Chapter NR 108 - Plan Approvals

Chapter NR 200 - Wastewater Permit Applications

Chapter NR 211 - Pretreatment

Chapter NR 214 - Land Application

Chapter NR 219 - Test Methods

Chapter NR 220 - Categories and Classes of Point Sources and Effluent Limitations

Section 144.04, Stats. - Plan Approvals

Chapter 147, Stats. - Wastewater Program Statute

Appendix 5 - Air Program Rules

Chapters NR 400-499, Air Pollution Control
General Contact: Pat Kirsop, 266-2060
Landfill Gas and Toxic Emissions: Steve Dunn, 267-0566
Air Monitoring Plans: Julian Chazin, 266-1902
Air Management Program Guidance:
Memorandum dated 11/17/89 - Guidance on Compliance with NR 445 for Landfill Gas Emissions

Appendix 6 - Water Supply Program Rules

Chapter NR 108 - Plan Approvals

Chapter NR 809 - Safe Drinking Water

Chapter NR 811 - Community Water Systems
Contact: Robert Baumeister, 266-2299

Chapter NR 812 - Well Construction
Private Water Supply/Withdrawal Well Contact: Bill Rock, 267-7649
Underground Injection Ban/UIC Contact: Rich Roth, 266-2438

Appendix 7 - Municipal Wastewater Program Rules

Chapter NR 110 - Sewage Systems
Contact: 266-2304

Chapter NR 113 - Servicing Septic/Holding Tanks
Contact: Bob Steindorf, 266-0449

Chapter NR 210 - Effluent Limits for Sewage Treatment Works

Appendix 8 - Technical Services Program Rules

Chapter NR 149 - Lab Certification
Contact: Ron Arneson, 267-7633

Appendix 9 - Water Regulation and Zoning Rules and Statutes

Chapter NR 115 - Shoreland Management

Chapter NR 116 - Floodplain Management

Chapter NR 117 - City/Village Program

Chapter NR 118 - St. Croix River

Chapter NR 320 - Bridges

Chapter NR 333 - Dams

Chapter NR 340 - Waterway Construction

Chapter 345 - Waterway Beds Construction

Chapter NR 346 - Fees

Chapter NR 347 - Dredging Project

Chapter 30, Stats.

Chapter 31, Stats.
Contact: Scott Hausmann, 266-7360
(This program, however, is mostly decentralized to the DNR district offices).
Water Regulation and Zoning Guidance:
Water Regulation and Zoning ARARs Training Document dated 4/12/90

Appendix 10 - Environmental Impact Rules

Chapter NR 150 - Environmental Analysis and Review
Contact: Roger Fritz, 266-1201

Appendix 11 - Department of Industry, Labor & Human Relations Rules

Copies of these codes are available through: Document Sales - Department of Administration, P.O. Box 7840, Madison, WI 53707, 266-3358

Contacts: Ron Buchholtz, 266-9420
Loretta Trapp, 266-2990 (Home treatment units)
DILHR Guidance:
Remediation System Design and Ignitable Contaminants memo dated 5/21/93

(Revised 6/96)

Attachments for Revision #4 (11/92):

Note: Enclosures 7, 9, 10, 13 and 14 were also included in the previous revision of 3/91. The other enclosures appear for the first time in this revision.

1. Revised NR 140 - Groundwater Quality - This replaces the earlier version of the same rule in Appendix 2, which may be discarded or kept for historical reference.

2. Revised NR 141 - Groundwater Monitoring Well Requirements - This replaces the earlier version of the same rule in Appendix 2, which may be discarded or kept for historical reference.

3. April 16, 1992 general letter on NR 141 and NR 112 (now NR 812) - Bentonite Products/Borehole & Wellhole Abandonment - Add to Appendix 2.

4. June 30, 1991 general letter on NR 141 revisions and attached forms, including revised boring and well log forms and abandonment forms - Add to Appendix 2.

5. NR 103 - Water Quality Standards for Wetlands - Add to Appendix 2.

6. Water Quality Standards for Wetlands - A Guide to NR 103, dated 9/92 - Add this guidance document to Appendix 2.

7. Present Department Regulations, Policies and Strategies Related to Contaminated Sediments in the State's Surface Water Bodies, dated 3/91 - Add this guidance document to Appendix 2.

8. Water Resource Management ARARs Training Document dated 4/12/90 - Add to Appendix 2.

9. NR 600 - 685 - Hazardous Waste Rules - These replace the earlier version in Appendix 3, which may be discarded or kept for historical reference.

10. Landfill ARARs Training Document dated 4/12/90 - Add to Appendix 3.

11. Letter dated 11/12/90 to Landfill Owners with attachments - Guidance on how Solid Waste Rules apply to landfill gas emission control - Add to Appendix 3.

12. Landfill Cover Design guidance memo dated 7/26/91 - Add to Appendix 3.

13. Gas Extraction System Design and Monitoring guidance memo dated 11/19/92 - Add to Appendix 3.

14. Interim Policy for Promoting the In-State and On-Site Management of Hazardous Wastes in Wisconsin, dated 3/14/91 - Add to Appendix 3.

15. Water Regulation and Zoning ARARs Training Document dated 4/12/90 - Add to Appendix 9.

Note: The DNR is currently in the process of developing rules (ch. NR 700 series) all aspects of site remediation, including soil cleanup standards. Once promulgated, the ch. NR 700 series with replace chs. NR 158 and NR 550. Guidance on how ch. NR 140 groundwater standards apply at clean-up sites is also under development. They will be added to Appendix 3 when complete.

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Carroll D. Besadny
Secretary

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TDD 608-267-6897

November 24, 1992

IN REPLY REFER TO:

Mr. James Mayka, Chief
MI/WI Remedial Response Branch
U.S. EPA Region 5, HSRW-6J
77 W. Jackson Blvd.
Chicago, IL 60604

SUBJECT: State Applicable, Relevant and Appropriate Requirements (ARARs) Pertaining to Section 121 of SARA
Revision #4

Dear Mr. Mayka:

Enclosed please find the fourth set of revisions to the comprehensive ARARs document we provided to you on March 6, 1987, May 2, 1988, January 9, 1990 and March 20, 1991. The tables have been revised to account for recent rule promulgation and the preparation of documents interpreting rules. Please distribute this information to your staff as appropriate.

Should you have any questions regarding this document, do not hesitate to contact me or Mr. Gary Edelstein, P.E., of my staff, at (608) 267-7563.

Sincerely,

Jane Lemcke
for MFG

Mark F. Giesfeldt, P.E., Chief
Emergency & Remedial Response Section
Bureau of Solid & Hazardous Waste Management

Enc.

cc: Jane Lemcke - SW/3 (w/enc.)
Gary Edelstein - SW/3 (w/enc.)
District Solid Waste Program Supervisors (w/enc.)
District Superfund Program Staff (w/enc.)
Superfund Program Unit Staff (w/enc.)

LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE STATE STANDARDS, REQUIREMENTS, CRITERIA AND LIMITATIONS FOR SUPERFUND PROJECTS IN WISCONSIN

Introduction

Amendments to the Comprehensive Environmental Response and Liability Act (CERCLA, commonly known as Superfund) under the Superfund Amendments and Reauthorization Act of 1986 (SARA) included a section on clean-up standards, Section 121. This section requires that any long-term clean-up (i.e., remedial actions) under the Act attain legally applicable or relevant and appropriate standards, requirements, criteria and limitations (ARARs) under state and federal law. State ARARs must be met if they are promulgated and legally applicable. If they are not legally applicable to a Superfund site, but were developed to regulate or protect an environmental media under a different program, they may still be considered relevant and appropriate. State ARARs must be formally promulgated to be required; they may be waived if they are not consistently applied by the state.

State advisories, guidance, policies, etc., may help define and develop the clean-up standards and interpret ARARs. These policies and guidance are known as "to be considered" (TBCs).

To assist persons (i.e., EPA, their contractors, responsible parties and their contractors) the Bureau of Solid and Hazardous Waste Management, Department of Natural Resources (DNR) has prepared this comprehensive listing of all promulgated state ARARs and important TBCs which may apply to Superfund long-term clean-ups. By providing this listing to such persons, Wisconsin is satisfying the requirement of Section 121 to provide timely notice of the ARARs.

The comprehensive listing can be easily matched to specific site responses considered through an alternatives array in a feasibility study. Therefore, it may be used at any Superfund site in Wisconsin by interested persons.

Rules, statutes and program requirements are subject to revisions. As the Bureau of Solid and Hazardous Waste Management becomes aware of them, this listing will be revised.

Explanation and Use of the Listings

Table 1 is a list of general options for possible remedial actions at Superfund sites. With exception of item D. in the table, it is arranged in a "ascending order" of more comprehensive response activities. For example, the options listed under category A are generally "easier" or less involved than, say, the options in category C. It is also important to note that more comprehensive options, when used at a site, will generally include less comprehensive options as part of a total site remedial action. For example, the treatment of hazardous substances in-place (B.1.) will usually include the management of extracted substances (A.4.) and monitoring (A.1.) as part of an action.

Table 2 matches all promulgated state ARARs (and TBCs) with the general options described in Table 1. Where no ARAR is given for an option from Table 1, there is no promulgated standard we are aware of. The Table describes the requirement in a general way, lists any important exceptions and specifies regulated activity and media regulated or protected.

Table 3 is a list of construction-related activities associated with the remedial actions listed in Table 1. These activities are not traditionally described in remedial option alternative descriptions, but are often encountered at Superfund construction projects, and are subject to state ARARs. Often, these activities are not identified until detailed design for an action is prepared.

Table 4 matches the promulgated state ARARs with the construction-related activities described in Table 3. The Table describes the requirements in a general way and any important exceptions. Construction contractors who operate in Wisconsin will usually have a good knowledge of these ARARs.

Appendices 1-10 are the specific requirements, regulations and laws promulgated by the state and administered by the DNR. The Appendices are arranged by each Department program. The names of each specific program contact is provided so interested persons may contact them for further details as a project progresses. Policies and guidelines utilized by DNR in interpreting the requirements, regulations and laws (TBCs) are also provided. Regulations administered by the Department of Industry, Labor and Human Relations may be obtained from the Office of Document Sales, P.O. Box 7840, Madison, Wisconsin 53707 (608-266-3358).

State Permits, Licenses, Plan Approvals and Other Approvals

In order for the listing to be comprehensive, state permit, approval, license and plan approval ARARs are provided. In many instances, technical standards and design or construction requirements are imposed through a license, permit or plan review and approval process. Section 121(e) of SARA states that "on-site" actions are not subject to state "permits". The National Contingency Plan (55 FR 8688, March 8, 1990) discusses the scope of this on-site exemption. Generally, state permits, approvals, licenses, etc., are not required for on-site actions at Superfund sites where the actions are conducted under a federal authority, such as a consent decree signed with U.S. EPA. The exemption does not apply to on-site actions at Superfund sites where the actions are conducted only under a state authority, such as a spill order or an Environmental Repair contract.

Delegated, Authorized and Primacy Programs

Several federal environmental programs have been delegated to the state for implementation and enforcement. For those programs, the state laws and rules constitute the ARARs instead of the federal laws and regulations. A comparison of the state and federal requirements under these programs is unnecessary, because U.S. EPA considers the state requirements under such programs to be the federal requirements. In Wisconsin, the following programs are delegated to the department:

1. Resource, Conservation and Recovery Act (RCRA) Subtitle C - Hazardous Waste (Authorized Program)

2. Clean Water Act NPDES Discharges - WPDES/Wastewater Program (Authorized Program)

3. Clean Air Act - Air Management Program (Delegated Program)

4. Safe Drinking Water Act - Water Supply Program (Primacy Program)

5. Underground Injection Control - Water Supply Program (Primacy Program)

Wisconsin Environmental Policy Act

Many DNR decisions, such as permits, license and plan approvals are subject to review under the Wisconsin Environmental Policy Act (WEPA), Section 1.11, Stats. and Chapter NR 150, which is provided in Appendix 10. Department decisions involving Superfund sites could be subject to review under these provisions. For some projects, it is possible that an environmental impact statement would have to be written before the project may proceed. Although it is not entirely clear if WEPA will apply at all Superfund sites (on-site actions subject to the SARA §121(e) on-site exemption would likely not fall under the WEPA provisions, since permits, approvals, plan reviews, etc., are not required), it is necessary to mention it so interested persons have been provided with timely notice.

(Revised 11/92)

Table 1 - General Options for Remediation
(Revised 11/92)

A. Leave hazardous substances in place; and

1. Monitor

   a. Groundwater
   b. Air
   c. Surface water/sediments
   d. Soil gas/subsurface gas migration

2. Contain

   a. Cap, cut-off walls; covers

3. Extract Migrating Substances

   a. Collection trenches/drains
   b. Withdrawal wells
   c. Gas collection
   d. Vapor Extraction

4. Manage Extracted Substances (from 3.)

   a. Discharge to groundwater; with treatment; without treatment

      1) Seepage/infiltration/spray irrigation
      2) Injection wells

   b. Discharge to surface water; with treatment; without treatment

   c. Discharge to publicly owned treatment works; with treatment; without treatment

   d. Release to air; with treatment; without treatment

      1) Vents/flares/stripper tower discharges

   e. Residuals; sludges; etc., generated from above - See C.

B. Manage hazardous substances in place; and

1. Treat/stabilize

   a. Physical treatment/stabilization

      1) Vitrification/heat/electrical/microwave, etc.
      2) In-situ stabilization

   b. Chemical treatment

      1) Chemical addition/flushing, etc.

   c. Biological treatment

      1) In-situ biodegradation
      2) Air sparging

C. Remove hazardous substances; and

1. Manage on-site

a. Re-disposal; landfill

b. Treat/stabilize

1) Physical treatment/incineration
2) Chemical treatment
3) Biological treatment
4) Recycle
5) Land spread/land treat

c. Storage

2. Manage off-site

a. In Wisconsin

1) Landfill
2) Treatment - all methods
3) Recycle
4) Landspread/land treat
5) Storage

b. Out-of-State

D. Water Supply (Does not "Remediate" the Facility Itself)

1. New Public Water Supply

2. New Private Water Supply Well(s)

3. Treat Public Water Supply

a. Air Stripping Tower
b. Activated Carbon
c. Other

4. Treat Private Water Supply(s)

a. In-house unit(s)

Table 2 - Promulgated Standards/Requirements
Activity and Media Regulated or Protected
General Options for Remediation
(Revised 11/92)

A.	Chs. NR 600 - 685: Activity - Any disposal or management in surface impoundments or landfills of hazardous waste (generally, defined the same as RCRA) after August 1, 1981, even if the unit ceased accepting waste before being addressed by the Environmental Repair Program or Superfund, must meet the closure and long-term care requirements (see ss. NR 585.05, 685.06, 660.15, 660.16 and 660.17) as well as groundwater monitoring requirements (See s. NR 635) that are generally consistent with RCRA 40 CFR 264/265 Subpart F. Clean closure or closure as a landfill is required for surface impoundments. These requirements are applicable to units that accepted hazardous waste after August 1, 1981, and may be relevant and appropriate to units that accepted hazardous waste before that date. Also see A.2.a., below. Media - Soil and groundwater.
A.	Chs. NR 500 - 520: Activity - Any solid waste landfill, regardless of when it accepted waste or when it closed, must meet the minimum closure and monitoring requirements the rule. Such landfills, should they have exceedances of Ch. NR 140 standards, must have a cover that meets the requirements of s. NR 504.07 (see A.1.e., A.2.a and A.3.c., below). Media - Soil and groundwater.
A.&B.	Chs. NR 105 and NR 106: Activity - Sites with contaminated sediments must be remediated to meet sediment quality criteria to protect surface water quality criteria in accordance with these chapters. See strategy paper on sediment quality criteria. Media - Surface water.
A.&B.	Ch. NR 103: Activity - Sites with contamination in wetlands must have the remediation impacts evaluated in accordance with this chapter. Media - Wetlands.
A.1.a.	Ch. NR 140: Activity - Legally applicable to all Department regulated activities that may have an impact on groundwater. The rule include groundwater monitoring and sampling frequency standards and specifies the actions required should groundwater standards be exceeded at the point of standards application. Media - Groundwater.
A.1.a.	Ch. NR 141: Activity - Groundwater monitoring well standards. Applies to all Department regulated activities that involve groundwater monitoring. Media - Groundwater.
A.1.a.	Ch. 149: Activity - Use of laboratories for testing of samples from groundwater monitoring.
A.1.a.	Chs. NR 500-520: Activity - Groundwater monitoring at solid waste landfills. See s. NR 508. This also relates to chs. NR 140 and NR 141.
A.1.a.	Ch. NR 109: Drinking water standards for water supplies. The standards include federal MCLs. The standards for maximum contaminant amounts in drinking water supplies are generally considered relevant and appropriate for groundwater at facilities addressed under Superfund. Media: Groundwater.
A.1.b.	Chs. NR 400-499: Media - Air pollution control standards Chs. NR 445 governs hazardous air pollutant emissions
A.1.c.	Chs. NR 500-520: Activity - Surface water monitoring at solid waste landfills. See s. NR 508.04(3).
A.1.c.	Chs. NR 102, NR 104, NR 105, NR 106 and NR 219: Activity - Stream classification/standards and sampling/testing methods. Water quality criteria must be met for surface waters where contaminants from Superfund sites cause exceedances.

	Discharges from in-place pollutants, such as sediments or contaminated groundwater are included. Media - Surface water and sediments.
A.1.e.	Chs. NR 500-520: Activity - Solid waste disposal landfill gas monitoring standards. See ss. NR 506.07(3), NR 504.04(4)(e) and NR 508.04(2). Media - Landfill gas in soils.
A.2.a.	Chs. NR 500-520: Activity - Solid waste disposal landfill cap standards. See ss. NR 506.08(3), NR 504.07, Ch. 516 and s. NR 514.07. See s. NR 512.18 for borrow source documentation.
A.2.a.	Ch. NR 103: Activity - Cover construction and borrow source activities that have the potential to impact wetlands must be evaluated in accordance with this chapter. Media - Wetlands.
A.2.a.	Chs. NR 600 - 685: Activity - Hazardous waste disposal landfill cap standards. See ss. NR 660.15 and 660.16.
A.3.a.&b.	Ch. NR 103: Activity - Any extraction system that has the potential to impact wetlands must be evaluated in accordance with this chapter. Media - Wetlands.
A.3.b.	Ch. NR 112: Activity - Any withdrawal well or combination of wells withdrawing 70 gpm or greater; standards and approvals. Media - Groundwater (drawdown impacts).
A.3.c.	Chs. NR 500-520: Activity - Solid waste disposal landfill gas control standards. Media - Landfill gas in soils and the air. See ss. NR 506.08(6), NR 506.07(3) and NR 504.04(4)(e). This also relates to Ch. NR 445, hazardous air pollution control standards. See guidance memos relating to solid waste and air pollution control rules for further details.
A.3.d.	See A.4.d.1) for discharges to the air; see C. for management of any condensate, spent carbon, recovered product, etc.
A.4.a.1)	Ch. NR 108: Activity - Wastewater treatment facility plan review and standards.
A.4.a.1)	Chs. NR 140, NR 200, NR 214, NR 219, NR 220 and Ch. 147, Stats.: Activity - Discharge of wastewater to the land (i.e., groundwater); effluent limits; discharge permits; sampling/testing methods. Media - Groundwater.
A.4.a.2)	Ch. NR 112: Activity - Prohibits injection wells of any sort. Media - Groundwater.
A.4.b.	Ch. NR 108: Activity - Wastewater treatment facility plan review and standards.
A.4.b.	Chs. NR 102, NR 104, NR 105, NR 106, NR 200, NR 207, NR 219 and NR 220 and Ch. 147, Stats.: Activity - Discharge of wastewater to surface waters; effluent limits; discharge permits; sampling/testing methods. Media - Surface water.
A.4.b.	Ch. NR 103: Activity - Discharges to wetlands must be evaluated in accordance with this chapter. Media - Wetlands.
A.4.c.	Ch. NR 108: Activity - Wastewater pretreatment facility plan review and standards.
A.4.c.	Ch. NR 211 and Ch. 147, Stats.: Activity - Discharge of wastewater to publicly owned treatment works; effluent limits. Media - Discharges from publicly owned treatment works - surface water/groundwater.
A.4.d.1)	Chs. 400-499: Media - Air pollution control standards. Ch. NR 445 governs hazardous air pollutant emissions.
A.4.e.	See C.

B.1.a.2)	Ch. NR 112: Activity - Injection of any substance for stabilization through a mechanism that meets the definition of "well" is prohibited. Media - Groundwater.
B.1.b.	Chs. NR 112, NR 140, NR 200, NR 214, NR 219, NR 220 and Ch. 147, Stats.: Activity - Discharge of wastewater to the land (i.e., groundwater; provided that a discharge to carry chemicals is used). Use of injection wells of any sort to inject chemicals is prohibited. Media - Groundwater.
B.1.c.1)	Same as B.1.b., but applies to nutrients as well as any chemicals.
B.1.c.2)	Ch. NR 112: Activity - Underground injection of any substances through a well is prohibited. Injection of only clean air (no oil or other substances present) is allowed. Media - Groundwater.
C.1.&2.	Chs. NR 157, NR 500-520, NR 600 - 685 and s. 144.79, Stats.: Activity - Management of PCB contaminated wastes. The treatment, storage, disposal and transportation of PCB wastes are subject to special state requirements and standards. Generally, the standards applied to wastes of concentrations greater than 50 ppm of PCBs follow the federal requirements. For wastes containing less than 50 ppm of PCBs, see the special guidance document in Appendix 3, which is a restatement and clarification of promulgated state standards. Media - Groundwater, soil and air.
C.1.a.	Chs. NR 500-520 and s. 144.44, Stats.: Activity - Solid waste disposal licensing process, plan review and standards. Standards are applied through plan review and a siting process which involves local governments and a state siting board. Media - Groundwater, soil.
C.1.a.	Chs. NR 600 - 685 and s. 144.44, Stats.: Activity - Hazardous waste disposal licensing process, plan review and standards. Standards are applied through plan review and a siting process which involves local governments and a state siting board. Media - Groundwater, soil.
C.1.b.1), 2),3)	Chs. NR 600 - 685: Activity - Hazardous waste treatment (includes incineration) facilities are subject to a licensing process, plan review and standards. For new facilities, standards are applied through plan review and a siting process which involves local governments and a state siting board. Systems for treating wastewater which discharge to surface water, groundwater, or a publicly owned treatment works pursuant to Ch. 147, Stats., fall under A. or B., above. Media - Air, groundwater and soil.
C.1.b.1)	Chs. 400-499: Activity - Emissions from treatment systems/incinerators. Media - Air pollution control. Ch. NR 445 governs hazardous air pollutant emissions.
C.1.b.4)	Chs. NR 600 - 685: Activity - Recycling of hazardous waste requires a special written exemption. Standards are applied through plan review of the exemption request. Media - Groundwater and soil.
C.1.b.5)	Chs. NR 600 - 685: Activity - Land treatment of hazardous waste is prohibited. Media - Groundwater and soil.
C.1.b.5)	Chs. NR 140, NR 214, NR 200 and NR 219: Activity - Landspreading of wastewater treatment facility sludges (nonhazardous waste sludges) is regulated under the wastewater program rules. Media - Groundwater and soil.
C.1.c.	Chs. NR 600 - 685: Activity - Hazardous waste storage facilities are subject to a licensing process, plan review and standards. For new facilities, standards are applied through plan review and a siting process involving local governments and a state siting board. Media - Groundwater and soil.
C.2.	Chs. NR 600 - 685: Activity - Generation and transportation standards for hazardous

waste are specified. They are based on RCRA standards. Manifests must be used for hazardous waste shipments. Transporters must be licensed to haul hazardous waste.

C.2.a.1) Chs. NR 500-520 and s. 144.44, Stats.: Activity - Solid waste disposal licensing process, plan review and standards. For new sites, standards are applied through plan review and siting process which involves local governments and a state siting board. Existing sites must be given special one-time waste disposal approval for solid (nonhazardous) waste disposal (See ss. NR 506.09 through NR 506.14). Media - Groundwater and soil.

C.2.a.1) Chs. NR 600 - 685 and s. 144.44, Stats.: Activity - Hazardous waste disposal licensing process, plan review and standards. For new sites, standards are applied through plan review and siting process which involves local governments and a state siting board. There are currently no existing commercially available sites for hazardous waste land disposal in Wisconsin. Media - Groundwater and soil.

C.2.a.2) Chs. NR 600 - 685: Activity - Hazardous waste treatment (includes incineration) facilities are subject to a licensing process, plan review and standards. For new facilities, standards are applied through a siting process involving local governments and a state siting board. Existing commercially available treatment facilities must be approved (through modification of their existing licenses) for acceptance of new waste streams they are not already approved to accept. Systems for treating wastewater which discharges to surface water, groundwater or a publicly owned treatment works, pursuant to Ch. 147, Stats., fall under A. or B., above. Media - Air, groundwater and soil.

C.2.a.2) Chs. 400-499: Activity - Emissions from treatment systems. Media - Air pollution control. Ch. NR 445 governs hazardous air pollutant emissions.

C.2.a.3) Chs. NR 600 - 685: Activity - Recycling of hazardous waste requires a special written exemption. Standards are applied through plan review of the exemption request. Existing, commercially available recycling facilities must be approved (through modification of their existing written exemption) for acceptance of new waste streams they are not already approved to accept. Off-site storage licensing may also apply. Media - Groundwater and soil.

C.2.a.4) Chs. NR 600 - 685: Activity - Land treatment of hazardous waste is prohibited. Media - Groundwater and soil.

C.2.a.4) Chs. NR 140, NR 214, NR 200 and NR 219: Activity - Landspreading of wastewater treatment facility sludges (nonhazardous waste sludges) is regulated under the wastewater program rules. Media - Groundwater and soil.

C.2.a.5) Chs. NR 600 - 685: Activity - Hazardous waste storage facilities are subject to a licensing process, plan review and standards. For new facilities, standards are applied through a siting process involving local governments and a state siting board. Existing, commercially available storage facilities must be approved (through modification of their existing licenses) for acceptance of new waste types they are not already licensed to accept. Media - Groundwater and soil.

C.2.b. Note: The Department has recently issued interim guidelines, dated March 14, 1991, for clean-up actions involving hazardous wastes. These guidelines specify that on-site and/or in-state management of hazardous wastes is preferred. These guidelines are not promulgated, so they are not ARARs, but are to be considered (TBC's) during remedy selection.

D.1. See Tables 3 and 4, item B.1.

D.2. See Tables 3 and 4, item B.1.a.

D.3. See Tables 3 and 4, item B.1.a.

D.3.a. Activity - Stripper discharges: See A.4.d.

D.3.b. Activity - Spent Carbon: See C

D.3.c. Activity - Other treatment residuals: See C

D.4. Ch. NR 112: Activity - In-house treatment units must be approved by the Department. See ss. NR 112.15(5) and (6). The property owner is responsible for obtaining the approval. As a matter of policy, the Department will only approve such systems as a method of last resort.

D.4. Chs. ILHR 81-84 (Uniform Plumbing Code): Activity - Plumbing system plans for in-house treatment units must be approved by DILHR. Only DILHR-approved products may be used in such systems. Products must have prior, separate approval. The plumbing code contains technical standards the system must conform to.

D.4. Activity - Spent carbon or other residuals from home treatment units: See C. Household waste may not be subject to chs. NR 600 - 685 requirements.

Table 3 - Construction Related Activities Associated With Options for Remediation

A. Construction Dewatering

1. Withdrawal wells

    a. Discharge to groundwater or surface water of withdrawn water; treated; untreated

2. Other methods of dewatering

    a. Discharge to groundwater or surface water of withdrawn water; treated; untreated

B. Water Supply

1. Potable supply

    a. Well(s)
    b. Surface water withdrawal

2. Nonpotable supply

    a. Well(s)
    b. Surface water withdrawal

C. Sewage/Sanitary Disposal

1. Discharge to surface water - with treatment
2. Discharge to groundwater - with treatment
3. Septic systems/holding tanks
4. Hook-up to local sewers
5. Landspreading/septage

D. Solid Waste Disposal/Dredge Spoil Disposal

1. On-site
2. Off-site

E. Buildings/Structures/Equipment

1. Tanks - flammable materials

    a. Below ground
    b. Above ground

2. Plumbing

3. Structures

4. Boilers/pressure vessels

5. Refrigeration

F. Floodplain/Shoreland Activities

1. Any construction in the floodplain

   a. Incorporated areas, including wetlands
   b. Unincorporated areas
   c. St. Croix River

G. Surface Water/Sediment Management and Structures

1. Dredging
2. Surface water rerouting
3. Pond construction
4. Filling
5. Dams
6. Bridges
7. Any other structure

H. Wetland/Shoreland Activities

1. Dredging/removal
2. Filling

I. Spills of Hazardous Materials

J. Safety in the Work Place

1. Trenches, excavations and tunnels
2. Noise
3. Compressed air
4. Illumination
5. Fire prevention
6. Dust, fumes, vapors and gases
7. Spray coatings

Table 4 - Promulgated Standards/Requirements
Construction Regulated Activities
Associated with Options for Remediation
(Revised 11/92)

A.1.	Ch. NR 112: Any withdrawal well or combination of wells withdrawing 70 GPM or greater; standards and approvals.
A.1.&2.	Ch. NR 103: Activity - Groundwater withdrawal activities that have the potential to impact wetlands must be evaluated under this chapter. Discharges to wetlands must be evaluated in accordance with this chapter. Media - Wetlands.
A.1.a.	Chs. NR 102, NR 104, NR 105, NR 106, NR 200, NR 207, NR 219, NR 220 and Ch. 147, Stats.: Discharge of wastewater to surface waters; effluent limits; discharge permits; sampling/testing methods. If no pollutants are to be discharged, several of these requirements can be waived.
A.1.a.	Chs. NR 112, NR 140, NR 200, NR 214, NR 219, NR 220 and Ch. 147, Stats.: Discharge of wastewater to land (i.e., groundwater). Use of injection wells of any sort is prohibited. Effluent limits; discharge permits; sampling/testing methods. If no pollutants are to be discharged several of these requirements may be waived.
A.1.a.	Ch. NR 108: Treatment facility (if needed to meet effluent limits) plan review and standards.
A.2.a.	Same as A.1.a.
B.1.a.	Chs. NR 111, NR 112, NR 108 and NR 109: Potable well construction for all applications must meet the ch. NR 112 construction and design standards. For any application withdrawing 70 GPM or more, standards and approvals are required under ch. NR 112. Wells, treatment and distribution systems for community and municipal water supplies must meet the construction and design standards in ch. NR 111, and are subject to the plan approval requirements of ch. NR 108. Potable water quality must meet ch. NR 109 standards.
B.1.b.	Chs. NR 111, NR 112, NR 108 and NR 109: Surface waters may not be used for private water supplies in accordance with ch. NR 112, nor for community supplies per ch. NR 111. They may be used for municipal water supplies; such systems utilizing surface water for a source are subject to the design and construction standards in ch. NR 111, plan approval under ch. NR 108 and the water quality standards in ch. NR 109.
B.2.a.	Ch. NR 112: Wells for all applications must meet ch. NR 112 construction and design standards. Any applications withdrawing 70 GPM or more are subject to standards and approvals.
C.1.&2.	Chs. NR 110, NR 104, NR 105, NR 106, NR 210, NR 214 and NR 219: Generally, separate sewage treatment facilities are prohibited unless determined to be necessary under s. NR 110.08(5)(c). If allowed, plans and reports are required under ch. NR 110. Effluent limits, permits and sampling/analysis requirements apply under the other rules. Land application is regulated under ch. NR 214.
C.3.&4.	Chs. ILHR81-84: Plumbing code requirements apply to the design and construction of septic systems, holding tanks and lateral connections to public sewer systems.
C.5.	Ch. NR 113: Septage and holding tank hauling and landspreading requirements, licenses and approvals.

D.1.&2. Ch. 147, Stats.: Confined dredge disposal areas adjacent to surface waters are regulated through a wastewater permit. Plan review, construction and design requirements apply.

D.1. Chs. NR 500-520 and ss. 144.436 and 144.44, Stats., Solid waste disposal landfills licensing process, plan review and standards. Standards are applied through plan review and a siting process than involves local governments and a state siting board. Generally, involves local governments and a state siting board. Generally, under s. 144.436, Stats., open burning of solid waste is prohibited.

D.2. Chs. NR 500-520 and s. 144.44, Stats.: Same as D.1. Off-site commercial or municipal landfills may need a special approval (plan modification) to accept special (nongarbage) wastes. See ss. NR 506.09 through 506.14.

E.1. Ch. IND 8: Tanks, including underground tanks, standards and design.

E.2. Chs. ILHR81-84: Plumbing code (see C.3. and 4.).

E.3. Chs. ILHR50-53 and 64: Building code - design, standards, construction, etc.

E.4. Chs. ILHR41 and 42: Boiler and pressure vessel design, standards, construction, etc.

E.5. ILHR45: Refrigeration design and standards.

F.1. Ch. NR 116: Regulates all construction activities in the floodplain (generally, the 100-year floodplain). Any construction activity must be evaluated for impact on upstream flooding. Generally, no activities are allowed in the "floodway", including solid or hazardous waste disposal.

F.1.a. Ch. NR 117: Requirements (implemented by local zoning) for floodplain activities in incorporated areas.

F.1.b. Ch. NR 115: Requirements for floodplain activities in unincorporated areas.

F.1.c. Ch. NR 118: Requirements for floodplain activities in the St. Croix basin.

G.1. Chs. NR 345-347 and Chapter 30, Stats.: Permits, approvals and technical standards for dredging activities. See the dredge spoil disposal requirements (D., above).

G.2. Ch. 30, Stats.: Permits, approvals, technical standards.

G.3. Ch. 30, Stats.: Permits, approvals, technical standards (if connected to, or within 500 feet of a stream).

G.4. Ch. 30, Stats.: Generally, this activity is prohibited, except for structures.

G.5. Ch. NR 333 and Ch. 31, Stats.: Permits, approvals and standards for construction.

G.6. Ch. NR 320 and Chs. 30 and 31, Stats.: Permits, approvals and standards.

G.7. Chs 30 and 31, Stats.: Permits, approvals and technical standards.

H. Ch. NR 103: Construction activities that have the potential to impact wetlands must be evaluated in accordance with this chapter. Includes construction activities associated with borrow sources and cover construction.

H.2. Chs. NR 115-117: Regulates filling in wetlands that are in the shoreland zone. Generally, implemented by local zoning.

I. Ch. 144.76, Stats. and Ch. NR 158: Spill law. Requires reporting and clean-up of spills of

any hazardous substance.

J. Ch. IND1: General safety requirements.

J.1. Ch. IND6: Safety requirements for trenches, excavations and tunnels.

J.2. Ch. IND11: Safety requirements for noise protection.

J.3. Ch. IND12: Safety requirements for compressed air.

J.4. Ch. IND19: Safety requirements related to illumination.

J.5. Ch. IND65: Safety requirements for fire prevention.

J.6. Ch. IND220: Safety requirements for dust, fumes, vapors and gases.

J.7. Ch. IND221: Safety requirements for spray coating operations.

Appendix 1 - General/Permit Primer

Appendix 2 - Water Resources Program Rules

Chapter NR 140 - Groundwater Quality
Contact: David Lindorff, 266-9265/Kevin Kessler, 267-9350

Chapter NR 141 - Groundwater Monitoring Well Requirements
Note: This code replaces the groundwater well installation and sampling guidelines in appendix 3.
Water Resources Program Guidance: June 30, 1991 general letter on NR 141 revisions and attached forms, including revised boring and well log forms and abandonment forms, April 16, 1992 general letter on NR 141 and NR 112 - Bentonite Products/Borehole & Wellhole Abandonment
Contact: Mike Lemcke, 266-2104

Chapter NR 103 - Water Quality Standards for Wetlands
Water Resources Program Guidance: Water Quality Standards for Wetlands - A Guide to NR 103, dated 9/92
Contact: Dave Siebert, 264-6048/Pat Trochlell, 267-2453

Chapter NR 102 - Water Quality Standards for Surface Waters

Chapter NR 104 - Classification Standards

Chapter NR 105 - Surface Water Quality Criteria for Toxic Substances

Chapter NR 106 - Procedures for Calculating Toxic Effluent Limits
Water Resources Program Guidance: Present Department Regulations, Policies and Strategies Related to Contaminated Sediments in the State's Surface Water Bodies, dated 3/91
Contact: Duane Schuettpelz, 266-0156

Appendix 3 - Solid Waste/Hazardous Waste Program Rules/Statutes/Guidance

Chapter NR 157 - PCBs
Contacts: District Hazardous Waste Specialists, Ed Lynch, 266-3084, or any Engineer in the Hazardous Waste Section

Chapter NR 158 - Spills
Contact: Kim McCutcheon, 266-2857 (This program however, is decentralized to the DNR Districts)

Chapter NR 500-520 - Solid Waste
General Contact: Lakshmi Sridharan, 266-0520
Gas and Cover Systems: Dennis Mack, 267-9386
Groundwater Monitoring: Jack Connelly, 267-7574
Solid Waste Program Guidance:
Memorandum dated 9/27/89 and letter dated 11/12/90 to Landfill Owners w/attachments - Guidance on how Solid Waste Rules apply to landfill gas emission control
Landfill Cover Design guidance memo dated 7/26/91
Gas Extraction System Design and Monitoring guidance memo dated 11/19/92

Chapters NR 600 - 685 - Hazardous Waste
Contact: Barbara Zellmer, 266-7055, or Ed Lynch, 266-3084

Chapter NR 550 - Environmental Response and Repair

Contact: Mark Giesfeldt, 267-7562
Emergency and Remedial Response Program Guidance:
Landfill ARARs Training Document dated 4/12/90
Interim Policy for Promoting the In-State and On-Site Management of Hazardous Wastes in Wisconsin, dated 3/14/91

Chapter NR 144, Stats., - Solid Waste, Hazardous Waste, PCBs, and Spills

PCB Guidance (Based on promulgated rules and Statutes)
Contacts: District Hazardous Waste Specialists, Ed Lynch, 266-3084, or any Engineer in the Hazardous Waste Section

Appendix 4 - Wastewater Program Rules/Statutes

General Explanation
Contact: Sue Bangert, 266-0014

Chapter NR 108 - Plan Approvals

Chapter NR 200 - Wastewater Permit Applications

Chapter NR 211 - Pretreatment

Chapter NR 214 - Land Application

Chapter NR 219 - Test Methods

Chapter NR 220 - Categories and Classes of Point Sources and Effluent Limitations

Section 144.04, Stats. - Plan Approvals

Chapter 147, Stats. - Wastewater Program Statute

Appendix 5 - Air Program Rules

Chapters NR 400-499, Air Pollution Control
General Contact: Pat Kirsop, 266-2060
Landfill Gas and Toxic Emissions: Steve Dunn, 267-0566
Air Monitoring Plans: Julian Chazin, 266-1902
Air Management Program Guidance:
Memorandum dated 11/17/89 - Guidance on Compliance with NR 445 for Landfill Gas Emissions

Appendix 6 - Water Supply Program Rules

Chapter NR 108 - Plan Approvals

Chapter NR 109 - Safe Drinking Water

Chapter NR 111 - Community Water Systems
Contact: Robert Baumeister, 266-2299

Chapter NR 112 - Well Construction
Private Water Supply/Withdrawal Well Contact: Bill Rock, 267-7649
Underground Injection Ban/UIC Contact: Rich Roth, 266-2438

Appendix 7 - Municipal Wastewater Program Rules

Chapter NR 110 - Sewage Systems
Contact: Chuck Burney, 266-2304

Chapter NR 113 - Servicing Septic/Holding Tanks
Contact: Bob Steindorf, 266-0449

Chapter NR 210 - Effluent Limits for Sewage Treatment Works

Appendix 8 - Technical Services Program Rules

Chapter NR 149 - Lab Certification
Contact: Ron Arneson, 267-7633

Appendix 9 - Water Regulation and Zoning Rules and Statutes

Chapter NR 115 - Shoreland Management

Chapter NR 116 - Floodplain Management

Chapter NR 117 - City/Village Program

Chapter NR 118 - St. Croix River

Chapter NR 320 - Bridges

Chapter NR 333 - Dams

Chapter NR 340 - Waterway Construction

Chapter 345 - Waterway Beds Construction

Chapter NR 346 - Fees

Chapter NR 347 - Dredging Project

Chapter 30, Stats.

Chapter 31, Stats.
Contact: Scott Hausmann, 266-7360
(This program, however, is mostly decentralized to the DNR district offices).
Water Regulation and Zoning Guidance:
Water Regulation and Zoning ARARs Training Document dated 4/12/90

Appendix 10 - Environmental Impact Rules

Chapter NR 150 - Environmental Analysis and Review
Contact: Roger Fritz, 266-1201

Department of Industry, Labor & Human Relations Rules

Copies of these codes are available through: Document Sales - Department of Administration, P.O. Box 7840, Madison, WI 53707, 266-3358
Contacts: Ron Buchholtz, 266-9420
Loretta Trapp, 266-2990 (Home treatment units)
(Revised 11/92)

Attachments for Revision #4 (11/92):

Note: Enclosures 7, 9, 10, 13 and 14 were also included in the previous revision of 3/91. The other enclosures appear for the first time in this revision.

1. Revised NR 140 - Groundwater Quality - This replaces the earlier version of the same rule in Appendix 2, which may be discarded or kept for historical reference.

2. Revised NR 141 - Groundwater Monitoring Well Requirements - This replaces the earlier version of the same rule in Appendix 2, which may be discarded or kept for historical reference.

3. April 16, 1992 general letter on NR 141 and NR 112 - Bentonite Products/Borehole & Wellhole Abandonment - Add to Appendix 2.

4. June 30, 1991 general letter on NR 141 revisions and attached forms, including revised boring and well log forms and abandonment forms - Add to Appendix 2.

5. NR 103 - Water Quality Standards for Wetlands - Add to Appendix 2.

6. Water Quality Standards for Wetlands - A Guide to NR 103, dated 9/92 - Add this guidance document to Appendix 2.

7. Present Department Regulations, Policies and Strategies Related to Contaminated Sediments in the State's Surface Water Bodies, dated 3/91 - Add this guidance document to Appendix 2.

8. Water Resource Management ARARs Training Document dated 4/12/90 - Add to Appendix 2.

9. NR 600 - 685 - Hazardous Waste Rules - These replace the earlier version in Appendix 3, which may be discarded or kept for historical reference.

10. Landfill ARARs Training Document dated 4/12/90 - Add to Appendix 3.

11. Letter dated 11/12/90 to Landfill Owners with attachments - Guidance on how Solid Waste Rules apply to landfill gas emission control - Add to Appendix 3.

12. Landfill Cover Design guidance memo dated 7/26/91 - Add to Appendix 3.

13. Gas Extraction System Design and Monitoring guidance memo dated 11/19/92 - Add to Appendix 3.

14. Interim Policy for Promoting the In-State and On-Site Management of Hazardous Wastes in Wisconsin, dated 3/14/91 - Add to Appendix 3.

15. Water Regulation and Zoning ARARs Training Document dated 4/12/90 - Add to Appendix 9.

Note: The DNR is currently in the process of developing rules (ch. NR 700 series) all aspects of site remediation, including soil cleanup standards. Once promulgated, the ch. NR 700 series with replace chs. NR 158 and NR 550. Guidance on how ch. NR 140 groundwater standards apply at clean-up sites is also under development. They will be added to Appendix 3 when complete.

WISCONSIN
DEPT. OF NATURAL RESOURCES

Carroll D. Besadny
Secretary

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

101 South Webster Street
Box 7921
Madison, Wisconsin 53707
TELEPHONE 608-266-2621
TELEFAX 608-267-3579
TDD 608-267-6897

April 16, 1992

IN REPLY REFER TO: 3230

TO: Environmental Consultants & Others Involved in the Monitoring Well Installation and Borehole/Drillhole Abandonment

SUBJECT: Bentonite Products & Borehole/Drillhole Abandonment

Enclosed are three items which provide information regarding the abandonment of boreholes and construction or abandonment of monitoring wells.

Two of the items are lists which provide information regarding monitoring well drilling and abandonment aids which meet specifications set in Chapter NR 141, Wis. Adm. Code, the Groundwater Monitoring Well Requirements Code. These lists are entitled:

- Wisconsin List of Approved High Solids Grouting Materials and Bentonite Products Meeting NR 141 Requirements for Monitoring Wells.

- Wisconsin List of Well Drilling & Abandonment Aids Denied Approval (NR 112 & NR 141)

These two lists are being provided to ensure environmentally sound monitoring well installation & abandonment, promote consistency across the state and to facilitate the easy use of the code. This information also updates and improves upon the information provided in my correspondence of June, 1991.

In addition to the bentonite lists, a letter recently sent out by the WDNR, Bureau of Water Supply, regarding the abandonment of borehole(s) is enclosed. I am sending this letter in case you did not receive a copy. Since this letter was transmitted, additional questions about borehole abandonment have surfaced which need clarification. The first question:

> Do boreholes/drillholes deeper than 10 feet need to be abandoned to the land surface with approved abandonment material? **Yes.** It would be a violation of the code to only abandon the boreholes/drillholes with approved abandonment material to within 10 feet of the land surface and then fill the rest of the hole with native material.

The second question:

> Do boreholes/drillholes deeper then 10 feet need to be abandoned from the bottom of the hole to the surface? Yes. It would be a violation of the code to let the boreholes collapse and then only fill them with approved abandonment material from the collapsed depth to the surface.

Since the revision of Chapter NR 141, the high degree of cooperation extended by the regulated community has been greatly appreciated. I hope that you can continue to contribute to this effort by taking the time to help identify further enhancement to ch. NR 141. If you have any further suggestions regarding this code please contact me at (608)-266-2104.

Sincerely,
Bureau of Water Resources Management

Michael Lemcke, Hydrogeologist
Groundwater Management Section

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WISCONSIN
DEPT. OF NATURAL RESOURCES

Carroll D. Besadny
Secretary

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

101 South Webster Street
Box 7921
Madison, Wisconsin 53707
TELEPHONE 608-266-2621
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March, 1992

IN REPLY REFER TO: 3320

TO: Consulting Engineers and Architects

SUBJECT: Well/Borehole/Drillhole Abandonment

There has been some confusion especially in the geotechnical well industry regarding what rules apply to well and drillhole (borehole) abandonment and to whom the rules apply. Proper abandonment of wells and drillholes, including geotechnical boreholes, is governed by the newly revised State Private Well Code (NR 112, Wis. Adm. Code). The effective date of this revision (5th edition) is February 1, 1991. The newly revised well code defines a "drillhole" as "any excavation or opening...deeper than it is wide that extends more than 10 feet below the ground surface."

The new private well code applies to all wells and drillholes (boreholes) in Wisconsin regardless of well or drillhole type except when another State code explicitly applies to a specific well type. For example, certain monitoring wells are governed by ch. NR 141. NR 141 applies to the construction and abandonment of monitoring wells constructed at DNR-regulated facilities or constructed under DNR contracts. However, if for some reason a monitoring well is not appropriately abandoned under the rules of NR 141, then NR 112 would apply to the abandonment of the well or drillhole. The well code could be used by us to ensure that the monitoring well or geotechnical borehole is properly filled so as not to pose a future hazard to the groundwater. NR 112 was specifically designed as a "catch-all" code to cover any well or drillhole not covered by any other code or statute.

The previous edition (4th) of the private well code did not apply to all wells. It also did not apply to drillholes (boreholes). It applied only to water wells. We therefore did not have clear authority to effect the proper abandonment of all wells and drillholes (boreholes).

New criteria in the revised well code indicates when and under what conditions a well or drillhole must be properly filled. The previous code edition had no such criteria. Generally, under the new criteria, a well or drillhole (borehole) must be abandoned and properly filled if it poses a hazard to health or safety, has noncomplying construction or location, is contaminated, or if it has been taken out of service and is no longer needed.

When a well or drillhole (borehole) is properly filled, a well/drillhole abandonment form (Form #3300-5B or 5W) must be completed and submitted to the appropriate DNR District office within 30 days of completion of the work.

The new well code rules apply to everyone working in Wisconsin, including licensed well drillers, firms that construct geotechnical drillholes (boreholes), engineering consulting firms, elevator shaft constructors, and property owners.

We are all concerned about the protection of our valuable groundwater resource in Wisconsin. To this end we think it is important for professional consulting engineers and architects to be aware of these new rules so they can be taken into consideration when planning for and performing any work that may have an effect on groundwater. The more people who are aware and follow these new rules, the fewer will be the threats to the groundwater and to the aquifers of the state. We would greatly appreciate any efforts you could make to help get this information to the people involved in you organization and to help ensure that the people of you organization are following these rules.

If you have any question regarding these matters, please call me at (608) 266-8697.

Sincerely,
Bureau of Water Supply

Thomas V. Riewe, Hydrogeologist
Private Water Supply Section

cc: Bob Krill -WS/2
Bill Rock -WS/2
Bob Baumeister -WS/2
Kevin Kessler -WR/2
Mike Lemcke -WR/2
Heidi Block -LC/5
Patricia Hanz -LC/5
Water Supply Supervisors
Private Water Supply Section - Routed Copy
WWWA Officials
Gervase Hephner -WWWA

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WISCONSIN LIST OF WELL DRILLING & ABANDONMENT AIDS
DENIED APPROVAL (FOR NR 112 & NR 141)

Denial Date	Product Name	Manufact.	Material(s)	Intended Uses	Reasons for Denial
12-17-90	"BH Grout"	Black Hills Bentonite Co.	88% nontreated sodium bentonite 7% sodium tripolyphosphate 2% sodium acid pyrophosphate 3% Portland Cement	High solids bentonite grout	Presence of polyphosphates (concern with phosphates acting a medium for bacterial growth)
06-29-90	BMR (Bentonite Mud Remover)	Water Well Chemical Co.	Inorganic acid salt and alcohol - dry granular colloidal dispersant.	Remove drilling mud clays during development.	Not able to determine whether or not ingredients pose a hazard to groundwater.
05-20-88	"Cellex"	N. L. Baroid	White granular powered organic polymer - 100% sodium carboxymethyl cellulose.	Drilling fluid additive for fluid loss control, drillhole stability and efficient cutting removal	Organic - polymer may act as a medium for growth of bacteria.
05-04-88	"E-Z Mud	N. L. Baroid	Anionic polymer emulsion (includes hydrolyzed polyacrylamide, isoparafinic hydrocarbon, soda ash & proprietary ingredients).	Solids-free drill fluid for formations that swell, cave, and disintegrate.	1. % acrylamide monomer (probable carcinogen) unknown. 2. Hydrocarbon may act as medium for growth of bacteria. 3. Some ingredients proprietary.
09-24-87	"NALCO-ASP-700" (Liquid)	Nalco Chemical Co.	Anionic liquid copolymer (acrylate/acrylamide)- (Includes ethoxylated nonylphenol & paraffinic/napthenic solvent).	Drill fluid ingredient (viscosifier).	Presence of acrylamides & hazardous ingredients (ethoxylated nonylphenol & paraffinic/ napthenic solvent, etc.
09-24-87	"NALCO-ASP-700-dry"	Nalco Chemical Co.	Anionic liquid copolymer (acrylate/acrylamide)- (Includes ethoxylated nonylphenol & paraffinic/napthenic solvent).	Drill fluid ingredient (viscosifier).	Presence of acrylamides & hazardous ingredients (ethoxylated nonylphenol & paraffinic/ napthenic solvent, etc.
09-24-87	"NALCO-ASP-715"	Nalco Chemical Co.	Nonionic liquid polyacrylamide polymer & same ingredients as ASP-700	Drill fluid viscosifier and flocculent.	Presence of acrylamides & hazardous ingredients (ethoxylated nonylphenol & paraffinic/ napthenic solvent, etc.

Denial Date	Product Name	Manufact.	Material(s)	Intended Uses	Reasons for Denial
09-24-87	"NALCO-ASP-717"	Nalco Chemical Co.	Liquid sodium polyacrylate	Clay deflocculent to ease removal of clay from screens & surrounding formations. Also used as mud additive.	Concern that polymer may act as medium for bacterial growth.
09-24-87	"NALCO-ASP-733"	Nalco Chemical Co.	Fatty acid in kerosene.	Core bit lubricant.	Presence of kerosene poses hazard for VOC contamination.
09-24-87	"NALCO-ASP-111"	Nalco Chemical Co.	Nonionic surfactant consisting of an aqueous solution of oxylkyates and methanol	Lubricant and emulsifying aid for "NALCO ASP-733."	Presence of hazardous materials - methyl alcohol & ethoxylated nonylphenol.
09-24-87	"NALCO-ASP-740"	Nalco Chemical Co.	Liquid phosphate	Drilling fluid additive for scale inhibitor; clay thinner for greater development ease.	Presence of hazardous materials - methyl chloride & ethylene glycol.
09-24-87	"NALCO-ASP-742"	Nalco Chemical Co.	Liquid defoamer - blend of fatty acids, polyglycols, polyglycol esters and oxyalkylate in kerosene and mineral oil.	To "knock-down" drilling foam.	Presence of hazardous ingredients, kerosene and mineral seed oils (concern with VOCs.)
09-24-87	"NALCO-ASP-743"	Nalco Chemical Co.	Aqueous solution of hexahydro-1,3,5 tris (2-hydroxyethyl)-S-triazine(triazine preservative - bacteriocide).	Control bacterial & prevent contamination in water producing zones.	Designed for oil well drilling; presence of hazardous material 2-hydroxyethyl; and on caustic nature of product.
09-24-87	"NALCO-ASP-744"	Nalco Chemical Co.	Thiocarmate preservative-microbiocide.	Control bacterial & prevent contamination in water producing zones.	Can react with strong oxidizers like chlorine compounds to produce chlorine gas.
09-24-87	"ADOFOAM-BF-1"	Nalco Chemical Co.	Anionic surfactant.	Drilling foam.	Presence of the hazardous ingredient ethylene glycol.

Denial Date	Product Name	Manufact.	Material(s)	Intended Uses	Reasons for Denial
09-24-87	"NALCO-ASP-222"	Nalco Chemical Co.	Anionic oxygen corrosion inhibitor.	Corrosion inhibitor for use when drilling with foam.	Presence of hazardous materials, zinc chloride and phosphoric acid.
10-17-90	"PdsCo Grout"	Black Hills Bentonite Co. (Distributed by Polymer Drilling Systems)	88% nontreated sodium bentonite 7% sodium tripolyphosphate 2% sodium acid pyrophosphate 3% Portland Cement	High solids bentonite grout	Presence of polyphosphates (concern with phosphates acting as medium for bacterial growth)
05-20-88	"Quik-Trol"	N. L. Baroid	Organic polymer containing proprietary ingredient(s).	For solids free drilling fluid; and additive for mud and foam drilling fluid	Presence of proprietary ingredients (lack of information regarding)
06-29-90	"SC-200"	Water Well Chemicals Co.	Organic surfactant.	Aid for development and cleaning of wells.	Cannot determine if ingredients pose a hazard to drinking water, groundwater or aquifers.
05-20-88	"Shur-Gel"	N. L. Baroid	Sodium montmorillonite (sodium bentonite), sodium carbonate (soda ash); sodium carboxymethyl cellulose (polymer).	Drilling fluid conditioner for fluid loss control; material for drillhole abandonment.	Polymer could act as medium for bacterial growth; good substitutes available for use.
06-22-89	"Supermud (Dry)"	Polymer Drilling Systems	Anionic co-polymer emulsion (includes a polyacrylamide).	Solids free drilling fluid.	Presence of polyacrylamide.
06-22-89	"Supermud (Liquid)"	Polymer Drilling Systems	Anionic co-polymer emulsion (includes a polyacrylamide).	Solids free drilling fluid.	Presence of polyacrylamide.

WISCONSIN LIST OF APPROVED HIGH SOLIDS GROUTING MATERIALS AND
BENTONITE PRODUCTS MEETING NR 141 REQUIREMENTS FOR MONITORING WELLS (NR 141)

April 2, 1992

Approval Date	Product Name	Mfg. Distr.	Material(s)	Uses	Special Conditions
04-08-88	"Aquagel Gold Seal"	N. L. Baroid	Untreated 100% drilling mud sodium bentonite (powder)(200 mesh)	Drilling mud clay; clay slurry ingredient	None
12-12-88	"Benseal"	N. L. Baroid	100% coarsely-ground (8-mesh) sodium bentonite	Clay slurry ingredient; lost circulation material for rotary-mud drilling	None
05-22-89	"Custom Seal Granular"	American Colloid Co.	100% ground (40-50 mesh) sodium bentonite (granular)	Clay slurry ingredient & lost circulation material for rotary-mud drilling	None
06-25-90	"Econoplug"	Distributed by Economy Mud Products Co.	100% chipped sodium bentonite - slow hydrating chips (medium - 1/4"-3/8")	Well and borehole abandonment; and annular space seal material.	Per restrictions in s. NR 141.11(2)(a) and s. NR 141.26(2)(d)
06-28-90	"Econoplug Grout" (same as "Enviroplug Grout")	Distributed by Economy Mud Products Co.	High solids (30%) sodium Bentonite grout material with two proprietary ingredients @ <1% each (No polymers)	Bentonite (clay) grout	Mud weight of 9.9 lbs/gal. - check for settling
05-18-89	"Enviroplug"	Wyo-Ben, Inc.	100% chipped sodium bentonite, slow hydrating, chips (med-1/4-3/8")	Well and borehole abandonment; and annular space seal material.	Restrictions in s. NR 141.11(2)(a) and s. NR 141.26(2)(d)
06-26-90	"Enviroplug Grout"	Wyo-Ben, Inc.	High solids (30%) sodium bentonite grout material with two proprietary ingredients @ <1% each (No polymers)	Bentonite (clay) grout	Mud weight of 9.9 lbs/gal. - check for settling
06-29-90	"Enviroplug No. 8"	Wyo-Ben, Inc.	100% coarsely-ground (8 mesh) (granular) sodium bentonite	Clay slurry ingredient; lost circulation material.	None
09-18-91	"Enviroplug No. 16"	Wyo-Ben, Inc.	100% coarsely-ground (16 mesh) (granular) sodium bentonite	Clay slurry ingredient; bentonite grout ingredient; lost circulation material for rotary mud drilling	None

Approval Date	Product Name	Manufact.	Material(s)	Uses	Special Conditions
09-18-91	"Enviroplug No. 16"	Wyo-Ben, Inc.	100% coarsely-ground (16 mesh) (granular) sodium bentonite	Clay slurry ingredient; bentonite grout ingredient; lost circulation material.	None
01-02-89	"Holeplug"	N.L. Baroid	100% chipped sodium bentonite - slow hydrating chips (medium - 1/4"-3/8")	Well and borehole abandonment; and annular space seal material.	Per restrictions in s. NR 141.11(2)(a) and s. NR 141.26(2)(d)
05-31-91	"Natural Gel"	Wyo-Ben, Inc.	Untreated powdered (200 mesh) drilling mud bentonite	Drilling mud clay	None
09-18-91	"Natural Gel"	Wyo-Ben, Inc.	Powdered (200 mesh) western sodium bentonite (montmorillonite)	Drilling mud clay; clay slurry ingredient	None
05-31-91	The "Ohio Recipe" (This is not a specific manufactured product)	N/A	Untreated powdered (200 mesh) bentonite and pure untreated granular 8-20 mesh) bentonite	High solids Grout Mix Ratio: 30-50 lbs. untreated, powdered bentonite mixed w/100 gal H_2O through venturi mud mixer; at least 125 lbs granular bentonite added to slurry	Only first 50 lbs. granular bentonite can be mixed through Venturi-hopper mixed; the rest must be only stirred into slurry.
07-24-89	"PDS Granular"	Polymer Drilling System (PdsCo)	100% ground (8-20 mesh) granular sodium bentonite	Clay slurry ingredient & lost circulation material for rotary mud drilling	None
07-24-89	"PDS Granular"	Polymer Drillings Systems (PdsCo)	100% ground (8-20 mesh) granular sodium bentonite	Clay slurry ingredient & lost circulation material	None
07-23-89 05-26-89	"PdsCo Plug"	Polymer Drilling Systems (PdsCo)	100% chipped sodium bentonite - slow hydrating chips (medium - 1/4"-3/8")	Well and borehole abandonment; and annular space seal material.	Per restrictions in s. NR 141.11(2)(a) and s. NR 141.26(2)(d)
02-28-90	"Permaplug"	Distributed by Cathodic Engineering Equipment Co., Inc.	100% chipped sodium bentonite - slow hydrating chips (medium - 1/4"-3/8")	Well and borehole abandonment; and annular space seal material.	Per restrictions in s. NR 141.11(2)(a) and s. NR 141.26(2)(d)
03-04-91	"Pure Gold Chips"	American Colloid Co. (CETCO)	100% slow hydrating sodium bentonite chips (3/8")	Well and borehole abandonment; and annular space seal material.	Per restrictions in s. NR 141.11(2)(a) and s. NR 141.26(2)(d)

Approval Date	Product Name	Manufact.	Material(s)	Uses	Special Conditions
05-31-91 07-18-91	"Pure Gold Gel"	American Colloid Co.	Additive-free powdered drilling mud-type sodium bentonite (100%) (200 mesh) - (additive free)	Drilling mud, clay slurry and "Ohio Recipe" ingredient	None
07-16-91	"Pure Gold Grout"	American Colloid Co. (CETCO)	Western sodium bentonite and proprietary mixture of sulfate	High solids Bentonite grout	None
05-30-89	"Tower Plug"	Black Hills Bentonite Co.	100% chipped bentonite - slow hydrating chips (3/8" chips)	Well and borehole abandonment; and annular space seal material	per restrictions in s. NR 141.11(2)(a) and s. NR 141.11(2)(d)
05-17-89	"Volclay Chips"	American Colloid Co. (CETCO)	100% chipped sodium bentonite - slow hydrating chips (medium - 1/4"-3/8")	Well and borehole abandonment; and annular space seal material.	Per restrictions in s. NR 141.11(2)(a) and s. NR 141.26(2)(d)
05-19-89	"Volclay Crumbles"	American Colloid Co. (CETCO)	100% ground (8-20 mesh) granular sodium bentonite	Clay slurry ingredient & lost circulation material.	None
05-19-89	"Volclay Crumbles"	American Colloid Co.	100% ground (8-20 mesh) granular sodium bentonite	Clay slurry ingredient & lost circulation material for rotary mud drilling	None
06-25-87	"Volclay Grout" (Bentonite Grout)	American Colloid Co.	Low yield bentonite (std. grade southern calcium bentonite) & magnesium oxide (clay initiator)	High solids bentonite grout	Must be mixed according to instructions with product.
03-04-91	"Volplug Chips"	American Colloid Co. (CETCO)	100% slow hydrating sodium bentonite chips (3/8")	Well and borehole abandonment; and annular space seal material.	Per restrictions in s. NR 141.11(2)(a) and s. NR 141.26(2)(d)

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES
Carroll D. Besadny, Secretary
Box 7921
Madison, Wisconsin 53707
TELEFAX NO. 608-267-3579
TDD NO. 608-267-6897

June 30, 1991 FILE REF: 3230

TO: Monitoring Well Drillers and
Groundwater Consultants

Dear Madams and Messrs.:

Enclosed is a copy of the newly revised Chapter NR 141, Wis. Adm. Code, the Groundwater Monitoring Well Requirements code. The revision to the Groundwater Monitoring Well Requirements code will go into effect on July 1, 1991. A copy of the revised Soil Boring Log form (4400-122) is also enclosed.

Revisions to both NR 141 and the Soil Boring Log form were made possible with the help of the NR 141 Ad Hoc Advisory Committee. The committee consisted of members of organizations appointed by and representing the regulated community. Since January of 1990, the Ad Hoc Committee has met monthly. These meetings were to ensure that the regulated community's ideas and insights could be incorporated into the revision.

Chapter NR 141 applies to all persons installing and abandoning groundwater monitoring wells and boreholes for purposes regulated by the Department under ch. 144, 147 or 160, Stats., or in permits, plan approvals, licenses or orders issued under those chapters. In addition, it applies to all persons installing groundwater monitoring wells and boreholes in fulfillment of terms of a contract with the Department. All groundwater monitoring wells and boreholes installed for purposes regulated by the Department under ch. NR 141 shall be abandoned according to s. NR 141.25. All other wells and boreholes shall be abandoned according to the provisions of ch. NR 112.

The five primary improvements to the code are: 1) the incorporation of aquifer test and recovery wells; 2) allowing the use of bentonite chips (to be used wherever bentonite pellets could be used); 3) specifications for flush mounted protective cover pipes; 4) allowing approved high solids grout for annular space seal (list enclosed); and 5) changes regarding the construction of monitoring wells in areas of shallow water table. Other areas which were changed within the code are the increase of the filter pack seal from 2 to 5 feet; the simplification of the use of collapsed formation as a filter pack; alteration of the shape of the ground surface seal to inhibit frost heave; and the reduction from 4 feet to 30 inches that a monitoring well casing, of known construction, may be cut off when abandoning a well beneath the land surface.

The Soil Boring Log Form was revised by soliciting input from over 100 drillers and groundwater consultants. The comments received were incorporated into the revision. From the comments, surprisingly few changes were needed to the original form. Use of this form is required by s. NR 141.23(3), Wis. Adm. Code. This revised form is the only acceptable format

in which the Department will accept borehole information. The monitoring well construction, development and abandonment forms required by NR 141 have not been changed.

During the course of the revision of ch. NR 141, the high degree of cooperation extended by the regulated community has been greatly appreciated. I hope that you can continue to contribute to this effort by taking the time to help identify further enhancements to NR 141. If you have questions regarding the revision please contact me at (608) 266-2104.

Sincerely,

Michael Lemcke, Hydrogeologist
Bureau of Water Resources Management

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WISCONSIN LIST OF APPROVED HIGH SOLIDS GROUTING MATERIALS
FOR MONITORING WELLS (NR 141)

July 1, 1991

Approval Date	Product Name	Manufact.	Material(s)	Uses	Special Conditions
06-28-90	"Econoplug Grout" (same as "Enviroplug Grout")	Distributed by Economy Mud Products Co. & Mfg'd by Wyo-Ben, Inc.	High solids (30%) sodium Bentonite grout material with two proprietary ingredients @ <1% each (No polymers)	Bentonite (clay) grout	Mud weight of 9.9 lbs/gal. - check for settling
06-26-90	"Enviroplug Grout"	Wyo-Ben, Inc.	High solids (30%) sodium bentonite grout material with two priprietary ingredients @ <1% each (No polymers)	Bentonite (clay) grout	Mud weight of 9.9 lbs/gal. - check for settling
05-31-91	The "Ohio Recipe" (This is not a specific manufactured product)	N/A	Untreated powdered (200 mesh) bentonite and pure untreated granular 8-20 mesh) bentonite	High solids Grout Mix Ratio: 30-50 lbs. untreated, powdered bentonite mixed w/100 gal H_2O through venturi mud mixer; at least 125 lbs granular bentonite added to slurry	Only first 50 lbs. granular bentonite can be mixed through Venturi-hopper mixed; the rest must be only stirred into slurry.
06-25-87	"Volclay Grout" (Bentonite Grout)	American Colloid Co.	Low yield bentonite (std. grade southern calcium bentonite) & magnesium oxide (clay initiator)	High solids bentonite grout	Must be mixed according to instructions with product.

WISCONSIN LIST OF BENTONITE PRODUCTS
WHICH MEET NR 141 SPECIFICATIONS

July 1, 1991

Approval Date	Product Name	Manufact.	Material(s)	Uses	Special Conditions
04-08-88	"Aquagel Gold Seal"	N. L. Baroid	Untreated 100% drilling mud sodium bentonite (powder)(200 mesh)	Drilling mud clay; clay slurry ingredient	None
12-12-88	"Benseal"	N. L. Baroid	100% coarsely-ground (8-mesh) sodium bentonite	Clay slurry ingredient; lost circulation material for rotary-mud drilling	None
05-22-89	"Custom Seal Granular"	American Colloid Co.	100% ground (40-50 mesh) sodium bentonite (granular)	Clay slurry ingredient & lost circulation material for rotary-mud drilling	None
05-31-91	"Natural Gel"	Wyo-Ben, Inc.	Untreated powdered (200 mesh) drilling mud bentonite	Drilling mud clay	None
07-24-89	"PDS Granular"	Polymer Drilling System (PdsCo)	100% ground (8-20 mesh) granular sodium bentonite	Clay slurry ingredient & lost circulation material for rotary mud drilling	None
05-31-91	"Pure Gold Gel"	American Colloid Co.	Additive-free powdered drilling mud-type sodium bentonite (100%) (200 mesh)	Drilling mud, clay slurry and "Ohio Recipe" ingredient	None
05-19-89	"Volclay Crumbles"	American Colloid Co.	100% ground (8-20 mesh) granular sodium bentonite	Clay slurry ingredient & lost circulation material for rotary mud drilling	None

State of Wisconsin
Department of Natural Resources

Route To:
☐ Solid Waste ☐ Haz. Waste
☐ Emergency Response ☐ Underground Tanks
☐ Wastewater ☐ Water Resources
☐ Superfund ☐ Other _____

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 5-92

Page _____ of _____

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
	_ _ _ _ _ _ _	

Boring Drilled By (Firm name and name of crew chief)	Date Drilling Started	Date Drilling Completed	Drilling Method
	M M / D D / Y Y	M M / D D / Y Y	

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

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 (If applicable)
_____ Feet ☐ N ☐ S _____ Feet ☐ E ☐ W

County	DNR County Code	Civil Town/City/ or Village
	_ _	

Sample										Soil Properties					
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments

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

Signature	Firm

This form is authorized by Chapters 144.147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than $10 nor more than $5,000 for each violation. Fined not less than $10 or more than $100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	

State of Wisconsin
Department of Natural Resources

Instructions
Soil Boring Log Information Forms
Form 4400-122, Form 4400-122A
(Rev. 5/92)

General Instructions
Fill out a Soil Boring Log Information form for every boring drilled. Be sure to indicate the page number and boring number in the blanks at the top of each page. All applicable portions of the Soil Boring Log Information Form must be properly completed. The form must be signed. Form 4400-122A must only be used as an attachment to form 4400-122.

Routing
Return this form to the project manager or plan reviewer for the Department program that required the boring. If the project manager/plan reviewer is in a District Office, send the original to the District Office and a copy to the Central Office in Madison. If the project manager/plan reviewer is in the Central Office, send the original form there and a copy to the District Office. If your project does not have a project manager or plan reviewer or you do not know who it is, send the form to the appropriate program in the Central Office.

Check the appropriate box at the top of the form to assure proper routing once the form reaches the Department.

General Boring Information
Facility/Project Name: The name of the landfill, lagoon, surface impoundment, spill or project.

License/Permit/Monitoring Number: The number assigned by the Department. If unknown, leave blank.

Boring Number: The site boring number or name (ie. B-1).

Boring Drilled By: The name of the drilling firm and the name of the drilling crew chief.

Date Drilling Started: The date the boring was started.

Date Drilling Completed: The date the boring was completed.

Drilling Method: The drilling method(s) used (ie. hollow stem auger).

DNR Facility Well Number: Leave blank. The Department will assign this number if needed.

Wisconsin Unique Well Number: Leave blank. The Department will assign this number if needed.

Common Well Name: The site well name if a well was constructed in the boring (ie. MW-1).

Final Static Water Level: The static water level in the borehole in tenths of feet above mean sea level prior to abandonment or well construction.

Surface Elevation: The surface elevation of the ground surface at the borehole in tenths of feet above mean sea level referenced to the closest USGS benchmark.

Borehole Diameter: The diameter of the borehole in tenths of inches.

Boring Location: The location of the boring in State Plane Coordinates or latitude and longitude in degrees, minutes, and seconds. If State Plane Coordinates are used circle the appropriate letter for north, central, or south. Also indicate the quarter-quarter section, township, and range if known.

Local Grid Location: The location of the boring on the local site grid if applicable.

County: The county in which the boring is located.

DNR County Code: The two-digit Department county code. (The code is based alphabetically with Adams County 01 and Wood County 72)

Civil Town/City/or Village: The municipality in which the boring is located.

Boring Log

Sample Number: The number used to identify the sample. Indicate the type of sampling apparatus used (ie. split spoon, Shelby tube). Note the diameter of the sampler in the Comments column.

Sample Length Attempted and Recovered: The length of sample attempted and the length of sample recovered reported in inches.

Blow Counts: The number of blow counts per specified length.

Depth: Indicate the depth of sample collection or any change in the soil or rock type encountered.

Soil/Rock Description and Geologic Origin: List visual characteristics of soil/rock noted during boring along with any pertinent descriptive remarks. Each major soil unit and bedrock formation shall be described using both subsurface investigations and regional information. Indicate likely geologic origin and Munsell color of the material.

USCS: Indicate the Unified Soil Classification System classification of any unconsolidated units encountered during boring.

Graphic Log: Graphically illustrate soil/rock types encountered through the depth of boring and provide a key for the symbols used. Indicate the final depth of the boring on the log, referenced to the USGS datum.

Well Diagram: Graphically show the well casing, well screen length(s), and the location of the top of the filter pack(s) if the boring is converted into a well.

PID/FID: Measurements performed on samples using a Photo-Ionization Detector or a Flame Ionization Detector. Indicate in the comments column the type of detector and the method used.

Soil Properties:

Compressive Strength - Standard measurements in tons/ft^2. Indicate in the comments column the type of test used.

Moisture Content - Laboratory measurements of percent moisture content.

Liquid Limit - Measurement in percent.

Plasticity Index - Measurement in percent.

P 200 - Measurement of percentage of soils smaller than the #200 sieve.

RQD/Comments: Where boring penetrates bedrock, indicate the Rock Quality Designation of the sample. Otherwise, place all comments or remarks in this column and the adjacent margin.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT

Form 4400-122A 7-91

Boring Number _____ Use only as an attachment to Form 4400-122. Page ____ of ____

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number	Length Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	

Sample		Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number	Length Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	

State of Wisconsin
Department of Natural Resources

WELL/DRILLHOLE/BOREHOLE ABANDONMENT

Form 3300-5B Rev. 12-9

All abandonment work shall be performed in accordance with the provisions of Chapters NR 111, NR 112 or NR 141, Wis. Admin. Code, whichever is applicable. Also, see instructions on back.

(1) GENERAL INFORMATION

Well/Drillhole/Borehole Location | County

___ 1/4 of ___ 1/4 of Sec. ____ ; T. ____ N; R. ____ ☐ E ☐ W

(If applicable)

_____ Gov't Lot _____ Grid Number

Grid Location

_____ ft. ☐ N. ☐ S., _____ ft. ☐ E. ☐ W.

Civil Town Name

Street Address of Well

City, Village

(2) FACILITY NAME

Original Well Owner (If Known)

Present Well Owner

Street or Route

City, State, Zip Code

Facility Well No. and/or Name (If Applicable) | WI Unique Well No. _ _ _ _ _ _

Reason For Abandonment

Date of Abandonment

WELL/DRILLHOLE/BOREHOLE INFORMATION

(3) Original Well/Drillhole/Borehole Construction Completed On

(Date) _____

☐ Monitoring Well
☐ Water Well
☐ Drillhole
☐ Borehole

Construction Report Available? ☐ Yes ☐ No

Construction Type:
☐ Drilled ☐ Driven (Sandpoint) ☐ Dug
☐ Other (Specify) _____

Formation Type:
☐ Unconsolidated Formation ☐ Bedrock

Total Well Depth (ft.) _____ Casing Diameter (ins.) _____
(From groundsurface)

Casing Depth (ft.) _____

Was Well Annular Space Grouted? ☐ Yes ☐ No ☐ Unknown
If Yes, To What Depth? _____ Feet

(4) Depth to Water (Feet) _____

Pump & Piping Removed?	☐ Yes	☐ No	☐ Not Applicable
Liner(s) Removed?	☐ Yes	☐ No	☐ Not Applicable
Screen Removed?	☐ Yes	☐ No	☐ Not Applicable
Casing Left in Place?	☐ Yes	☐ No	

If No, Explain _____

Was Casing Cut Off Below Surface?	☐ Yes	☐ No
Did Sealing Material Rise to Surface?	☐ Yes	☐ No
Did Material Settle After 24 Hours?	☐ Yes	☐ No
If Yes, Was Hole Retopped?	☐ Yes	☐ No

(5) Required Method of Placing Sealing Material
☐ Conductor Pipe-Gravity ☐ Conductor Pipe-Pumped
☐ Dump Bailer ☐ Other (Explain)

(6) Sealing Materials
☐ Neat Cement Grout
☐ Sand-Cement (Concrete) Grout
☐ Concrete
☐ Clay-Sand Slurry
☐ Bentonite-Sand Slurry
☐ Chipped Bentonite

For monitoring wells and monitoring well boreholes only
☐ Bentonite Pellets
☐ Granular Bentonite
☐ Bentonite - Cement Grout

(7) Sealing Material Used	From (Ft.)	To (Ft.)	No. Yards, Sacks Sealant or Volume (Circle One)	Mix Ratio or Mud Weight
	Surface			

(8) Comments: _____

(9) Name of Person or Firm Doing Sealing Work

Signature of Person Doing Work | Date Signed

Street or Route | Telephone Number ( )

City, State, Zip Code

(10) FOR DNR OR COUNTY USE ONLY

Date Received/Inspected	District/County
Reviewer/Inspector	☐ Complying Work ☐ Noncomplying Work
Follow-up Necessary	

REASONS FOR WELL/DRILLHOLE/BOREHOLE ABANDONMENT

Wis. Adm. Code (NR 111, NR 112, & NR 141) requires well owners to permanently abandon unused wells/drillholes/boreholes on their property. The reasons for this requirement are:

- To prevent contamination from entering the well/drillhole/borehole at the surface or through corroded well casings and moving downward to an aquifer used by other wells, and
- To prevent vertical movement of water between different geologic formations of differing water quality.

Most licensed well drillers and pump installers have the equipment, knowledge and experience needed to permanently abandon wells/drillholes/boreholes. We recommend that these licensed contractors be hired to do this work.

PROCEDURE

1. Remove any pump, pump piping, debris or other obstacles that could interfere with the sealing operation. In most situations the well casing should be left in place. When the casing is removed it should be pulled during the abandonment process so the drillhole does not collapse.
2. The sealing material must be placed with a conductor (tremie) pipe either by pumping or by gravity, (except when approved chipped bentonite is used according to department instructions).
3. The bottom end of the conductor pipe must initially reach the bottom of the well and must be kept submerged in the sealing material as it is placed.
4. Unconsolidated formation wells should be sealed with the materials listed in item (6) on the form. When clay or sodium benonite slurry is used to fill wells, the top 20 feet must be sealed with neat cement grout, concrete grout, concrete, or bentonite chips. Bedrock formation wells should be filled with neat cement grout, concrete grout or concrete. Monitoring wells must be filled with the materials specified by NR 141, Wis. Adm. Code.
5. Fill the entire well column from the bottom to the top with the required sealing material.
6. Any standing water in the hole will be forced out by the concrete or cement grout (it is more dense) resulting in an entire column of cement to seal the well. The sealing material must flow at the surface with the same consistency as it is being pumped in.
7. The casing may be cut off several feet below the ground surface.
8. To abandon flowing wells, the flow must be stopped or greatly reduced. This can be accomplished by extending the well casing to an elevation higher than the artesian head, or inserting a seal or packer in the casing. Once the flow has been stopped or reduced, the well can be abandoned the same as other wells.
9. For a municipal well, information regarding drillhole diameter and depths and geologic formations should be submitted on a separate sheet.
10. For use of alternative methods and materials, especially for deep, multi-formation wells contact DNR.

TEMPORARY ABANDONMENT

- A well may be temporarily abandoned if it is planned to place the well back in service within a time specified by administrative rule.
- Temporary abandonment is accomplished by threading or welding a watertight cover to the casing or by filling the well with a clean clay slurry and then placing a cover over the well.
- If the well is not placed back into service, it should be permanently abandoned unless a written extension is granted by DNR.

REPORT TO DNR

The Well/Drillhole/Borehole Abandonment Form 3300-5B, on the front, must be completed by the owner (or agent) and submitted to the appropriate DNR district office or delegated county office within 30 days.

This form is authorized by chapters 144, 147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than $10.00 nor more than $5,000.00 for each violation. Fined not less than $10.00 or more than $100.00 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss. 144.99 and 162.06, Wis. Stats.

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTI
Form 4400-113A Rev. 4

Facility/Project Name	Local Grid Location of Well _____ ft. ☐ N. ☐ S. _____ ft. ☐ E. ☐ W.	Well Name
Facility License, Permit or Monitoring Number _ _ _ _ _ _ _	Grid Origin Location Lat. _ _ _ _ _ _ Long. _ _ _ _ _ _ or	Wis. Unique Well Number DNR Well Num _ _ _ _ _ _ _ _ _ _
Type of Well Water Table Observation Well ☐ 11 Piezometer ☐ 12	St. Plane _____ ft. N, _____ ft. E.	Date Well Installed _ _ / _ _ / _ _ m m d d y y
Distance Well Is From Waste/Source Boundary ft.	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)
Is Well A Point of Enforcement Std. Application? ☐ Yes ☐ No	Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	

A. Protective pipe, top elevation _ _ _ _ . _ _ ft. MSL

B. Well casing, top elevation _ _ _ _ . _ _ ft. MSL

C. Land surface elevation _ _ _ _ . _ ft. MSL

D. Surface seal, bottom _ _ _ _ . _ ft. MSL or _ _ _ . _ ft.

12. USCS 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 _ _ _ . _ ft.

F. Fine sand, top _ _ _ _ . _ ft. MSL or _ _ _ . _ ft.

G. Filter pack, top _ _ _ _ . _ ft. MSL or _ _ _ . _ ft.

H. Screen joint, top _ _ _ _ . _ ft. MSL or _ _ _ . _ ft.

I. Well bottom _ _ _ _ . _ ft. MSL or _ _ _ . _ ft.

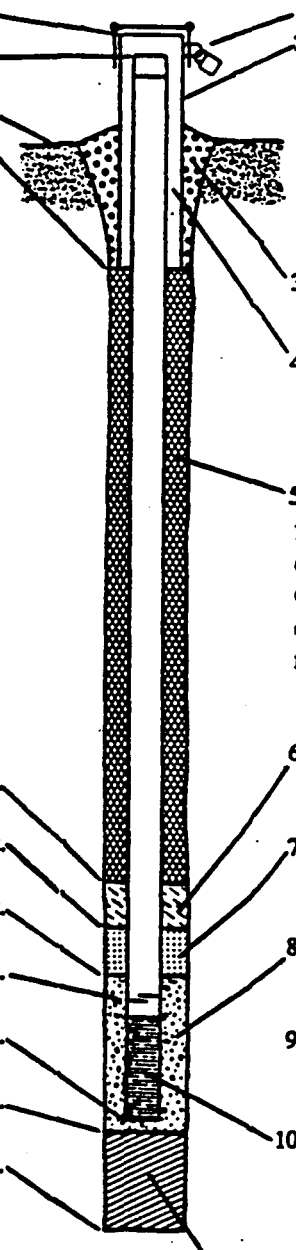
J. Filter pack, bottom _ _ _ _ . _ ft. MSL or _ _ _ . _ ft.

K. Borehole, bottom _ _ _ _ . _ ft. MSL or _ _ _ . _ ft.

L. Borehole, diameter _ _ . _ in.

M. O.D. well casing _ _ . _ _ in.

N. I.D. well casing _ _ . _ _ in.



1. Cap and lock? ☐ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: _ _ . _ in.
b. Length: _ _ . _ 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
Annular space seal ☐
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 & mesh size
a. _____
b. Volume added _____ ft^3

8. Filter pack material: Manufacturer, product name and mesh size
a. _____
b. Volume added _____ ft^3

9. Well casing: Flush threaded PVC schedule 40 ☐ 23
Flush threaded PVC schedule 80 ☐ 24
_____ Other ☐

10. Screen material: _____
a. Screen type: Factory cut ☐ 11
Continuous slot ☐ 01
_____ Other ☐
b. Manufacturer _____
c. Slot size: 0. _ _ _ in.
d. Slotted length: _ _ . _ 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 | Firm

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch.144, Wis Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than $10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 4-90

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well Number
_ _ _ _ _ _ _	_ _	_ _ _ _ _ _ _	_ _ _

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 _ _ _ _ _ min.

4. Depth of well (from top of well casisng) _ _ _ . _ ft.

5. Inside diameter of well _ _ . _ _ in.

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

7. Volume of water removed from well _ _ _ . _ 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. _ _ _ . _ _ ft.	_ _ _ . _ _ ft.
Date	b. _ _ / _ _ / _ _ (m m d d y y)	_ _ / _ _ / _ _ (m m d d y y)
Time	c. _ _ : _ _ ☐ a.m. ☐ p.m.	_ _ : _ _ ☐ a.m. ☐ p.m.
12. Sediment in well bottom	_ _ . _ inches	_ _ . _ inches
13. Water clarity	Clear ☐ 10 Turbid ☐ 15 (Describe)	Clear ☐ 20 Turbid ☐ 25 (Describe)
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. Additional comments on development:

Well developed by: Person's Name and Firm

Name: _____

Firm: _____

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

Signature: _____

Print Initials: _ _ _

Firm: _____

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

INSTRUCTIONS

Wisconsin Department of Natural Resources

Monitoring Well Construction Form 4400-113A
Monitoring Well Development Form 4400-113B
4/30/90

General instructions: Fill out both a monitoring well construction form (4400-113A) and a monitoring well development form (4400-113B) for each well installed. Fill in the blanks and boxes by hand. (They're hard to type.) Sign each form. Please note that this form is subject to change, especially after the NR 141 Ad Hoc Advisory Committee makes recommended changes to NR 141 in early 1991.

Routing: Return this form to the project manager or plan reviewer for the DNR program that required the well installation. If the project manager/plan reviewer is in the District Office, send the original form to the District Office and a copy to the Central Office in Madison. If the project manager/plan reviewer is in the Central Office, send the original form there and a copy to the District Office. If your project does not have a project manager or plan reviewer or you don't know who it is, send the form to the appropriate Central Office. The addresses of the DNR offices are provided on the attached map.

Check the appropriate box at the top of the form to assure proper routing once the form reaches DNR. If the well was installed as part of a Superfund investigation, check the box labeled "Env. Response and Repair".

Time-saving tip: When filling out many forms at once, you can save time by using a photocopier. Fill out one form (the "original") with any information that is the same for all wells, such as facility name, section location, grid origin location, drilling method and well casing type. Photocopy both sides of the "original", making as many copies as there are wells. On the separate copies, fill in the details that are unique for each well.

MONITORING WELL CONSTRUCTION FORM 4400-113A

Top Left

Facility/Project Name: Fill in name of landfill, seepage lagoon, surface impoundment, spill or project.

Facility License, Permit, or Monitoring Number: Fill in number assigned to facility by the Department. If unknown, leave blank.

Type of Well: Check whether the well is a water table observation well or a piezometer. The screen of a water table observation well intercepts the water table while the screen of a piezometer is sealed below the water table.

Distance Well Is From Waste/Source Boundary: Enter distance in feet from the monitoring well to the edge of the facility itself, e.g., from the edge of a wastewater lagoon or the approved waste fill boundary for a landfill. For a contaminant source which is not a facility, e.g., a spill, enter the distance the well is from the contaminant source.

Is Well a Point of Enforcement Standards Application?: Check box. A monitoring well is a point of enforcement standard application if it is beyond the Design Management Zone or the property boundary at a facility or if it is a water supply well. For spills, every point at which groundwater is monitored is a point of enforcement standards application. (For more information, see s. NR 140.22, Wis. Adm. Code.)

Top Center

Local Grid Location of Well: List to the nearest foot. Locate each well according to a local grid using whole numbers (no +'s) such as 624 ft. N and 278 ft. E of a local grid origin. Do NOT locate each well according to state plane coordinates or latitude and longitude.

Grid Origin Location: Locate the grid origin close to the waste or source of contamination. Indicate the location of the local grid origin (but not each well) according to latitude and longitude or state plane coordinates. An acceptable way to provide this information without actually surveying in the point is to locate the grid origin on a USGS 7½ minute quadrangle map. Then interpolate between 2½ minute tick marks to provide the location in latitude and longitude.

Section Location of Waste/Source: Quarter quarter section, township and range.

Location of Well Relative to Facility/Waste Source: Check the box which describes the location of the well relative to the facility and groundwater flow directions. If groundwater flow directions are unknown, check "not known."

Top Right

Well Name: Fill in common name, such as B-11, OW-13A, or MW-5R. (Use the suffix "R" for a replacement well.)

Wis. Unique Well Number and DNR Well Number: DNR will assign these numbers.

Date Well Installed: Month/Day/Year.

Well Installed By: Fill in name and firm of the person who supervised the drilling. The person must be a hydrogeologist, a drilling crew chief or experienced engineering technician.

Bottom Left

Numerical specifications: Fill in data for letters A through N which refer to design elements on the figure on the form. Letters A and B must be reported as elevations in feet above mean sea level (MSL), surveyed to the nearest 0.01 foot. Letters C through K may be either elevation above MSL or depth below land surface, accurate to the nearest 0.1 foot.

A. **Protective pipe, top elevation.** With cap off.
B. **Well casing, top elevation.** With cap off.
C. **Land surface elevation.**
D. **Surface seal, bottom.**
E. **Bentonite seal, top.** (See NR 141 to determine if this seal is required)
F. **Fine sand, top.** Cross out if not installed.
G. **Filter pack, top.**
H. **Screen joint, top.** (Top of the entire screen section, NOT the top slot)
I. **Well bottom.**
J. **Filter pack, bottom.**
K. **Borehole, bottom.**
L. **Borehole, diameter:** Diameter to nearest 0.1 inch.
M. **O.D. well casing:** Outside diameter to nearest 0.01 inch.
N. **I.D. well casing:** Inside diameter to nearest 0.01 inch.

Bottom Left Insert (Box)

12. **USCS classification of soil near screen:** Check boxes for all soil types (or bedrock) found at the depths spanned by the well screen, using the Unified Soil Classification System symbols. Refer to the native soil near the screen, not to the filter pack material.

13. **Sieve analysis attached?:** Check box. The sieve analysis for soil near the screen is required for all wells.

14. **Drilling method used:** Choose from among the choices on the form or check "Other" and write in one of the choices below:

Reverse rotary	Solid stem auger
Cable tool	Driven point
Jetted point	Casing hammer
Wash boring	

15. **Drilling fluid used:** Check appropriate box.

16. **Drilling additives used:** Check box. If yes, describe.

17. **Source of water:** Cite source(s) of any water used to drill the well OR to hydrate dry bentonite OR to mix annular space sealant. Cite exact source so that a sample of the water can be obtained later, if necessary. If the well is at a solid waste facility, attach an analysis of the water according to NR 508.11(3), Wis. Adm. Code.

Bottom Right

1. **Cap and lock:** Check box.

2. **Protective pipe:** Provide the information below.

   a. **Inside diameter:** Give to nearest 0.01 inch.
   b. **Length:** Give to nearest 0.1 foot.

c. **Material:** Check box. If not steel, describe.
d. **Additional protection?:** Check and describe.

3. **Surface seal:** The material used to prevent surface water from entering the borehole. If none, write "none."

4. **Material between well casing and protective pipe:** Check box. If "other", describe.

5. **Annular space seal:** Check boxes for both materials used and how installed, and fill in volume used.

Material: If dry bentonite, list source of water in blank 17. For wells near a solid waste site, attach an analysis of water (see s. NR 508.11(3), Wis. Adm. Code.) For other choices, fill in pounds per gallon mud weight or percent bentonite as appropriate. If other, describe, such as "collapsed formation" or "neat cement."

e. **Volume:** Fill in volume used in cubic feet.

f. **How installed:** Check how the annular space seal was installed. If dropped from the land surface, check "gravity."

6. **Bentonite seal:** If bentonite pellets were used, also check the pellet diameter. If material installed was the same as the annular space seal, or if no filter pack seal was installed, write "none."

7. **Fine sand material:** Fine sand is used when there is cement in the annular space seal. Indicate manufacturer, product name, mesh size and volume added.

8. **Filter pack material:** General description of filter pack material, e.g., "430 grit sand," and name of filter pack manufacturer, product name or number, and volume added. Attach grain size analysis of filter pack and state quantity used.

9. **Well casing:** Check PVC type or describe "other." Examples of "other" include stainless steel, steel, and TeflonR.

10. **Screen material:** If same as well casing, write "same."

a. **Screen type:** Check box. If other, describe the design.
b. **Manufacturer:** List name of manufacturer.
c. **Slot size:** Give width of slot in thousandths of an inch.
d. **Slotted length:** Give distance from top slot to bottom slot to nearest 0.1 foot.

11. **Backfill material:** Check "none" or describe any backfill installed below the filter pack.

Far bottom

"I hereby certify that the information on this form is true and correct to the best of my knowledge.": Sign the form and indicate name of firm.

MONITORING WELL DEVELOPMENT FORM 4400-113B

Top Two Lines

Facility/Project Name: Fill in the name of landfill, seepage lagoon, surface impoundment, spill or project.

Facility License Permit, or Monitoring Number: Enter number assigned to facility by the DNR. If unknown, leave blank.

County Name: Fill in the name of the county in which the well is installed.

County Code: Fill in the two digit county code number (See the back of the attached map of DNR District Offices for a list of county codes.)

Well Name: Fill in common name, such as P-11, OW-13A, or MW-5R. Use the suffix "R" for a replacement well.

Wis. Unique Well Number and DNR Well Number: DNR will assign these numbers.

Left Column

1. **Can this well be purged dry?** Check whether well can or cannot be purged dry (all water removed).

2. **Well development method:** Check appropriate box. If "other," describe.

3. **Time spent developing well:** In minutes.

4. **Depth of well:** In tenths of feet, from top of well casing.

5. **Inside diameter of well:** In hundredths of inches.

6. **Volume of water in filter pack and well casing:** In tenths of gallons.

7. **Volume of water removed from well:** In tenths of gallons.

8. **Volume of water added, if any:** In tenths of gallons.

9. **Source of water added:** Cite exact source so that a sample of the water can be obtained later, if necessary.

10. **Analysis performed on water added?** If well is near a solid waste facility, attach analysis of water according to s. NR 508.11(3), Wis. Adm. Code.

Right Column

11. **Depth to water:**

    a. Enter distance from top of well casing to top of water in well, in hundredths of a foot, both before and after development.

    b. Date: Enter month/day/year development began and ended.

    c. Time: Enter according to a twelve hour clock the time development began and ended.

12. **Sediment in well bottom:** Compute to tenths of inches, both before and after development.

13. **Water clarity:** Check box and describe.

14. **Total suspended solids:** As determined by a certified or registered analytical laboratory. Required only for wells near solid waste facilities and when drilling fluids were used.

15. **COD:** Chemical oxygen demand, as determined by a certified or registered analytical laboratory. Required only for wells near solid waste facilities and when drilling fluids were used.

Bottom Section

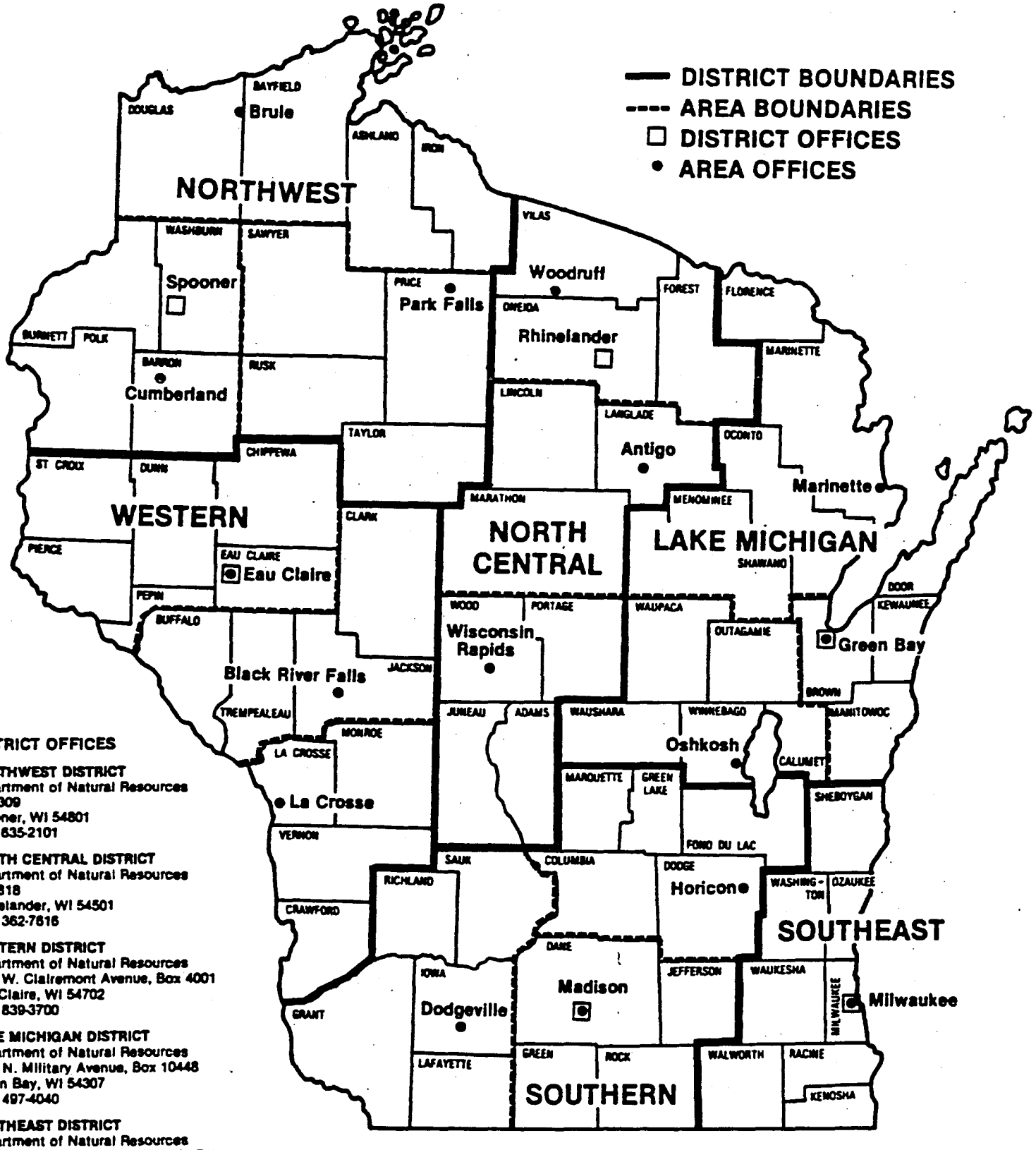
16. **Additional comments on development:** Describe any of the above in more detail or add information such as the relative recovery rates of wells or the amount of drilling fluid lost to the formation and the amount of water removed to account for lost drilling fluid. For example, if 150 gallons of drilling water were lost, you should remove the volume of water in the filter pack and well casing plus 150 gallons as part of development.

Well developed by: Enter name and firm of the person who supervised the development. This person must be a hydrogeologist, the drilling crew chief or an experienced engineering technician.

I hereby certify that the information on the form is true and correct to the best of my knowledge. Signature, and initials of person filling out the form and name of firm for which the person works.

BBG:dmc
v:\perm\sw9welco.jpc
04/26/90

DNR FIELD DISTRICTS AND AREAS



DISTRICT OFFICES

NORTHWEST DISTRICT
Department of Natural Resources
Box 309
Spooner, WI 54801
(715) 635-2101

NORTH CENTRAL DISTRICT
Department of Natural Resources
Box 818
Rhinelander, WI 54501
(715) 362-7616

WESTERN DISTRICT
Department of Natural Resources
1300 W. Clairemont Avenue, Box 4001
Eau Claire, WI 54702
(715) 839-3700

LAKE MICHIGAN DISTRICT
Department of Natural Resources
1125 N. Military Avenue, Box 10448
Green Bay, WI 54307
(414) 497-4040

SOUTHEAST DISTRICT
Department of Natural Resources
2300 N. Dr. Martin Luther King, Jr. Drive
Box 12436
Milwaukee, WI 53212
(414) 562-9500

SOUTHERN DISTRICT
Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711
(608) 275-3266

Central Office, DNR
P.O. Box 7921
Madison, WI 53703

Rev. 5-88

County Codes

01 ADAMS
02 ASHLAND
03 BARRON
04 BAYFIELD
05 BROWN

06 BUFFALO
07 BURNETT
08 CALUMET
09 CHIPPEWA
10 CLARK

11 COLUMBIA
12 CRAWFORD
13 DANE
14 DODGE
15 DOOR

16 DOUGLAS
17 DUNN
18 EAU CLAIRE
19 FLORENCE
20 FOND DU LAC

21 FOREST
22 GRANT
23 GREEN
24 GREEN LAKE
25 IOWA

26 IRON
27 JACKSON
28 JEFFERSON
29 JUNEAU
30 KENOSHA

31 KEWAUNEE
32 LA CROSSE
33 LAFAYETTE
34 LANGLADE
35 LINCOLN

36 MANITOWOC
37 MARATHON
38 MARINETTE
39 MARQUETTE
40 MENOMONEE

41 MILWAUKEE
42 MONROE
43 OCONTO
44 ONEIDA
45 OUTAGAMIE

46 OZAUKEE
47 PEPIN
48 PIERCE
49 POLK
50 PORTAGE

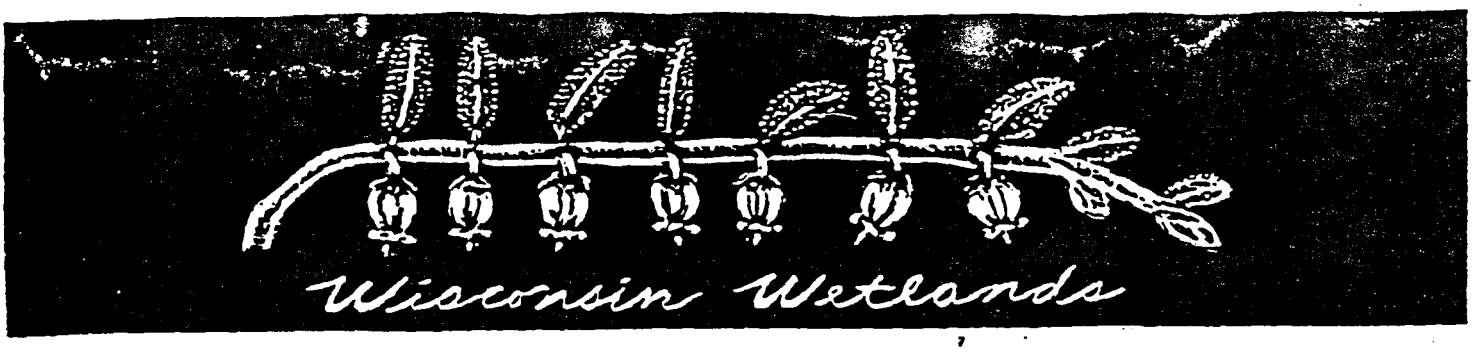
51 PRICE
52 RACINE
53 RICHLAND
54 ROCK
55 RUSK

56 ST. CROIX
57 SAUK
58 SAWYER
59 SHAWANO
60 SHEBOYGAN

61 TAYLOR
62 TREMPEALEAU
63 VERNON
64 VILAS
65 WALWORTH

66 WASHBURN
67 WASHINGTON
68 WAUKESHA
69 WAUPACA
70 WAUSHARA

71 WINNEBAGO
72 WOOD



WATER QUALITY STANDARDS FOR WETLANDS

A Guide to NR 103

September 1992

Wisconsin Department of Natural Resources
Bureau of Water Regulation and Zoning
P.O. Box 7921
Madison, Wisconsin 53707

Funded in part by the United States Environmental Protection Agency

over Illustrations by Amy Nast ©1991

WISCONSIN
DEPT. OF NATURAL RESOURCES
Carroll D. Besadny
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INTRODUCTION

Background

Chapter NR 103 of the Wisconsin Administrative Code became effective on August 1, 1991, establishing water quality standards for wetlands. In accordance with s. 144.025 (2)(b), Wis. Stats and s. NR 103.01(2), "water quality standards are intended to protect public rights and interest, public health and welfare and the present and prospective uses of all waters of the state for public and private water supplies, propagation of fish and other aquatic life and wild and domestic animals, preservation of natural flora and fauna, domestic and recreational uses, and agricultural, commercial, industrial and other uses." These water quality standards are specific to wetland ecosystems.

The NR 103 Wetland Water Quality Standards serve as a basis for Department of Natural Resources (DNR) decisions in regulatory, permitting, planning or funding activities that affect wetlands. These standards contribute to the protection of the functions and values of wetlands including biological diversity and wildlife habitat, sediment and pollution attenuation, storm and flood water retention, hydrologic cycle maintenance, shoreline protection, and human uses such as recreation and education.

This document provides information on the background of the rule and guidance for its implementation. Consistent application of NR 103 on a statewide basis will contribute to the protection and preservation of the state's important wetland resources.

What are Water Quality Standards for Wetlands?

Water quality standards consist of designated uses and criteria necessary to protect those uses in the waters of the state. "Waters of the state" are defined in s. 144.01 (19), Wis. Stats., as:

> ...those portions of Lake Michigan and Lake Superior within the boundaries of Wisconsin, and all lakes, bays, rivers, streams, springs, ponds, wells, impounding reservoirs, marshes, watercourses, drainage systems, and other surface and ground water, natural or artificial, public or private, within the state or its jurisdiction.

NR 103 is Water Quality Standards for Wetlands. Wetlands are included in the above definition in the terms "marshes" (a lay term for "wetland") and "other surface and ground water".

The term "wetland" is defined in s. 23.32(1), Wis. Stats., as "...an area where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions." This definition includes, but is not limited to, wooded swamps, floodplain forests, bogs, cedar swamps, fens, shrub carrs, alder thickets, deep and shallow marshes, sedge meadows, fresh wet meadows, low prairies, and seasonally flooded basins.

NR 103 sets standards to "protect, preserve, restore and enhance the quality of waters in wetlands and other waters of the state influenced by wetlands." Water quality criteria are established to protect the functional values of wetlands (discussed in detail later in this document).

Because of the hydrologic and ecological variations within different types of wetlands, it is not feasible to establish specific numerical criteria, which is normally the approach in water quality standards. Instead, narrative water quality criteria or conditions are established to assure that wetland functions and values are maintained.

HISTORY

Wetland Losses

Wisconsin is a state with an abundant supply of natural resources. Wetlands were plentiful in pre-settlement times, making up an estimated ten million of the state's thirty-five million acres. According to the Wisconsin Wetland Inventory program, approximately 5.3 million acres of wetlands remain in the state-- a loss of almost half of the pre-settlement resource.

Wetlands in Wisconsin were historically drained mainly for agricultural use. The federal government subsidized wetland drainage to create farm land out of what was then considered wasteland. Residential, commercial and industrial development have also displaced large acreages of wetland and continue to be a major factor in wetland losses.

Only recently have wetlands been recognized as natural resources to be protected. Various state laws have been enacted to protect the quality of all waters of the state, including some wetlands. Primary emphasis has been to protect navigable rivers and lakes from the pollution and impacts caused by human activity, thus preserving and enhancing the use of the water resources for recreational, commercial or aesthetic interests. Wetlands associated with navigable waters have therefore received some level of regulation and protection, while isolated wetlands lack comprehensive protection in Wisconsin.

Why Develop NR 103?

Water quality standards are required for all "waters of the state" under Wisconsin law by Section 144.025(2)(b), Wis. Stats. As discussed previously, wetlands are included in the definition of waters of the state.

Section 303 of the Clean Water Act and 40 CFR Part 131 of the Federal Regulations require states to develop standards for "waters of the United States" subject to review and approval by the U.S. Environmental Protection Agency (USEPA). Federal guidelines include wetlands as "waters of the United States."

In 1989, the Natural Resources Board directed the Department to develop water quality standards for wetlands, reacting partly to a 1981 petition by the Wisconsin Public Intervenor's office requesting that the Department develop wetland water quality standards to serve as a basis for water quality certification decisions under section 401 of the Clean Water Act. Also, USEPA has established program guidance calling for all states to develop wetland water quality standards by 1993, in order to comply with the provisions of the Clean Water Act.

NR 103 was developed to create a definitive state process for making decisions regarding impacts to wetlands. These decisions come into play in several Department programs, including the water quality certification process under the federal 404 permitting program.

APPLICABILITY OF NR 103

NR 103 applies to DNR decisions and activities where a decision on wetland impacts is required. Some activities that have significant effects on wetlands may fall outside the jurisdiction of the Department, as established by state law, and thus not be regulated by the standards found in NR 103. NR 103 does not apply to other state agencies, unless DNR is involved in a decision.

What programs are affected by NR 103?

NR 103 is not a permitting program. The rule establishes water quality standards for all wetlands of the state. These are statewide and DNR program-wide standards for review of projects affecting wetlands. The standards must be applied where a specific activity requires authorization or reauthorization after the effective date of the rule (August 1, 1991).

The standards include a review process for addressing projects that may affect wetlands. "All Department regulatory, planning, resource management, liaison and financial aid determinations that affect wetlands... and which are subject to the requirements of statute or rule requiring a Department determination concerning effects on water quality or wetlands" must comply with the NR 103 process and standards (s. NR 103.06).

In many cases, coordination with other Department programs is essential. Certain activities may not require review under NR 103 for one aspect of a project, while other aspects do. In order to avoid confusion for applicants, the regulator should consider a broad view of what will be required to allow a project to proceed.

Table 1 lists the types of Department activities that will likely require NR 103 consideration.

TABLE 1: Activities Affected by NR 103

AIR MANAGEMENT
- Construction permits for major sources in non-attainment areas [s. 144.393 (2)(d), Wis. Stats.]

COMMUNITY ASSISTANCE
- Grants require or can be conditioned for compliance with NR 103.

ENDANGERED RESOURCES
- Acquisition, management and research in State Natural Areas including master plans and feasibility studies, wetland restorations, exotic and problem species plant control, and boardwalks and pedestrian bridges
- Species introduction and management activities including hydrologic manipulations, island construction, rip-rapping, and nesting platforms

ENVIRONMENTAL ANALYSIS AND REVIEW
- Preparation of EIS's and EA's [NR 150]
- Review of DOT/DNR non-highway bridge projects for airports, railroads, and harbor facilities

ENVIRONMENTAL LOANS
- Loans administered by DNR for wastewater treatment projects [NR 162]

TABLE 1 (cont'd): Activities Affected by NR 103

FISH MANAGEMENT
- Spring pond dredging
- Fish barriers
- Lake or stream alterations
- Species introduction
- Public access development projects

FORESTRY MANAGEMENT
- Pest control [s. 26.30, Wis. Stats.]
- Access roads for silviculture
- Log and pulp landing construction
- Logging road stream crossings
- Skidding and pre-hauling of forest products
- Dry hydrant construction

PARKS AND RECREATION
- New property acquisition
- Public access development
- Flowage construction, operation, maintenance or abandonment
- Facilities construction (including beaches, picnic areas, camping areas, roads, parking areas, buildings, boat landings, trails, special use areas, piers, bridges, boardwalks, overlooks, drainage fields, and wells)

PROPERTY MANAGEMENT
- Feasibility Studies for new properties or modified boundaries
- Master Plans for property management including the river systems like the Mississippi River, the Lower Wisconsin State Riverway, the Chippewa, Turtle, and Flambeau Flowages, and Wild and Scenic Rivers
- Planning, design and construction of facilities including roads, trails, and buildings
- Non-DNR road grants

RESEARCH
- Habitat management research projects
- Land manipulation projects

SOLID AND HAZARDOUS WASTE MANAGEMENT
- All solid waste facilities, except containerized storage and incinerators must meet wetland locational criteria. [NR 500]
- Landfill Related Activities including footprint, surface/subsurface drainage system, borrow sources, land spreading, sludge ponds, compost sites [NR 500]
- Power Plant Siting [NR 500]
- Landfill expansions [NR 500]
- Corrective actions-Solid Waste [NR 500]
- Hazardous Waste facilities siting [NR 600]
- Corrective actions-Hazardous Waste [NR 600]
- Superfund remediation [Applicable or Relevant and Appropriate Requirement (ARAR)]
- Environmental Repair Program (ERR) [currently NR 550, Pending NR 700]
- Leaking Underground Storage Tanks (LUST) [Pending NR 700]
- Spills [s. 144.76 and NR 158]

TABLE 1 (cont'd): Activities Affected by NR 103

WATER REGULATION AND ZONING

- Water Quality Certification of proposed federal actions, including permits and licenses [s. 401 and 404 Clean Water Act, Ch. 147, Wis. Stats., and NR 299]
- Approval of submerged lands lease [s.24.39(4), Wis. Stats.]
- Approval of barge fleeting areas [s. 30.10, Wis. Stat.]
- Approval of bulkhead lines [s.30.11]
- permit for structure in navigable waters [s. 30.12(2)]
- Permit for riprap, sand blanket, fish crib, ford, boat ramp, or boat shelter [s. 30.12 (3)]
- Municipal bridge approval [ss. 30.123 (1)/84.01(23) and TRANS 207]
- Permit for bridge construction [s. 30.123]
- Approval of pier construction or pierhead lines [ss.30.13 and 30.12]
- Permit for surface water diversion/withdrawal [s. 30.18]
- Permit for waterway enlargements, ponds, grading [s. 30.19]
- Permit to change course of stream [s. 30.195]
- Permit to enclose a stream [s. 30.196]
- Permit/contract to remove bed material [s. 30.20]
- Approval/MOU for COE disposal sites for Miss. R. dredged material [s. 30.202]
- Issuance of general permits for certain activities [s. 30.206]
- Establishing water levels and flows [s.31.02]
- Permit to construct a dam [ss. 31.05 and 06]
- Approval of plans for a dam [s. 31.12]
- Permit to raise/enlarge a dam [s. 31.13]
- Order approving modification/alteration of a dam [s. 31.18]
- Permit to transfer ownership/abandon a dam [s. 31.185]
- Permits for dams on non-navigable streams [s. 31.33]
- Grants to repair/remove dams [s. 31.385]
- Approval of DNR projects that would require permits/approvals for non-DNR applicants [M.C. 3565.1]

WATER RESOURCES MANAGEMENT

- Basin plans [NR 121]
- Remedial action plans [Clean Water Act, Great Lakes Water Quality Agreement]
- Sewer service area plans [NR 121]
- BMPs/priority watersheds [NR 120]
- Detention basins [NR 120]
- Streambank easements [NR 120]
- Lake Protection and Wetland restoration grants [s. 144.254, Wis. Stats.]
- WPDES permit limit calculations [Ch. 147, Wis. Stats.]
- Remedial demonstration projects
- Monitoring projects
- FERC projects
- Surface water classification
- Power plant siting
- Superfund discharges
- Aquatic plant management [NR 107]
- Stormwater limits [Ch. 147, Wis. Stats.]
- Water Quality Standards [NR 102 - 106]

TABLE 1 (cont'd): Activities Affected by NR 103

WASTEWATER MANAGEMENT
- WPDES Permits
- Plan and Spec Approvals
- Sludge Management
- Facilities Plan Approvals

WILDLIFE MANAGEMENT
- Beaver abatement
- Dike construction
- Creation of ditches
- Plan and construct potholes
- Construction of habitat development projects including nesting structures, cookie cutters, and flowages
- Reintroduction of aquatic plants
- Water level manipulation
- Dike repair
- Maintenance dredging
- Boat ramp maintenance
- Rough fish control activities
- Emergency spillway maintenance
- Maintenance of shallow lakes and bays
- Purple loosestrife control

Are there any activities where NR 103 does not apply?

Some activities have been exempted in the rule (NR 103.06). Exemptions from NR 103 include:

1. Local Shoreland-Wetland Zoning Decisions.

Chapter NR 115 requires counties to adopt zoning ordinances for the regulation of wetlands in the shoreland zone for unincorporated areas. Chapter NR 117 requires similar ordinances for villages and cities. The shoreland zone is defined as those areas located within 1000 feet of the ordinary high water mark (OHWM) of a navigable pond, lake, or flowage or within 300 feet of the OHWM of a navigable river or stream (or to the landward side of the floodplain, whichever is greater). The state administrative codes require regulation of all wetlands, or portions of wetlands, located within the shoreland zone that are greater than 5 acres in size and are shown on final adopted Wisconsin Wetland Inventory maps. Local ordinances may be more restrictive than the state requirements. Some municipalities presently regulate all shoreland wetlands 2 acres or more in size. The shoreland/wetland zoning ordinances include a number of permitted and prohibited uses.

2. Metallic mineral prospecting and metallic mining projects.

Specific legislation that regulates mining in the state addresses the concerns for direct impacts to wetlands due to metallic mining activities. Chapters NR 131 and NR 132 set forth specific requirements for considering impacts to wetlands from these types of activities. The metallic mining laws and administrative codes were developed through a consensus process involving government officials, environmental group representatives, and mining interests. Evaluations of alternatives and wetland functions and values associated with a project are required. The codes also set forth provisions for when

mining activities may have adverse impacts on wetlands and still be permitted. This provision is similar to the practicable alternatives test in NR 103.

3. Activities exempt from regulation under state and federal law.

Again, if the Department has no specific jurisdiction over an activity, NR 103 does not apply. For example, certain agricultural activities are specifically exempt from permit requirements under Chapter 30 of the state statutes and Section 404 of the Clean Water Act.

4. DNR/DOT Liaison Agreement

Section 30.12 (4) of the state statutes set forth procedures under which a liaison agreement was entered into between the Departments of Natural Resources and Transportation for addressing wetland concerns for state highway projects. The liaison agreement between the two agencies sets forth specific requirements for dealing with wetland impacts. The DOT is exempt from any permit requirements but must meet the substantive requirements of certain regulations, including the NR 103 standards.

Does NR 103 supersede NR 1.95?

NR 1.95 was promulgated in 1978 to establish the Department policy on wetlands preservation, protection and management. The rule sets forth the policy of the Natural Resources Board that "wetlands shall be preserved, protected, and managed to maintain, enhance or restore their values in the human environment." The rule requires that impacts to wetlands be considered in all Department regulatory and management actions. NR 1.95 also includes a listing of wetland functions and values.

Section NR 103.05(2) specifically covers this issue of supersedence. This section states that "whenever the procedures [of NR 103] are applicable to an activity, they shall supersede the regulatory provisions of s. NR 1.95 (5)." NR 103 is very similar to NR 1.95, but creates a specified process for decision making. NR 1.95 is still applicable to DNR decisions where no formal NR 103 decision is required. The older rule can still be used as a reference for the Department's policy on protecting wetland functional values.

THE NR 103 DECISION PROCESS

The NR 103 process establishes sound project planning by requiring that project proponents consider alternatives that avoid wetland impacts. If wetlands must be affected, it must be shown that there are no significant adverse impacts to the wetland functional values.

Figure 1 outlines the process for making decisions under NR 103. The burden of proof is on the applicant/sponsor to show compliance with the standards. Therefore, much of the Department's involvement will be through the review of applicant and consultant derived information and documentation.

Early meetings should occur to ensure proper documentation and to head off projects that will not comply with NR 103. In fact, section NR 103.08 specifically requires the Department, when requested, to meet with project proponents (applicants and/or consultants) and other interested parties to discuss potential for compliance with the standards early in project planning.

FIGURE 1: THE NR 103 DECISION PROCESS

STEP 1. WILL THE PROJECT AFFECT A WETLAND?

Will there be any
direct or indirect effects?

Yes: Proceed to Step 2.

No: You need not continue with the NR 103 process.

STEP 2. IS THE PROPOSED ACTIVITY WETLAND DEPENDENT?

Does it require a wetland location
to fulfill its basic purpose?

Yes: Proceed to Step 4.

No: Proceed to Step 3.

STEP 3. DOES A PRACTICABLE ALTERNATIVE EXIST?

Is there an affordable, available option
which will not harm wetlands or cause other
significant harm to the environment?

Yes: NR 103 standards are not met.
Your project cannot be approved.

No: Proceed to Step 4.

STEP 4. WILL THE PROJECT HAVE SIGNIFICANT ADVERSE IMPACTS ON WETLAND FUNCTIONAL VALUES?

After considering alternatives to avoid and/or minimize
impacts and other factors listed in NR 103.08 (3) (b to f),
will there be a significant adverse impact upon wetlands,
water quality, or other significant environmental consequences?

Yes: NR 103 standards are not met.
Your project cannot be approved.

No: NR 103 standards are met.
Your project is in compliance with wetland water quality standards.

What are the specific steps required in the NR 103 process?

The following is a step-by-step explanation of the NR 103 process. Important issues are addressed for each of the steps.

- **STEP 1: Will the activity affect wetlands?**

A. What is a wetland?

As discussed above, the term "wetland" is defined in section 23.32, Wis. Stats., as:

> ...an area where water is at, near or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions.

This definition was established to guide the Wisconsin Wetland Inventory (WWI) mapping program. The term wetland describes an area where hydrology, vegetation and soils interact to form a unique community of plants and animals.

Due to variability of climatic and geologic conditions, many different types of wetlands can be found in Wisconsin, ranging from bogs to marshes to lowland hardwood swamps. NR 103 applies to all wetlands of the state, regardless of size and quality. This is important to note since the WWI only maps and classifies wetlands down to 5 or 2 acres, depending on the county. The inventory also utilizes point symbols to denote wetlands smaller that 2 acres, but not all small wetlands are included on the maps. NR 103 applies to all wetlands in the state, regardless if they are designated on WWI maps or not.

The 1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands established a scientifically sound methodology for delineation of wetland areas based on the three criteria of hydrology, vegetation, and soils. This manual provides an excellent scientific framework for making wetland determinations, however the state definition is more inclusive than the federal approach, especially in assessing wetland soils. The federal methodology requires that a wetland meet the hydric soil criterion, whereas the state definition allows for somewhat poorly drained, poorly drained, and very poorly drained soils to qualify as wetland soils. The presence of a predominance of hydrophytic vegetation may also be used as evidence of wetland hydrology necessary to meet the state definition.

B. What does "affect" mean?

Wetlands can be affected directly by filling, draining, dredging, mowing, and plowing, or indirectly by altering the watershed or changing the wetland's hydrology. NR 103 requires that an activity avoid wetland impacts if possible or practicable.

According to the federal NEPA regulations (40 CFR 1508.8), "effects include: a) Direct effects which are caused by the action and occur at the same time and place [and] b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."

Activities which result in chemical and physical changes to the wetland can cause changes in water clarity, color, odor, and taste. These alterations can eliminate, reduce, or change populations of aquatic organisms and impact water for human consumption, recreation and aesthetics. Nutrient and organic matter inputs can result in an increase in biochemical oxygen demand (BOD) which can cause reduced dissolved oxygen (DO) levels. This affects the survival of aquatic organisms and may lead to increases in nuisance aquatic vegetation such as algae which may cause adverse health effects and other changes.

Activities which result in increases in suspended particulates can reduce water clarity which can affect plant growth and may reduce or eliminate feeding by sight-feeding organisms. Suspended materials may react with dissolved oxygen (DO) and reduce or deplete the oxygen in the water column. Toxic materials and pathogens which are adsorbed or absorbed on particulates may become biologically available. Turbid water conditions within wetlands can adversely impact aesthetics and change plant species composition.

Water current changes can result in changes in location, structure and dynamics of aquatic communities. They can also affect shoreline and substrate erosion and deposition rates, deposition of suspended particulates, the rate and extent of mixing of dissolved and suspended components of the wetland and water stratification.

Activities which change the natural water fluctuation patterns (referred to as the hydroperiod) within a wetland, either by exaggerating the highs and lows or by eliminating natural fluctuation patterns can alter erosion and sedimentation rates, aggravate water temperature extremes and upset the nutrient and DO balance of the aquatic ecosystem. Also, changes to hydrology can destroy communities and populations of aquatic organisms, modify habitat, reduce the food supply, restrict the movement of aquatic fauna, destroy spawning areas, and change the plant and animal character of adjacent, upstream and downstream areas.

Some project proponents may propose artificially supplementing surface water flows to maintain wetland hydrology and therefore avoid "affecting" a wetland. It may be argued that such a proposal would avoid the need of going through the NR 103 process. Engineering the hydrology or similar measures are strategies for minimizing impacts to wetlands and should be considered later during the "review other factors" portion of the review process during STEP 4. Alternatives that avoid wetland impacts altogether are preferred over alternatives where wetland impacts are minimized through engineering.

A simple method for determining if a project does not need to be evaluated under NR 103 (i.e. a showing that there will be no affect on wetlands) involves the delineation of the subject wetland's primary drainage basin. For most activities, if the proposal will avoid any work within the topographic drainage basin, it can be concluded that no effect to wetlands will occur. This does not mean that any project located in the drainage basin will definitely affect a wetland. A project proponent may show that the activity will not have a measurable affect on the hydrology of a wetland through hydrologic budget, run-off and groundwater calculations. The Department may determine that there is no potential for effects to wetlands due to the type of project, size of project activity, distance to wetlands or other conditions,

As with other aspects of the NR 103 process, decisions on what constitutes an effect on the wetland will need to be determined by the Department on a case-by-case basis.

STEP 1 CONCLUSION: IF THE ACTIVITY MAY AFFECT WETLANDS, PROCEED TO STEP 2. IF NO EFFECT ON WETLANDS, THEN NR 103 DOES NOT APPLY.

• STEP 2: Is the activity wetland dependent?

A. What does "wetland dependent" mean?

"Wetland dependency" is defined in section NR 103.07(2) and means "the activity is of a nature that requires location in or adjacent to ... wetlands to fulfill its basic purpose."

B. What is the difference between "wetland dependent" and "water dependent"?

For the purposes of NR 103, WATER DEPENDENT = WETLAND DEPENDENT.

The "Definitions" section of the rule (NR 103.07) includes both terms-- wetland and water dependency. In order to maintain some consistency with federal terminology, as used in the 404 (b)(1) guidelines that were developed by USEPA for administration of the Section 404 permit program, the term "water dependent" was also included in NR 103. The federal definition of water dependent connotes a necessity to be located in an aquatic site to meet the project's basic purpose. The state definition of water dependency is to be used interchangeably with the term wetland dependency.

The key is to remember that the focus of the NR 103 standards is wetlands and thus the determination section of the rule requires a decision of whether or not the proposed activity must be located in or adjacent to a wetland to fulfill its basic purpose (NR 103.08 (3)(a)).

C. What is the significance of a decision that an activity is wetland dependent?

A determination that an activity is wetland dependent means that alternatives are considered as part of several other factors in determining the significance of the project impacts (See STEP 4). If the activity can be located or configured to avoid wetland impacts, the project should be changed to do so.

Activities that are not wetland dependent need not be located in or near wetlands, and thus the pursuit of alternatives that avoid adverse wetland impacts must be more substantial (See STEP 3). For these projects, the evaluation of alternatives must occur prior to and independent of the other factors listed in STEP 4 below, including the significance of the expected impacts.

Department staff must be careful not to confuse the NR 103 process with similar processes in the 404 program. While the Corps of Engineers does not usually require the applicant to provide an evaluation of practicable alternatives for projects determined to be water dependent, the DNR will need to consider practicable alternatives for a wetland dependent project under NR 103 (See STEP 4).

D. Does the Department have a definitive list of wetland dependent activities?

No. The determination of wetland dependency must be made on a case-by-case basis with the focus being on the overall project purpose.

The evaluator must look at each case on its own merits. It may be that certain portions of a large project will be wetland dependent. Such a determination would not make the entire project wetland dependent. Certain projects are very site specific activities (e.g. remediation of a contaminated wetland) and thus would be considered wetland dependent. Other examples of activities that may be considered wetland dependent activities under certain circumstances include aquatic plant management actions, construction of bridge abutments through a wetland, and construction of a boardwalk through a wetland for educational purposes.

STEP 2 CONCLUSION: IF THE ACTIVITY IS WETLAND DEPENDENT, PROCEED TO STEP 4. IF THE ACTIVITY IS NOT WETLAND DEPENDENT THEN PROCEED TO STEP 3 FOR A FULL ANALYSIS OF PRACTICABLE ALTERNATIVES.

• STEP 3: Are there practicable alternatives that avoid wetland impacts?

A. What is the definition of "practicable" ?

The term "practicable alternative" is defined in NR 103.07(1) and means an alternative that is "available and capable of being implemented after taking into consideration cost, available technology and logistics in light of overall project purpose." As with the definition of wetland dependency, this term was adapted from the federal 404(b)(1) guidelines. Federal case law related to the 404 program has provided some standards for considering practicable alternatives. In order to make federal and state wetland regulatory programs as consistent as possible, the Department has decided to follow appropriate Wisconsin and Federal case law on wetland regulation.

B. How does the Department decide if an alternative is practicable?

The practicable alternatives test is a key element of the NR 103 process. The need for sound planning up front should be strongly emphasized early in the project development process. Alternatives that avoid wetland impacts should be considered early in the project planning. Early consultation with Department staff should be encouraged to discuss potential for compliance with NR 103 requirements (NR 103.08 (1)).

Practicability of alternatives must be defined in the context of the specific activity proposed. Due to the large variety in the types of projects that are affected by NR 103, it is difficult to derive specific criteria for an alternatives analysis. Each Department program may want to develop guidance for the practicable alternatives review. The NR 103 Citizens Technical Advisory Committee is currently preparing information regarding practicability of alternatives for specific project types.

The burden of proof is on the applicant to show that no practicable alternative exists that will not adversely impact wetlands. Department review of documentation will need to employ some element of best professional judgement based on staff knowledge of the types of projects, associated technological constraints, cost considerations, and the local availability of alternative sites. For complex projects, staff may need to rely on special consultant resources to help determine the viability of certain alternatives.

Figure 2 is an attachment that is sent to Corps of Engineers permit applicants and sets forth a suggested outline for evaluating alternatives. At a minimum, the Department should require and receive a letter, or preferably a report format, that addresses practicable alternatives. The applicant's report should state the project purpose, determine the wetland dependency of the activity, list alternatives considered, evaluate the alternatives based on costs, logistics and technology, and justify the selected option. The report should be substantial enough to show that if the selected alternative will impact a wetland, no practicable alternative exists that would avoid wetlands. If a project proponent is not able to provide sufficient information, the application for the activity may be denied.

It is important to remember that the practicable alternative test includes the evaluation of costs, logistics and technology. Therefore, even if an upland site is available, other factors may make the alternative not practicable. A wide array of arguments can be expected and applicants should be encouraged to put forth all viable explanations and issues surrounding the practicability of various alternatives. Department staff may need to suggest certain alternatives for consideration based on staff knowledge of a particular area.

STEP 3 CONCLUSION: IF NO PRACTICABLE ALTERNATIVE EXISTS, PROCEED TO STEP 4. IF THERE IS A PRACTICABLE ALTERNATIVE, THEN COMPLIANCE WITH NR 103 IS NOT ACHIEVED.

FIGURE 2: INFORMATIONAL REQUIREMENTS FOR PRACTICABLE ALTERNATIVES ANALYSIS UNDER NR 103

I. Detailed Outline of the Background of Project

A. Describe the purpose and need for project.

B. Is your project an expansion of existing work or is it new construction?

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

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

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

A. How could you satisfy your needs in ways which do not affect wetlands?

B. How could the project be re-designed to fit the site without affecting wetlands?

C. How could the project be made smaller and still meet your needs?

D. What other sites were considered?

1. What geographical area was searched for alternative sites?

2. How did you determine whether other non-wetland sites are available for development in the area?

3. In recent years, have you sold or leased any lands located within the vicinity of the project? If so, why were they unsuitable for the project?

E. What are the consequences of not building the project?

III. Comparison of Alternatives

A. How do the costs compare for the alternatives considered in II above?

B. Are there logistical (location, access, transportation, etc.) reasons that limit the alternatives considered?

C. Are there technological limitations for the alternatives considered?

D. Are there other reasons certain alternatives are not feasible?

IV. If you have not chosen an alternative which would avoid wetland impacts, explain:

A. Why your alternative was selected, and

B. What you plan to do to minimize adverse effects on the wetlands impacted.

• **STEP 4: Considering several factors, will the activity have significant adverse impacts on wetland functional values or other significant adverse environmental consequences?**

A. What other factors need to be reviewed?

Section NR 103.08 (4)(b) requires that several factors be considered in making the determination concerning significance of impacts. These factors include: practicable alternatives to the proposal that will avoid and/or minimize impacts to the wetland; impacts to the wetland standards (functional values); cumulative and secondary impacts; and adverse impacts to areas of special natural resource interest.

B. Why consider practicable alternatives at this stage of the process?

This factor is very important for review of wetland dependent activities, as described in Step 2 above. Even if a project must be located in or adjacent to a wetland, there may be available alternatives to avoid the impacts. Alternatives to avoid or minimize impacts should be considered for all projects at this stage. Reconfiguration of the project, erosion control measures, slope restrictions, etc. may be required in order for the Department to conclude that no significant adverse impacts to wetland functional values will occur.

C. What are the functional values of wetlands?

Functions and values are the physical, chemical and biological attributes of a wetland and the associated benefits which wetlands provide to humans and the natural environment. As presented in section NR 103.03 (1) of the rule, wetlands are recognized for performing the following water quality related services and values:

1. Storm/flood water storage and retention and moderation of water level fluctuation extremes:

Peak flows from ground and surface water can be detained as they travel down slope and through wetlands. When several wetland basins perform this function within a watershed, they can individually release water gradually, causing a staggered or moderated discharge which reduces flood peaks. In studies throughout the state, flood flows are significantly lower in basins with substantial lake and wetland area than in basins with no lake and wetland area. This function provides a direct benefit to the public by reducing the need for structural flood controls such as dikes and levees and by reducing costly flood damage.

2. Hydrologic functions including maintenance of dry season stream flow, the discharge of groundwater to a wetland, the recharge of groundwater from a wetland to another area and the flow of groundwater through a wetland:

Groundwater recharge is the process by which surface water moves into the groundwater system. Although recharge usually occurs in the higher parts of the landscape, some wetlands can provide a valuable service of replenishing groundwater supplies. Groundwater discharge, which more commonly occurs in wetlands, can be important for stabilizing stream flows, especially during dry months. This results in an enhancement of the fish and aquatic life communities in the downstream areas.

3. Filtration or storage of sediments, nutrients or toxic substances that would otherwise adversely impact the quality of other waters of the state:

Wetlands can store or filter nutrients, such as phosphorus and nitrogen, which would otherwise flow into other ground or surface waters or wetlands. Wetlands can store the nutrients on a short term within wetland plants or a long term basis in sediments or peats. Even the short term storage of nutrients is beneficial as downstream waters may be highly sensitive to nutrients at the time of year that the wetland

is storing them. Also, wetlands can transform nitrogen to its gaseous state (denitrification), thereby removing it from the aquatic environment. Sediment storage often occurs in wetlands because of their low slope and flow characteristics (water retention capacity). Many toxic substances can also be stored or transformed to a less toxic state within wetland sediments.

Although a very important function of wetlands, the use of wetlands to filter or store sediments or nutrients for an extended period of time will result in changes to the wetland. Sediments will eventually fill in wetlands and nutrients will eventually modify the vegetation. Such changes may result in the loss of this function over time.

Conditions that allow a wetland to perform this functions can also be conditions that allow for serious impact to the system. For example, a riverine wetland that is downslope from a corn field is likely providing a significant water quality function as the wetland slows run-off waters and allows settling and uptake of nutrients before the materials can get to the surface water system. However, too much run-off can change the plant community and excess nutrients can affect the productivity of the system.

An evaluator of the functional value of a wetland for water quality purposes must consider the line between performing the function and being overloaded and thus adversely impacted.

4. Shoreline protection against erosion through the dissipation of wave energy and water velocity and anchoring of sediments:

Wetland vegetation can hold soil particles and reduce wave energy. Benefits include the protection of habitat, buildings, other structures, and land which may otherwise be lost to erosion. Also, a wetland which reduces erosion also reduces sedimentation to nearby waterways. If the waterway is a navigational channel, the reduction in sedimentation can reduce the frequency of dredging the channel.

5. Habitat for aquatic organisms in the food web including, but not limited to, fish, amphibians, crustaceans, mollusks, insects, annelids, planktonic organisms and the plants and animals upon which they feed and depend for their needs in all life stages:

Wetlands provide food and habitat for a tremendous variety of biota which in turn supports species of fish and other organisms. Most freshwater fish require shallow water for a part of their life cycle. Benefits include providing support for fish species which are important for both the sport and commercial fishing industries.

6. Habitat for resident and transient wildlife species, including mammals, birds, reptiles and amphibians for breeding, resting, nesting, escape cover, travel corridors and food:

Wildlife species may depend upon wetland habitats for their entire life cycle, as with most amphibians, waterfowl and muskrats, or they may rely upon wetlands to provide habitat needs during only a part of their life stage. Recreation such as bird watching and hunting are dependent upon a wetland's ability to provide habitat for wildlife species.

7. Recreational, cultural, educational, scientific, and natural aesthetic values and uses:

Wetlands provide areas for many forms of recreation including nature observation, hiking, biking, skiing, photography, hunting, fishing and canoeing. Wetlands provide educational and scientific research opportunities because of their unique combination of terrestrial and aquatic life and physical/chemical processes. Many species of endangered and threatened species are found in wetlands. Wetlands are also important for their cultural and historical values.

D. What are the criteria for the standards?

If a wetland is to continue to perform the above functions, certain water quality and quantity criteria or conditions must be met and are established in the rule. The criteria are qualitative standards for the discharge of materials, the protection of hydrologic conditions and the protection of habitat and are set forth in section NR 103.03 (2).

The criteria require that the following "may not be present in amounts which may cause significant adverse impacts to wetlands":

1. Liquids, fills or other solids or gas;

2. Floating or submerged debris, oil or other material;

3. Materials producing color, odor, taste or unsightliness;

4. Concentrations or combinations of substances which are toxic or harmful to human, animal or plant life when considered individually or cumulatively.

The criteria also establish standards for maintaining hydrologic conditions (NR 103.03 (2)(e)). Significant adverse impacts must be prevented for the following parameters: water currents; erosion or sedimentation patterns; water temperature; the chemical, nutrient and dissolved oxygen regimes; movement of aquatic fauna; pH; and water levels or elevations.

Further, the criteria state that existing habitats and populations of wetland animals and vegetation shall be maintained by protecting food supplies and reproductive and nursery areas and preventing conditions conducive to the establishment of nuisance organisms (NR 103.03 (2)(f)).

E. What techniques are available and acceptable for evaluating wetland functional values and the project impacts?

The rule lists examples of several wetland evaluation methodologies that have widespread acceptance. These methodologies range from simple rapid assessments to more sophisticated computer driven models. While the level of work required will likely be dictated by the scope of the project, it is best to use the DNR Rapid Assessment Methodology in most cases due to the complexities and time involved with using other techniques.

The following is a brief description of the methodologies listed in NR 103. Note that the list is not comprehensive, and any method that covers all wetland functions and values listed in NR 103, and appropriate to the subject wetland, can be employed. For the most part, the Department will be reviewing reports prepared by consultants using the approved methodologies.

1. Wisconsin DNR Rapid Assessment Methodology- An earlier version called the Wetland Evaluation Questionnaire or WEQUEST has been updated. Both are field checklists that require the investigator to focus on important indicator attributes of the wetland and watershed. Positive responses to checklist questions indicate a greater significance for that wetland fulfilling a given function. The method can also be used as a good summary of a site visit.

2. Wetland Evaluation Technique (FHWA/COE)- This methodology is also referred to as WET, WET 2, the Adamus Method, or the Federal Highway Administration Method. This is a fairly sophisticated methodology that is nationally applicable and can be completed on a computer. The model evaluates wetland functions and values on opportunity to fulfill a certain function;

effectiveness of the wetland to fulfill a given function based on its physical, chemical, and biological characteristics; and the social significance of the function.

The Corps of Engineers has begun an extended effort to develop a new methodology to replace WET.

3. Wisconsin Wetland Evaluation Methodology- This method is a shortened and modified version of WET 2, that was refined to address Wisconsin wetland types and conditions. As with the above, the Wisconsin WEM evaluates opportunity, effectiveness and social significance.

4. Hollands/Magee- Also referred to as the IEP or IEP/Normandeau methodology, this evaluation technique uses a condition weighted model to evaluate functions and values. The output is a numerical scoring and comparison to minimize/maximize model values. It can easily be adapted to spreadsheet use.

5. Minnesota Wetland Evaluation Methodology for the North Central United States-- This method is also know as the Minnesota WEM and was developed as a regionalized version of WET 2. WDNR was involved early in the development of the methodology. This method is very similar to the Wisconsin WEM described in #3 above.

F. How does one determine if an impact is significant?

This term will necessarily be defined on a case-by-case basis. The term "significant impacts" is not new and has been the basis for many analyses under the Wisconsin Environmental Policy Act (WEPA), shoreland-wetland zoning, Chapter 30 water regulations, and federal environmental regulatory programs (including National Environmental Policy Act (NEPA) procedures).

NR 150, the Wisconsin Administrative Code for the WEPA program, defines "significant effects" as "considerable and important impacts...on the quality of the human environment."

Federal regulations (section 40 CFR 1508.27) state that "significantly, as used in NEPA, requires consideration of both context and intensity: a) context...means that the significance of the action must be analyzed in several contexts such as society as a whole..., the affected region, the affected interests, and the affected locality. Significance varies with the setting of the proposed action.... Both short- and long-term effects are relevant. b) Intensity ...refers to the severity of the impact...."

Due to the complex nature of wetland ecosystems, the great variety of types and quality of wetlands throughout the state, and the variable abundance of wetland resources in different regions of the state, significance of impacts cannot be specifically defined. Remember that the burden of proof is on the applicant to show that no significant adverse impacts will occur. The reviewer will need to consider all the above factors in his/her determination.

G. What are secondary and cumulative impacts?

It is often difficult to differentiate between primary and secondary effects of a project. The requirement to consider both direct and indirect impacts was included in NR 103 to focus the review on all potential impacts from the project. Activities that are near, but not directly in, wetlands may have very significant secondary impacts. Impacts to one wetland or portion of a wetland may have far reaching effects on other wetlands and surface waters. Secondary impacts may also occur over time. For example, filling a very small wetland area may allow for future building activities which will lead to increased erosion and sedimentation of other wetlands nearby. In such a scenario, the actual impacts of the immediate action were minor, but the secondary impacts in the future may be significant. Consideration of cumulative impacts requires evaluating the impacts of the current project in relation to past or reasonably anticipated

future actions. NR 150 requires that the Department consider the extent of cumulative effects of repeated actions of the same type, or related actions or other activities occurring locally that can be reasonably anticipated and that would compound impacts.

Federal regulations (40 CFR 1508.7) define cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency... or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

Again, the evaluator must consider the ramifications of the action beyond the immediate scope of the proposed project. A very minor fill may set precedent for other minor fills in an area, thereby eventually causing the destruction of scarce habitat in an urbanizing setting.

H. What are areas of special natural resource interest?

Section NR 103.08 lists several areas for which any adverse impacts to wetlands should be especially avoided. This list includes wetlands directly associated with:

1) Cold water communities as defined in s. NR 102.04(3)(b), including all trout streams and their tributaries and trout lakes;

2) Lake Michigan and Superior and the Mississippi River;

3) State and federal designated wild and scenic rivers, designated state riverways, and the state designated scenic urban waterways;

4) Environmentally sensitive areas and environmental corridors identified in area-wide water quality management plans, special area management plans (SAMP), special wetland inventory studies (SWIS), advanced delineation and identification studies (ADID) and areas designated by the United States Environmental Protection Agency under s. 404(c), 33 USC 1344(c);

5) Calcareous fens;

6) Habitat used by state or federally designated threatened or endangered species;

7) State parks, forests, trails, and recreation areas;

8) State and federal fish and wildlife refuges and fish and wildlife management areas;

9) State and federal designated wilderness areas;

10) Designated or dedicated state natural areas;

11) Wild rice waters as listed in s. NR 19.09; and

12) Any other surface waters identified as outstanding or exceptional resource waters in ch. NR 102.

If the proposed project will have an adverse effect (not necessarily a significant adverse effect) on a wetland associated with an area of special natural resource value, this should be a red flag indicating the

need for very careful Department scrutiny of the project. The reviewer should strongly pursue the reason that the project must be located as proposed.

I. What is meant by "other significant adverse environmental consequences"?

This factor is included in the rule to balance concerns about other aspects of the environment outside of the wetlands. For some projects, the overall environmental good of the project or the potential for adverse impacts to other important natural resources may outweigh any adverse impacts to a wetland. An example would be a hazardous waste clean-up where the only alternative for preventing human health impacts and/or further damage to the ecosystem may require significant adverse impacts to a wetland. Such a determination will only be made in very special cases however.

STEP 4 CONCLUSION: IF IT IS DETERMINED THAT THE PROJECT WILL NOT HAVE SIGNIFICANT ADVERSE IMPACTS TO WETLAND FUNCTIONAL VALUES OR OTHER SIGNIFICANT ADVERSE ENVIRONMENTAL CONSEQUENCES, COMPLIANCE WITH NR 103 IS ACHIEVED. IF THERE WILL BE SIGNIFICANT ADVERSE IMPACTS TO WETLAND FUNCTIONAL VALUES OR OTHER SIGNIFICANT ENVIRONMENTAL CONSEQUENCES, THE PROPOSAL DOES NOT MEET NR 103 STANDARDS AND CANNOT BE COMPLETED AS PROPOSED.

DOCUMENTING DECISIONS UNDER NR 103

How are NR 103 decisions handled?

For most Department programs, the NR 103 decision will come at the time of a determination that compliance is not achieved or at the time an authorization is granted. Such determinations may be included as a finding of fact and conclusion of law, depending on the program requirements. The decision should state that the project has been reviewed in accordance with NR 103, Wis. Adm. Code. The following elements of NR 103 should be included in any formal finding of fact, as well as supporting field investigations:

COMPLIANCE WITH NR 103–

case 1: The proposed activity will not affect wetlands.

case 2: The proposed activity will affect wetlands, the project is wetland dependent, and the activity will not result in significant adverse impacts to wetland functional values, water quality, or other significant environmental consequences.

case 3: The proposed activity will affect wetlands, the project is not wetland dependent, no practicable alternative exists, and the activity will not result in significant adverse impacts to wetland functional values, water quality, or other significant environmental consequences.

NON-COMPLIANCE WITH NR 103–

case 4: The proposed activity will affect wetlands, the project is wetland dependent, and the activity will result in significant adverse impacts to wetland functional values, water quality, or other significant environmental consequences.

case 5: The proposed activity will affect wetlands, the project is not wetland dependent, but a practicable alternative exists that would avoid wetland impacts.

case 6: The proposed activity will affect wetlands, the project is not wetland dependent, no practicable alternative exists, and the activity will result in significant adverse impacts to wetland functional values, water quality, or other significant environmental consequences.

The Department may determine that NR 103 standards are not met if the applicant fails to provide sufficient, required and/or requested information.

What appeal rights are available to applicants?

NR 103 provides the standards for making decisions regarding wetland impacts within existing Department regulatory and management programs. The appeals language for a given decision will be the same as employed by each program before NR 103 came into effect. Many of these decisions will have appeal rights under Section 227, Wis. Stats.

TRACKING NR 103 DECISIONS

In order to assure consistency and to be able to evaluate the losses and gains of wetland acreage statewide, it is important that diligent tracking of decisions take place. All Department decisions involving NR 103 determinations will be tracked using common data elements. Programs lacking a tracking data base will need to track information in manual written form. Figures 3 and 4 are examples of forms that may be used by Department programs for use in tracking NR 103 decision data.

Each program should maintain its own data base of NR 103 decisions. It is envisioned that at some point, the entire Department will have an automated database for tracking wetland decisions.

FIGURE 3: SAMPLE NR 103 TRACKING FORM #1

01 County Code #: _____/_____/_____

02 Project Docket Number:

03 Applicant Information
NAME: _____
ADDRESS: _____
_____
PHONE: _____

04 Location Description for wetland:
(___¼, ___¼, ___¼, ___¼, Section ___, Township____, Range____)

05 Project Type/Jurisdiction: _____

06 Will proposed project affect wetlands? (Y or N)

07 Type of Wetland Affected (WWI Classification): _____

08 Activity Wetland/Water Dependent? (Y or N)

09 Was there a practicable alternative? (Y or N)

10 Estimated acres of wetland impacted (direct and/or indirect): _____

11 Wetland impact beneficial (B), adverse (A), or significantly adverse (SA)?

12 Compliance with NR 103 achieved? (Y or N)

13 Date of Decision: _____

14 Other Comments:

Wisconsin presently does not have promulgated sediment quality criteria, either numerical or biological, contained in state administrative codes. NR 347, Wis. Adm. Code applies to removal and disposal of materials from the beds of waterways except where exempted by statute. NR 347 assists project applicants and the Department in:

1) identifying information requirements that need to be submitted by project applicants (e.g., sampling and analysis requirements), and

2) directing project proposals to appropriate programs for approval.

NR 347 establishes criteria for dredged material used for beach nourishment projects. Beach nourishment is the replacement of exposed water-edge materials that have been eroded by wind and wave action. These criteria include compatible grain sizes, color, and acceptable levels of metals and persistent organic compounds in sediments applied to beach areas.

The guidance criteria for metals and organic contaminants is based on background levels from surficial sediments, bluff materials, and 200 year old sediments in Lake Superior and Lake Michigan. Wisconsin does not allow open water disposal of dredged materials in its adjacent Great Lakes waters or inland surface water bodies.

All dredging projects require review under NR 500-522, Wis. Adm. Code for disposal of dredged material under the Solid Waste Management Program and under NR 181 if the dredged material meets hazardous waste criteria.

Evolving knowledge of historical and ongoing sediment contamination and associated impacts has prompted the state and the Department to take a proactive approach in dealing with the problem. There is clear evidence of the broad impact of contaminated sediment on the aquatic ecosystem biota including fish, water column organisms, bottom dwelling organisms, water birds, wildlife, and human health.

Initiatives for dealing with contaminated sediments include: 1) funding for staff to work on a sediment management program strategy, and 2) funding for projects to demonstrate the ability to remediate sites that are impaired by contaminated sediment.

Components of the sediment management program strategy includes:

1. Evaluation, development, and application of the various sediment quality assessment approaches and interpretation of the results of these approaches;

2. Coordination of sediment issues within various regulatory programs (e.g., Superfund, RCRA Hazardous Waste Sites, Remedial Action Plans, inland water and Great Lakes Dredging Projects, and Environmental Repair Fund Sites);

3. Development of site specific criteria for use in decision-making regarding point source control, non-point abatement efforts, and site remediation techniques.

4. Produce a statewide inventory of sites with contaminated sediments or wetland soils.

Wisconsin Department of Natural Resources
Bureau of Water Resources Management
Monitoring Unit

PRESENT DEPARTMENT REGULATIONS, POLICIES, AND STRATEGIES RELATED TO CONTAMINATED SEDIMENTS IN THE STATE'S SURFACE WATER BODIES

March 1991

1. Equilibrium partitioning approach for river sediments contaminated with PAH compounds;

2. Equilibrium partitioning approach for river sediments contaminated with PCBs; and

3. Sediment toxicity approach for a site with wetland soils and stream sediments contaminated with metals, cyanide, and possible volatile organics from a direct discharge of electroplating wastewater.

To assure that these approaches result in establishing valid criteria, the Department recommends that supplemental investigations and field studies be conducted. Synoptic measures of chemical contamination, sediment bioassays, monitoring of in-field biological variables, and use of other indicators will insure multiple end-point information to provide ample evidence as to contaminated sediment impacts.

v:\9106\wr9sedst.tpj

The sediment quality assessment approaches being evaluated and applied by the Department includes:

1. The Sediment Quality Triad Approach - Compares bulk chemistry, toxicity and bioaccumulation testing, and in-field biological variables between an unimpacted reference site and impacted site;

2. The Screening Level Concentrations Approach - This approach is a field-based approach that estimates the highest concentration of a contaminant in sediment that can be tolerated by 95% of benthic fauna. We are presently using screening level values developed by Ontario Ministry of the Environment.

3. The Equilibrium Partitioning Approach - Sediment criteria for nonpolar hydrophobic compounds such as PCBs and PAH compounds are calculated based on sediment Total Organic Carbon, partitioning coefficients, and promulgated water quality criteria.

4. Natural background or reference area comparisons with impacted site concentrations of metals and organic compounds.

5. Sediment Bioassay Approach - The approach exposes test organisms in the laboratory to collected sediments. Measures of acute and chronic toxicity and bioaccumulation are compared to reference area sediments. The bioassays provide quantitative indicators for identifying problem areas.

The Department has laboratory capabilities for performing toxicity and bioaccumulation studies. The objective of the sediment management program strategy and use of assessment approaches is to adopt statewide sediment management standards for source control, cleanup activities, and to ultimately protect the biological integrity and quality of the aquatic resource. In most instances, the Department is operating in an assessment and monitoring mode related to contaminated sediments. As necessary, on a site specific basis, the Department will move into a regulatory mode in order to protect water quality criteria as promulgated in NR 105, Wis. Adm. Code and to protect the biological integrity of the state's surface water and wetland resources.

The Department has necessary authority in NR 106 to develop and recommend effluent limitations on discharges to surface waters. Under NR 106.06(6), the Department has the ability to calculate limitations to prevent contamination of sediment with toxic substances or to prevent accumulation of substances in sediments if determined necessary to protect water quality. The cross-media interrelationship between water quality and sediments in a regulatory sense is established in this reference. The integral relationship of sediments, interstitial water, interfacial water, and the water column in a physical, chemical, and biological sense makes it unrealistic to attempt to isolate any of the environmental compartments. The criteria promulgated to protect one compartment, as a matter of biological and regulatory necessity, must result in the cross-media development of related criteria to ensure related environmental compartment criteria are met.

To date the Department has developed sediment remediation criteria designed to protect water quality criteria as established in NR 105 at three sites. The approaches applied and pollutants involved at the three sites are:

the rules. Second, if the site has contaminated sediments, the Water Resources Program will calculate the acceptable sediment quality criteria based on the standards in the rules. An equilibrium partitioning method is used to calculate the sediment quality criteria.

Water Resource Management ARAR's
Superfund Remedial Meeting, Stevens Point
April 12, 1990

Chapter NR 140

The groundwater standards in ch. NR 140, Wis. Adm. Code are applicable to any operable unit that is an activity regulated by the Department. Generally, all units at Superfund sites would fall under a regulated activity (e. g., solid or hazardous waste disposal facilities, wastewater lagoons, spill sites, etc). The standards are applied at the point of standards application, defined in the rule for different types of activities. In instances where there are groundwater standard exceedances, ch. NR 140, Wis. Adm. Code, requires some sort of response. At a minimum, groundwater monitoring would always be required, so a strict no action alternative at a site with exceedances would not meet the rule. The remedial goal for sites is to restore the groundwater to the preventive action limits where technically and economically feasible. Restoration of the groundwater to the enforcement standards is required regardless of technical or economic feasibility. No continuing releases from the source which may cause an exceedance of the standards at their point of standards application is allowed. It is important to note that the chapter has no time limit to reach the standards. Dilution and attenuation can be integrated with other remedial actions to achieve the standards. However, there must be documentation showing how this integration will achieve the standards. Issues needing additional guidance include:

a. Are more active restoration methods always required? Are we able to consider such factors as groundwater use, risk assessment and economic viability of the persons required to take the action when selecting remedial actions to restore groundwater, especially when enforcement standards are exceeded? The policy for Superfund sites, as specified in a March 28, 1990 memo, is to favor active methods of restoration, where practicable.

b. When can dilution and attenuation be integrated into an action? Should this occur only when there are no other practicable alternatives? It is clear that this can't occur if it would allow a release from a source to continue to cause a standards exceedance at the point of standards application.

c. It may be more difficult, perhaps impossible, to meet the standards at hazardous waste sites and other sites where the DMZ or property boundary is very close to or at the edge of the waste. There may always be some groundwater at the DMZ or property boundary that's contaminated above the standards, especially where remediation barriers are installed at some distance away from the waste.

Water Quality Standards

The water quality criteria for toxics in chs. NR 105 and NR 106, Wis. Adm. Code can be ARAR's in 2 ways. First, if a site remedy involves a discharge to surface water, either through a direct point source discharge from a treatment system (such as a leachate or groundwater treatment system) or an indirect discharge through contaminated groundwater flows, the applicable effluent limits for toxic substances would be determined for such discharges based on

a cover is relevant and appropriate for containment of low-level contaminants where direct contact and/or dust is a primary concern and frost penetration, gas, settlement and precipitation percolation is of secondary concern.

2. Section NR 504.07, Wis. Adm. Code, multi-layer soil cover system for solid waste facilities. We believe such a cover is relevant and appropriate for containment of municipal waste sites (or co-disposal sites), where frost penetration, gas, settlement and precipitation percolation is of primary concern, in addition to concern about direct contact.

3. Section NR 181.44(13), Wis. Adm. Code, new facility cover (based on RCRA §264). We believe such a cover is relevant and appropriate for the containment of hazardous wastes, or similar wastes, where settlement, side slopes and other problems can be overcome. Generally, such a cover may be inappropriate at municipal co-disposal sites because of the engineering problems associated with the low permeability membrane portion. However, there may be a few co-disposal landfill Superfund sites where the engineering problems could be overcome.

Gas Collection and Monitoring

Any solid waste disposal unit (regardless of size) that accepted municipal waste which could have subsurface gas migration are required to comply with the gas monitoring requirements in ss. NR 506.07(3), NR 504.04(4)(e) and NR 508.04(2), Wis. Adm. Code (they are applicable). Therefore, soil gas monitoring is required and the explosive gas level standards must be met.

Any solid waste disposal unit that accepted more than 500,000 cubic yards of municipal refuse is required to comply with s. NR 506.08, Wis. Adm. Code (it would be applicable). These units must have an effective gas collection system to collect and combust the gas, unless it can be shown through testing that the air contaminant standards in s. NR 445.03, Wis. Adm. Code (Air Toxics rule), will be met without collection and combustion. Guidance has been prepared by the Solid Waste and Air Management Programs, in response to questions from the Superfund Program Unit, outlining collection, testing and combustion requirements (see the ARAR's listings document, dated January 9 and sent to all SF Program staff). Generally, most landfill units will be required to have active gas collection with extraction wells and flares for combustion. "Testing out" of the collection and combustion requirement will generally be difficult and expensive, and will likely not succeed at larger sites. Therefore, the Department generally recommends that "testing out" not be attempted at these larger sites, and persons assume the active gas extraction and combustion installation is required (some PRP's have accepted this assumption outright).

Plans for a gas collection and combustion system should follow s. NR 514.07, Wis. Adm. Code, requirements for engineering plans and a design report. Documentation of the completed system should follow s. NR 516, Wis. Adm. Code, construction documentation requirements for report preparation, testing and plans. Both s. NR 514.07 and ch. 516, Wis. Adm. Code, are legally applicable to a facility if the collection and combustion system is required.

Landfill ARAR's
Superfund Remedial Meeting, Stevens Point
April 12, 1990

Covers at Existing Units

Areas where the past disposal (or placement; this would not include areas contaminated by spills, drippage, etc.) of wastes and materials took place, are considered old landfill units. In accordance with s. NR 506.08(3), Wis. Adm. Code, the final cover system specified under NR 504.07, Wis. Adm. Code (multilayer soil cover), is required (i. e., it would be legally applicable) if there are exceedances of ch. NR 140, Wis. Adm. Code, groundwater standards (enforcement standards or preventive action limits (PALs) at the DMZ) at the units. This cover system is necessary to prevent future and abate current exceedances of groundwater standards contained in ch. NR 140, Wis. Adm. Code. It should be noted that ch. NR 140, Wis. Adm. Code, requires the Department to consider economic and technical feasibility when requiring actions if only PALs are exceeded. The Department can't consider those feasibility factors if any enforcement standards are exceeded.

Plans for the cover system should follow s. NR 514.07, Wis. Adm. Code, requirements for engineering plans and a design report. Documentation of the completed cover system should follow s. NR 516, Wis. Adm. Code, construction documentation requirements for report preparation, testing and plans. Both s. NR 514.07 and ch. 516, Wis. Adm. Code, are legally applicable to a facility if the cover system is required.

Chapter NR 181, Wis. Adm. Code, cover requirements may be relevant and appropriate for past landfill units. This determination is based on how similar the unit is to a disposal unit which is required to undergo RCRA (Ch. NR 181) closure. The requirements are generally relevant and appropriate if it is known that hazardous wastes (or wastes sufficiently similar to hazardous wastes) were disposed of, even if before 1980. However, they may be relevant, but not appropriate to capping large, dispersed areas of low level contamination. See 53 FR, 51446-51447 and 55 FR, 8763 (proposed and final NCP preambles) for further detailed discussion on RCRA requirements as relevant and appropriate requirements. Also note that the s. NR 181.44(12), Wis. Adm. Code, existing facility cover standards are less stringent than the solid waste cover requirements specified above, while the new facility cover standards under s. NR 181.44(13), Wis. Adm. Code, are based on, but are slightly more stringent than the RCRA §264 cover standards.

Solid or hazardous waste cover requirements are not legally applicable to areas not considered past landfill units, such as large areas of soil contamination from past drippage, spillage and discharges. However, certain solid or hazardous waste cover standards may be relevant and appropriate for these areas if they are to be contained. The type of cover that may be relevant and appropriate would depend on the nature and extent of the contamination, the soil and groundwater conditions in the area, and the risks that require mitigation. Department regulations specify 3 types of covers that may be relevant and appropriate:

1. Sections NR 181.44(12) and NR 506.08(3), Wis. Adm. Code, soil cover. This is essentially 2 feet of clay with 6 inches of topsoil. We believe such

Groundwater Monitoring and Long-Term Care

Using the same logic for determining when certain cover systems are applicable or relevant and appropriate, as described above, the groundwater monitoring requirements in the solid waste rules, ch. NR 508, Wis. Adm. Code, or the hazardous waste rules, s. NR 181.49, may be applicable or relevant and appropriate. Monitoring should be carried out in accordance with ch. NR 141, Wis. Adm. Code, which sets out monitoring well construction requirements. Sampling and analysis should be in accordance with the Department's sampling and analysis guideline document (a "to be considered" (TBC) guideline).

Requirements for long-term care outlined in the solid or hazardous waste rules are also applicable or relevant and appropriate to landfill units, based on the same determination for cover systems. The site O&M plan, prepared as part of the remedial design, must address these requirements, including cover maintenance, gas collection system operation and maintenance, gas and groundwater monitoring, and leachate and/or groundwater collection and treatment system maintenance. Generally, landfills are expected to be cared for at least 30 years, but longer time period may be specified under certain circumstances, depending on the nature of the site. Owners of unapproved landfills are responsible for the care of the site into perpetuity. If hazardous waste long-term care requirements are found to be applicable or relevant and appropriate, the long-term care period may be extended past 30 years if necessary to protect human health or the environment.

3. Demonstrate to the Department's satisfaction that your landfill's design capacity does not exceed 500,000 cubic yards or did not accept municipal solid waste.

We strongly encourage you to choose the first option and proceed with plans for an active gas extraction and emission control system. However, we have developed a method for attempting to "test out" of this requirement, which is detailed in Appendix A of this document. This method necessitates installation of a "mini extraction system" and in-depth monitoring of landfill gas constituents for a period of five years. Money spent on testing could be largely wasted, should a site fail to test out of NR 506.08(6).

In light of the above discussion, we ask that you contact us in writing within thirty days regarding your intentions toward regaining compliance with NR 506.08(6). If you are agreeable to submitting plans and installing an active extraction and emission control system, we would like to enter into an administrative consent order with you in the near future. Because the Department cannot handle all affected landfills at once, we intend to stagger the plan submittal and construction dates in the consent orders over the next two or three years based upon the priority given specific facilities. If complied with, this consent order would eliminate any violations associated with failing to meet the August 6, 1989 deadline for compliance with NR 506.08(6), Wis. Adm. Code.

We're also including a memo in Appendix B which provides insight on NR 445 itself and requirements for treatment of hazardous air contaminants once extracted from the landfill. Questions regarding this letter and Appendix A should be directed to Dennis Mack or Ann Timmerman of our Solid Waste Management program at (608) 267-9386 and (608) 267-7575, respectively, and questions regarding Appendix B should be directed to Steve Dunn of our Air Management program at (608) 267-0566.

Sincerely,

Lakshmi Sridharan, Ph.D, P.E., Chief
Solid Waste Management Section
Bureau of Solid & Hazardous Waste Management

LS:dpm

Enclosures

cc: Solid and Hazardous Waste Program Supervisors

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Carroll D. Besadny, Secretary
Box 7921
Madison, Wisconsin 53707
DNR TELEFAX NO. 608-267-3579
TDD NO. 608-267-6897
SOLID WASTE TELEFAX NO. 608-267-2768

November 12, 1990 File Ref: 4400

^F1^

Dear ^F2^

As you know, Wisconsin's current administrative code series governing solid waste management, chs NR 500-520 Wis. Adm. Code, went into effect in February of 1988. A specific provision of this series, NR 506.08(6) HAZARDOUS AIR CONTAMINANT CONTROL, states:

"All solid waste disposal facilities which have a design capacity of greater than 500,000 cubic yards and have accepted municipal solid waste shall install a department approved system to efficiently collect and combust hazardous air contaminants emitted by the facility within 18 months of February 1, 1988 unless the owner can demonstrate that the performance criteria of s. NR 504.04(f) can be achieved without implementing such a system. Control techniques other than combustion may be approved by the department."

We believe that you have at least one landfill which is subject to this requirement for control of hazardous air contaminants. (Please see attached list.) If so, you are currently more than one year overdue in complying with this requirement. In order to come into compliance with this regulation, you will have to do one of the following:

1. Submit proposed plans for an active gas extraction system to the Bureau of Solid and Hazardous Waste and plans for an emission control system to the Bureau of Air Management. The Bureau of Solid and Hazardous Waste is responsible for approving gas extraction system plans. The Bureau of Air Management is responsible for approving emission control plans. Upon obtaining Department approval of the plans you would be required to install the system during the next construction season.

2. Conclusively show that the performance criteria of NR 504.04(4)(f) are being achieved without such a system. (NR 504.04(4)(f) itself refers to NR 445, the administrative code regulating the discharge of hazardous air contaminants.)

Southern District

Dane County - Verona (2680) *
Dane County - Rodefeld (3018)
Refuse Hideaway (1953) *
Hechimovich (3068)
Land and Gas Reclamation (1118)
Central Sanitary Landfill (2132)
Jongetes (943)
Valley Sanitation (2686)
Rock County (3023)
City of Janesville (62) *
City of Janesville (2822) *
Sauk County (2051)
Sauk County (2978)
WMI-Valley Trail (1890) *
WMI-Valley Trail (3066)
Fond du Lac County (2358) *
City of Portage (2330)
Carl Schmidt - Old Site (1309)
City of Madison - Green Tree Hills (1714)
City of Madison - Sycamore (1935)
Dane County - Truax
WMI-City Disposal (37)
Sanitary Transfer and Landfill - Koshkonong (720)
City of Sun Praire (814)
Metropolitan Refuse District (107)
Majerus Landfill (7)

Southeast District

WMI-Pheasant Run (1739) *
WMI-Pheasant Run - Northern Expansion (3062)
WMI-Metro (1099) *
City of Milwaukee - College Avenue (428)
City of Milwaukee - Hartung Quarry (1501)
City of Milwaukee - Hauley Road (426)
City of Wauwatosa (525)
Land Reclamation Ltd. (572)
City of Sheboygan Falls (1167)
BFI-Troy Area (3090)
WMI-Mallard Ridge (140)
WMI-Parkview (3108)
WMI-Stone Ridge (141)
WMI-Stone Ridge (2895) *
Sanitary Transfer and Landfill - Delafield (719)
WMI-Omega Hills (1678) *
WMI-Lauer 1 (11)
City of West Bend (2619)
Milwaukee County Highway Department Landfill (881)
WMI-Reclamation Inc. (1356)
WMI-Brookfield (1) *
WMI-Caledonia (147) *
WMI-Polk (307)

LANDFILLS SUBJECT TO NR 506.08(6)
HAZARDOUS AIR CONTAMINANT CONTROL

Northwest District

City of Superior (2627)
Lake Area Disposal (3144)

North Central District

Holz - Krause (674)
Midstate (436) (2812) *
Marathon County (2892) *
Oneida County (2805) *
Portage County (2966)
Tork Old (652) *
Tork-Seneca (2967)
City of Rhinelander - Slaughterhouse Creek (686)
Juneau County (2565)
Adams County (3150) *

Western District

Eau Claire County (2921) *
Jackson County Sanitary Landfill (2004)
LaCrosse County (2637) *
Monroe County (2858)
Junker Sanitary Landfill (1972)
City of Eau Claire - Blue Valley (77)
City of La Crosse - Isle la Plume (144)
City of Chippewa Falls (85)

Lake Michigan District

Brown County East (2569) *
Brown County West (2568) *
Door County (2937)
WMI-Ridgeview (2575)
WMI-Ridgeview horizontal (3041)
Outagamie County (2484) *
Winnebago County (611) *
WMI-Eaton (3)
City of Two Rivers (318)
City of Green Bay - Humboldt Road (1129)
City of Green Bay - Military Avenue (169)
City of Green Bay - Danz Avenue (170)
City of Manitowoc - Muth Site
Lehrer - Midwest Disposal (73)
Marinette County (3095)
City of Appleton (112)
City of Neenah (2299)

APPENDIX A

SUGGESTED METHOD FOR ESTIMATING HAZARDOUS AIR CONTAMINANT EMISSIONS FROM LANDFILLS

Any source planning to conduct any of the tests specified below must submit a test plan in accordance with ch. NR 439.07, Wis. Adm. Code.

STEP 1. In order to determine which hazardous constituents are present in a particular site's gas, monitoring wells would be installed at various points within the landfill. One well would be installed per five acres of landfill, with a minimum of four wells. These wells should have long screens covering all but perhaps the upper 10 or 15 feet of the waste in order to obtain average gas concentrations. Unless otherwise determined by the Bureau of Air Management (BAM), each of the wells would then be monitored at least three times for benzene, vinyl chloride and all parameters contained in Tables 1, 3B and 4 of ch. NR 445. Elimination of some of the parameters in Tables 1, 3B and 4 may be possible if the landfill owner can demonstrate to BAM's satisfaction that their presence in the landfill or possibility of emission is remote. Only the substances detected in this step would subsequently be monitored for.

STEP 2. Either during or after performing step 1. above, landfill gas extraction wells would be installed to the base of the waste. These extraction wells would be placed at the same frequency as the monitoring wells mentioned above; one per five acres, with a minimum of four wells. Each extraction well would be screened over approximately the lower two-thirds of its length. All extraction wells would be located away from leachate collection systems or other conduits which could conduct gas or outside air such as existing passive system vents. If this is not possible, sources of outside air intrusion must be tightly sealed. Each of the extraction wells would be connected by flexible header piping, and the header piping would be connected to a blower capable of producing a sufficient vacuum within the waste at all wells. Additional gas monitoring wells would be required at various distances from each extraction well in order to determine the distance from which the extraction well is drawing gas when pumped.

STEP 3. Each quarter, the blower would be run for a period of one or more days. During this time, the following data would be obtained:

-The gas extraction rate

-The concentration of each substance of concern identified in step 1.

-The radius of influence for each extraction well and the volume of waste contained within the theoretical cylinder formed by that radius

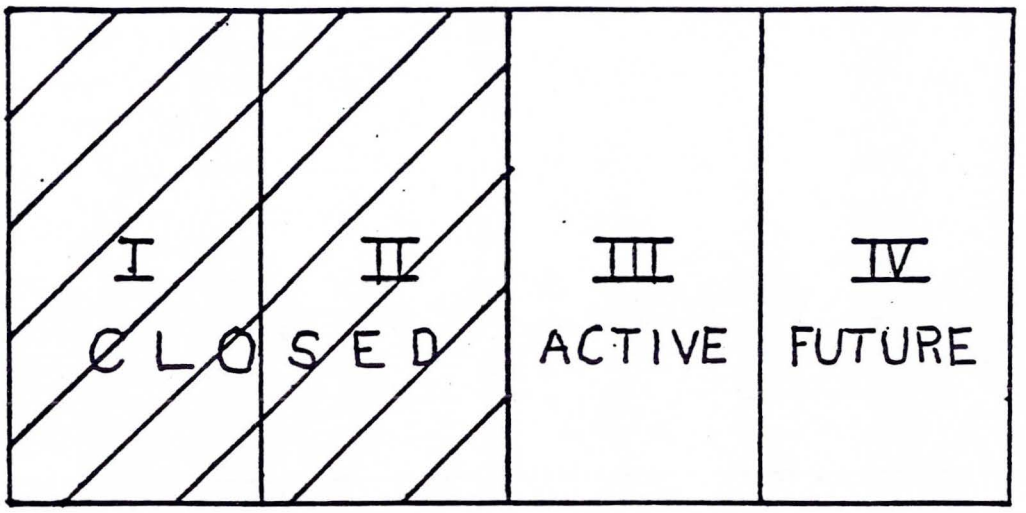
The level of vacuum applied by the blower is not critical. However, it should not be so great as to cause appreciable outside air intrusion.

City of Kenosha (38)
Sanitary Transfer and Landfill - Oconomowoc (718)
Town of East Troy (24)
City of Burlington (186)
City of Waukesha (521)
Master Disposal (2425) *

* Means hazardous air contaminant control system has been installed or plan has at least been received by Department.

( ) License Number

EXAMPLE



* *20 Acre Active Landfill Which Accepts Municipal Solid Waste*

* *Landfill Divided into 4 Phases, 2 of Which are Closed, Filling Occuring in 3rd Phase*

* *Design Capacity All 4 Phases of Landfill in total= 5 million Cubic Yards*

STEP 4.. Using the information gathered in step 3., the owner would be required to calculate the rate at which each substance of concern is being emitted in units of pounds per year per cubic yard of waste affected by the test extraction wells. Then, this data would be extrapolated to estimate the total emissions from the entire landfill. If, for any quarter of testing, the estimated emission rate for a substance in Table 3 exceeded that allowed in ch. NR 445, installation of an active gas extraction system to meet control requirements of ch NR 445, Wis. Adm. Code. would be required. For exceedances of Tables 1 and 4, the landfill owner would have the option of performing air modelling to demonstrate that ambient concentrations at the landfill's property line do not exceed 1 or 24-hour limits. If the standards were not exceeded at the property line, no system would be required for hazardous air contaminant control.

For example, assume that from steps 1 through 3 it was determined that for the second quarter of the third year of testing on a 5,000,000 cubic yard landfill, the Table 3 parameter vinyl chloride was being emitted at a rate of 20 pounds per year, and that the volume of waste affected by the test extraction wells was 200,000 cubic yards. Then, the extrapolation of this data would give an estimated emissions rate of 500 pounds of vinyl chloride per year. Since this exceeds the 300 pound per year level in ch. NR 445, an active gas system would be required.

If, after five years of quarterly testing, no exceedances of ch. NR 445 emission rates had occurred, a site would then be exempt from the requirement to install a system to efficiently collect and combust hazardous air contaminants. An abbreviated example which follows this method and contains schematic drawings is included on the next three pages.

All questions regarding proper sampling techniques should be addressed to the Department's Bureau of Air Management.

Step 3: *Run blower quarterly and determine its extraction rate (cfm).*

Determine radius of influence of extraction wells & volume of garbage affected.

Determine concentrations of contaminants identified in Step 1.

Step 4: *Assume it's determined that vinyl chloride being emitted at rate of 20 lbs./yr, and the 4 extraction wells are affecting a total of 200,000 yds³ of waste.*

Extrapolate this over entire design capacity:

$$\frac{20 \text{ lbs/yr}}{200{,}000 \text{ yds}^3} \times 5{,}000{,}000 \text{ yds}^3 = 500 \frac{\text{lbs VC}}{\text{yr}}$$

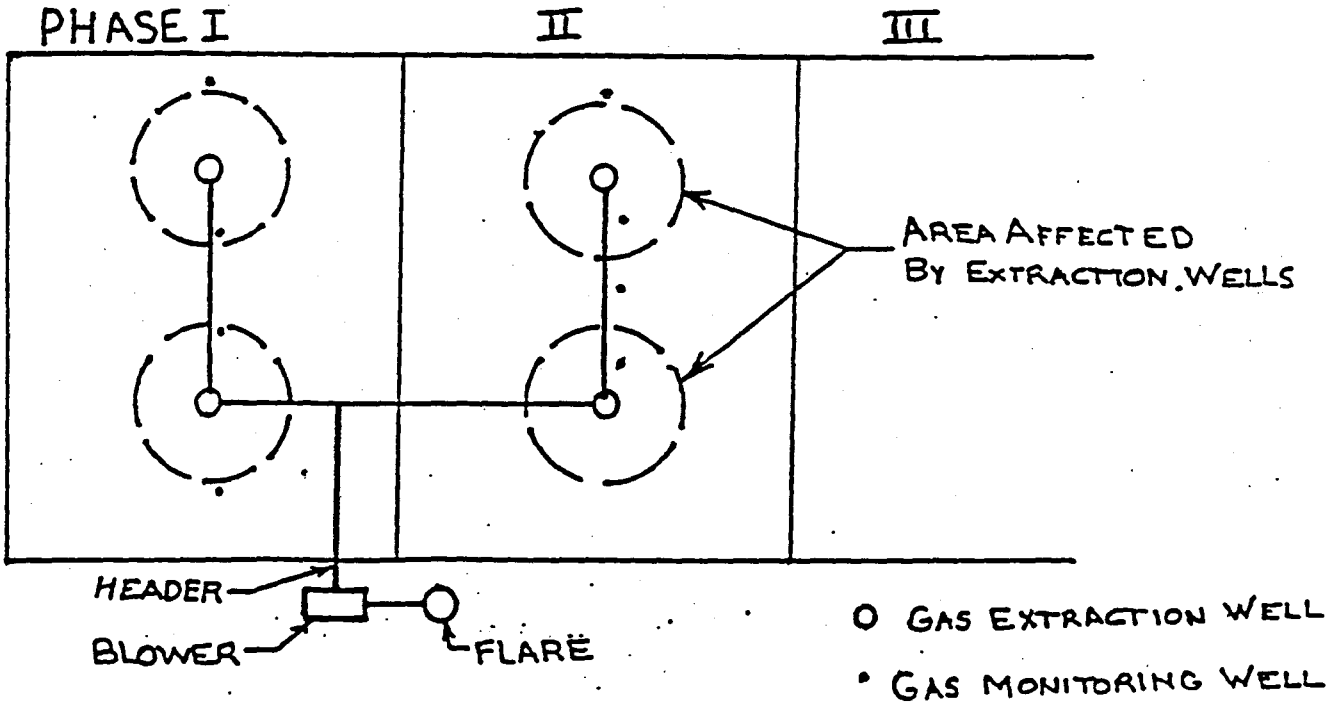
Since this is > 300 lbs/yr standard in NR 445, must install system to control HAC's.

Step 1: *Install at least 2 gas monitoring wells in each of closed Phases 1 & 2.*

Sample each well 3 time for all parameters in Tables 1, 3, & 4 of NR 445

Step 2: *Install at least 2 gas extraction wells in each of Phases 1 & 2 and hook them up to a common blower.*

Install more gas monitoring wells at varying distances from the extraction wells.



2. What is LAER?

LAER is defined in ch. NR 445 to be the more stringent of the following:

a. The most stringent emission limitation for the hazardous air contaminant which is contained in the air pollution regulatory program of any state for this class or category of source, unless an applicant for a permit demonstrates that this limitation is not achievable; or

b. The most stringent emission limitation for the hazardous air contaminant which is achieved in practice by the class or category of source.

Under Air Management rules, the burden of demonstrating what is LAER is placed on the facility. The Department is only required to determine whether the proposed LAER is adequate through the approval, disapproval or conditional approval of the facility's compliance plan. For landfills, BAM has decided to develop a "presumptive LAER" for all landfills. The decision was based on BAM's opinion that most landfills have sufficiently similar emissions to allow a presumptive LAER to be generally applicable.

Since each facility is required to do a LAER analysis, any facility may submit an alternative LAER analysis, which differs from presumptive LAER, to the Department for approval. However, it is unlikely any alternative LAER submittal would be deemed acceptable if it did not meet the required destruction/capture efficiencies contained in the Department's presumptive LAER analysis.

3. Presumptive LAER Analysis for Landfills

The Department has determined that LAER for landfills will be the installation and operation of an enclosed thermal oxidizer ("gas flare"). The requirements for design and operation of the LAER flare may be found in Attachment 1 of this memo. The following is a brief summary of the requirements.

a. Flare Type - An enclosed thermal oxidizer is the flare type with the highest organic destruction efficiency.

b. Operating Temperature/Ret. Time - To meet LAER requirements, the unit must operate at 1500°F with a 0.6 sec. retention time.

c. Operating Requirements - There is a continuous temperature monitoring requirement to ensure that organic emissions are being controlled at the Required Destruction Efficiency. The low temp./flame-out alarm system is required to minimize uncontrolled or improperly controlled emissions.

APPENDIX B

DATE: November 7, 1990 FILE REF: 4500

TO: Landfill Owners

FROM: Steve Dunn - AM/3 SDF

SUBJECT: Landfill Requirements Under Chapter NR 445, Wis. Adm. Code

1. What is NR 445?

Chapter NR 445, Wis. Adm. Code is an Air Management rule developed to control the emission of hazardous pollutants to the atmosphere. The wide scope of the rule has brought many non-traditional sources under regulation by the Bureau of Air Management (BAM). These non-traditional sources include wastewater treatment plants, gas stations and landfills, among others.

Under ch. NR 445, hazardous pollutants are regulated under one of two basic approaches. These are:

- Carcinogens (known or suspected human carcinogens) are required to be controlled based on available control technologies.
- Non-carcinogens (acute toxics) are regulated on the basis of their ambient air concentrations.

The known and suspected human carcinogens are contained in Table 3 of ch. NR 445. (Note: There are four tables in ch. NR 445.) These are further subdivided into Tables 3A and 3B. Table 3A is a list of known human carcinogens. Table 3B is a list of suspected human carcinogens. The only practical difference between Tables 3A and 3B are the levels of control required of sources. Control is required when actual emissions exceed the de minimis values listed in the tables.

Facilities which have actual emissions above the Table 3A de minimis levels are required to install control technology which meets the Lowest Achievable Emission Rate (LAER). LAER will be defined and more thoroughly explained in Sections 2, 3 and 4.

Facilities which have actual emissions above the Table 3B de minimis levels are required to install control technology which represents Best Available Control Technology (BACT). BACT will be more thoroughly discussed and defined in Sections 4, 5, 6 and 7.

Facilities which desire to meet LAER or BACT requirements by using an energy recovery device (i.e. internal combustion engine, gas turbine, ...) to control emissions of hazardous pollutants should contact BAM for specific requirements for these devices.

and operational requirements for the BACT flare for landfills is essentially the same as LAER except for two changes (See Attachment 1). These two exceptions are:

a. Operating Temperature/Ret. Time - The flare operating parameters for BACT are 1400°F and 0.6 secs. retention time.

b. Required Destruction Efficiency - There are no required destruction efficiencies for benzene and vinyl chloride. The required efficiency for NMOC must, however, still be met.

7. Testing to demonstrate that BACT is not Applicable.

A facility is exempt from BACT requirements if it is able to demonstrate that its Department-approved gas extraction system does not emit any Table 3B compound above the de minimis level.

Unlike the Table 3A compounds, indicators (benzene, vinyl chloride) would not be considered an acceptable compliance demonstration. Thus, all Table 3B compounds would need to be evaluated [See Attachment 2].

8. Procedures for Testing to demonstrate that flaring is not required.

The procedures for testing to demonstrate that the LAER or BACT control requirements do not apply may be found in Attachment 2. The Department believes these procedures will ensure that no source, with or without control, will emit any NR 445 compound above the de minimis levels [See Attachment 2].

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Attachment 1

Flare design and operating requirements to meet LAER and BACT under ch. NR 445.

Attachment 2

Procedures for testing to demonstrate that control requirements are not applicable.

d. Emission Testing - The required emission testing characterizes the landfill gas, and measures the flare's destruction efficiency. Benzene and vinyl chloride serve as indicators for all ch. NR 445, Table 3 compounds. Non-methane organic carbon (NMOC) is used as a surrogate indicator for all NR 445 compounds. Also, NMOC will likely be the primary pollutant indicator for designing control measures in upcoming EPA regulations for large landfills.

e. Required Destruction Efficiency - The required destruction efficiencies must be met by all flares. Operating at the minimum temperature and retention time is not a satisfactory compliance demonstration if the required destruction efficiencies are not met.

f. Reporting Requirements - The reporting requirements represent the data the Department believes is necessary to ensure the flare is operating properly. It also allows the Department to estimate emissions from the flare.

g. Other Requirements - These requirements are meant to highlight Air Management regulations which need to be followed by every landfill required to control the emission of hazardous air contaminants.

4. Testing to Demonstrate LAER is not Applicable.

A facility is exempt from LAER requirements if it is able to demonstrate that its Department-approved gas extraction system does not emit any Table 3A compounds above the de minimis levels. This could be accomplished by demonstrating through testing that benzene and vinyl chloride are not present in sufficient concentrations to exceed ch. NR 445 de minimis levels (300 pounds/yr for each compound). Once this has been established, LAER would not be required for the source. However, since Table 3B emissions may be above de minimis levels, BACT may still be required [See Attachment 2].

5. What is BACT?

BACT (Best Available Control Technology) is defined as "the maximum degree of emission reduction practically achievable taking into account energy, economic and environmental impacts." BACT is generally considered to be a less stringent level of control than LAER.

BACT, like LAER, is generally determined by the facility. However, in order to ease the burden on affected facilities, BAM has developed a presumptive BACT for landfills. The development of a presumptive BACT does not obviate the requirement that a facility conduct its own BACT review.

6. Presumptive BACT Analysis for Landfills

The Department has determined that BACT for landfills is the installation and operation of an enclosed thermal oxidizer ("gas flare"). The design

Landfill Gas Flare
BACT Design and Operating Requirements
Under Chapter NR 445, Wis. Adm. Code

Flare Type - Enclosed thermal oxidizer.

Operating Temperature/Ret. Time - 1400°F for 0.6 seconds after flame burner.

Operating Requirements - Continuous measurement and recording of the fifteen minute average flue gas temperature after the flame zone, and low temperature/flame out telephone alarm system to notify responsible party. An alternative system may also be installed if it is determined by the Department to be equally effective in ensuring against emissions of toxic pollutants.

Emissions Testing - Testing of the inlet and outlet of the flare for the concentration and mass emission rate of carbon monoxide, carbon dioxide, methane, nonmethane organic carbon (NMOC), vinyl chloride and benzene. Determine destruction efficiency for NMOC. If NMOC is not found at the inlet, then no outlet testing is required. The testing is to be done within 60 days of system start-up and biennially at the inlet and quadrennially at the outlet thereafter (i.e. destruction efficiency need only be measured once every four years). Each biennial/quadrennial test shall be performed within 60 days of the anniversary date of the first test.

Required Destruction Efficiencies - 99% for NMOC

Reporting Requirements - The Quarterly reports need to include the following information:

- Percent operating time for the extraction system.
- Average daily temperature after the flame zone.
- Biweekly measured flowrate of gas in standard cubic feet per minute.
- Duration and cause of any uncontrolled emissions (i.e., system operation without combustion).

The reports should be sent to the appropriate Air Management District office for the first year of operation. Thereafter, the reports should be maintained at the site only.

Other Requirements - The source must comply with all applicable Air Management Regulations in the Wis. Adm. Code. Specifically:

- NR 439.03 (Reporting)
- NR 439.04 (Recordkeeping)
- NR 439.07 (Testing)
- NR 439.11 (Malfunction Prevention and Abatement)
- any other Air Regulation which is applicable to the specific source.

v:\9009\am9flare.sdd

Attachment 1

Landfill Gas Flare
LAER Design and Operating Requirements
Under Chapter NR 445, Wis. Adm. Code

Flare Type - Enclosed thermal oxidizer.

Operating Temperature/Ret. Time - 1500°F for 0.6 seconds after flame burner.

Operating Requirements - Continuous measurement and recording of the fifteen minute average flue gas temperature after the flame zone, and low temperature/flame out telephone alarm system to notify responsible party. An alternative system may also be installed if it is determined by the Department to be equally effective in ensuring against emissions of toxic pollutants.

Emissions Testing - Testing of the inlet and outlet of the flare for the concentration and mass emission rate of carbon monoxide, carbon dioxide, methane, nonmethane organic carbon (NMOC), vinyl chloride and benzene. Determine destruction efficiency for NMOC, vinyl chloride and benzene. If a compound is not found at the inlet, it does not need to be tested for at the outlet. The testing is to be done within 60 days of system start-up and biennially at the inlet and quadrennially at the outlet thereafter (i.e. destruction efficiency need only be measured once every four years). Each biennial/quadrennial test shall be performed within 60 days of the anniversary date of the first test.

Required Destruction Efficiencies - 90% for Benzene, 99% for Vinyl Chloride and NMOC.

Reporting Requirements - The Quarterly reports need to include the following information:

- Percent operating time for the extraction system.
- Average daily temperature after the flame zone.
- Biweekly measured flowrate of gas in standard cubic feet per minute.
- Duration and cause of any uncontrolled emissions (i.e., system operation without combustion).

The reports should be sent to the appropriate Air Management District Office for the first year of operation. Thereafter, the reports should be maintained at the site only.

Other Requirements - The source must comply with all applicable Air Management Regulations in the Wis. Adm. Code. Specifically:

- NR 439.03 (Reporting)
- NR 439.04 (Recordkeeping)
- NR 439.07 (Testing)
- NR 439.11 (Malfunction Prevention and Abatement)
- any other Air Regulation which is applicable to the specific source.

v:\9009\am9flare.sdd

"Reasonably be expected to be emitted" includes all Table 3B compounds which are not solid at standard temperature and pressure.

3. No hazardous emissions - If a source wishes to demonstrate that no hazardous air contaminant treatment technology is required because it does not emit any NR 445 compounds above de minimis levels (including Tables 1 and 4 of ch. NR 445), it may use the following procedure:

The mass emission rate of all ch. NR 445 compounds (Tables 1,3 and 4) which could reasonably be expected to be emitted from landfills shall be determined by a series of four quarterly tests plus yearly reconfirmation of results. The following time schedule should be used:

Time(DAYS)	Action
0	System Start-up
60	First Quarterly Test
150	Second Quarterly Test
240	Third Quarterly Test
330	Fourth Quarterly Test
330+365	First Annual Test
+365	Second Annual Test
+365	Third Annual Test
+365	Fourth Annual Test
+730	7-Year Test
+730	9-Year Test
+365	Final Test

"Reasonably be expected to be emitted" includes all NR 445 compounds which are not solid at standard temperature and pressure.

Attachment 2

The following testing procedures apply to landfills which have installed, are in the process of installing, or are required to install active gas collection systems. Facilities which had complete and operational gas extraction systems prior to October 1, 1988 may use an abbreviated test procedure with Department approval. Other facilities will be evaluated individually as necessary by BAM.

Two control "levels" may be applicable to landfills under NR 445. These levels are Lowest Achievable Emission Rate (LAER) and Best Available Control Technology (BACT).

Presumptive LAER and BACT determinations may be found in Attachment 1.

Testing Procedures

Any source planning to conduct any of the tests specified below must submit a test plan in accordance with ch. NR 439.07, Wis. Adm. Code.

1. LAER - LAER is required of all sources which emit greater than the de minimis level of any Table 3A compound. BAM has determined that benzene and vinyl chloride are the primary Table 3A compounds which may reasonably be expected to be emitted from landfills. Thus, LAER control technology is required for any landfill which emits more than 300 lb/yr of benzene or vinyl chloride.

In order for a facility to be exempt from the requirement to install LAER technology, it must demonstrate through testing that it does not emit benzene or vinyl chloride above the de minimis levels. This may be established by the following procedure:

The mass emission rate of benzene and vinyl chloride will be determined by a series of four quarterly tests over a one-year period.

The tests shall commence within 60 days of system start-up.

2. BACT - BACT is required of all sources which emit greater than the de minimis level of any Table 3B compound, but do not emit Table 3A compounds above de minimis levels. For a source to be exempt from the requirement to install BACT it must demonstrate that it does not emit any Table 3B compound above de minimis levels by using the following procedure:

The mass emission rate of all Table 3B compounds which could reasonably be expected to be emitted from landfills shall be determined by a series of four quarterly tests over a one-year period.

The tests shall commence within 60 days of system start-up.

approximately 50-75 feet from the landfill perimeter. The wells would be connected by a header pipe located near the landfill surface to a blower and flare. The blower creates a vacuum that sucks the gas out of the waste.

A surficial passive system over the entire site would only dissipate the gases generated near the top of the landfill. This system would not stop the gases from migrating off site and would need to be supplemented in areas where this is a concern. Also, it is unlikely that a passive system could be modified to efficiently collect and combust hazardous air contaminants or control methane migration should problems develop.

If properly designed and installed, an active system over the entire site would remove essentially all gas from the landfill thereby preventing gas migration from occurring at all locations. An active gas extraction system could be modified to efficiently collect and combust hazardous air contaminants if subsequently found to be necessary. Also, it has been shown that an active gas extraction system within waste helps reduce groundwater contamination by removing contaminants that otherwise would enter the groundwater aquifer.

On a related topic, this site may also have a leachate mound within it, based on the clay environment and high water table. Generally, the Solid Waste Section requires leachate extraction if there is more than five or so feet of liquid above the base of a site. A low permeability cap alone is probably not an effective way of remediating and/or preventing groundwater contamination at a zone of saturation landfill. Vertical gas extraction wells and an active gas system can be designed to include leachate extraction or may be modified, if needed, at a later date.

As stated earlier, due to lack of information we cannot give you a definitive answer now on the type of gas system needed. However, based on the information we do have, we would recommend an active gas extraction system over the entire site that is also designed to remove leachate.

We also believe that the methane levels detected west of the landfill are cause for concern. Frequent monitoring of this perimeter and especially nearby structures should occur at least until a control system is constructed and operational.

If you have any questions or need additional information please feel free to call Ann at (608) 275-7575 or Dennis at (608) 267-9386.

cc: Mark Giesfeldt/Sue Bangert - SW/3
Lakshmi Sridharan/Dennis Mack - SW/3
Don Grasser - NCD
Gary Kulibert - NCD

State of Wisconsin

CORRESPONDENCE/MEMORANDUM

Date: February 19, 1991

To: Michelle Owens - NCD

From: Ann ~~Timmerman~~ and Dennis Mack - SW/3 DM

Subject: Spickler Landfill Superfund Site

This memo is in response to your February 4, 1991 request for assistance. Based upon available methane monitoring results from gas wells located outside of the limits of waste, we believe a gas migration control system is definitely necessary on the west side of the site and possibly on the south side as well. Given the limited information on site geology, waste depths, etc. it is difficult to tell at this time whether a passive system would suffice or whether an active system is necessary for control of methane migration.

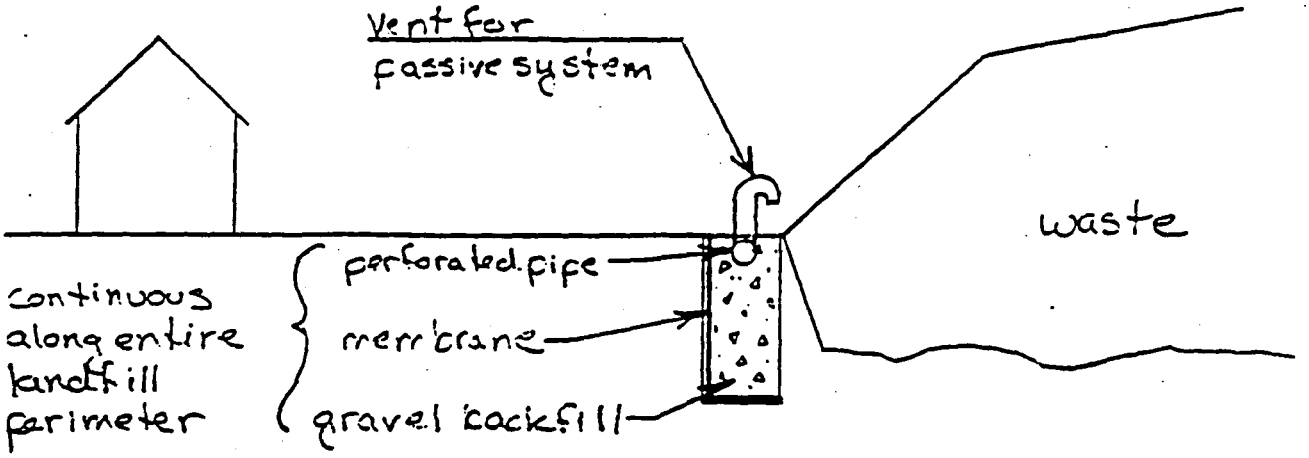
The site is under 500,000 cubic yards and is not required to have an active gas system under NR 506.08(6), Hazardous Air Contaminant Control. However, the following must be complied with:

> NR 504.04(4)(e), Wis. Adm. Code, performance standard for the migration and concentration of explosive gases in any facility structures or in the soils or air at or beyond the facility property boundary in excess of 25% of the lower explosive limit for such gases at any time. The site is clearly in violation of this code provision.
>
> NR 504.04(4)(f), Wis. Adm. Code, performance standard for the emission of any hazardous air contaminant exceeding the limitations for those substances contained in s. NR 445.03. (The implicit assumption in the code is that sites with design capacities less than 500,000 cubic yards will not exceed NR 445 emission standards.)

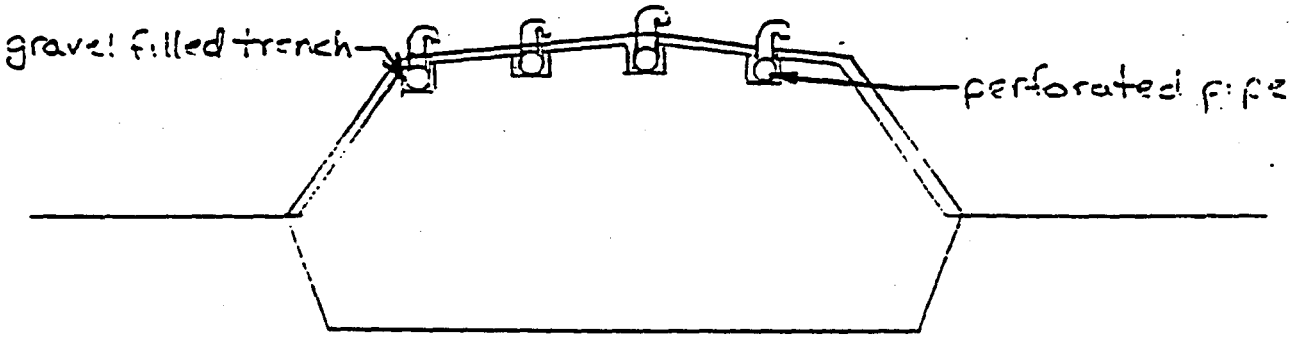
Several options may be considered to control the migration of gas: a perimeter system which could be either passive or active; a system over the entire site which could be either passive or active; or possibly a combination of these systems.

To be effective, a perimeter system must extend to or below the bottom of waste. This type of system prevents the horizontal migration of gas in that direction but does not affect gasses in other portions of the landfill. A passive perimeter system would be located just outside of the limits of waste. It must be continuous along the entire perimeter, extend below the deepest waste, and be keyed into an impermeable layer at its base. An active perimeter system would require a series of vertical wells spaced approximately every 100-150 feet, all of which would be located inside the limits of waste

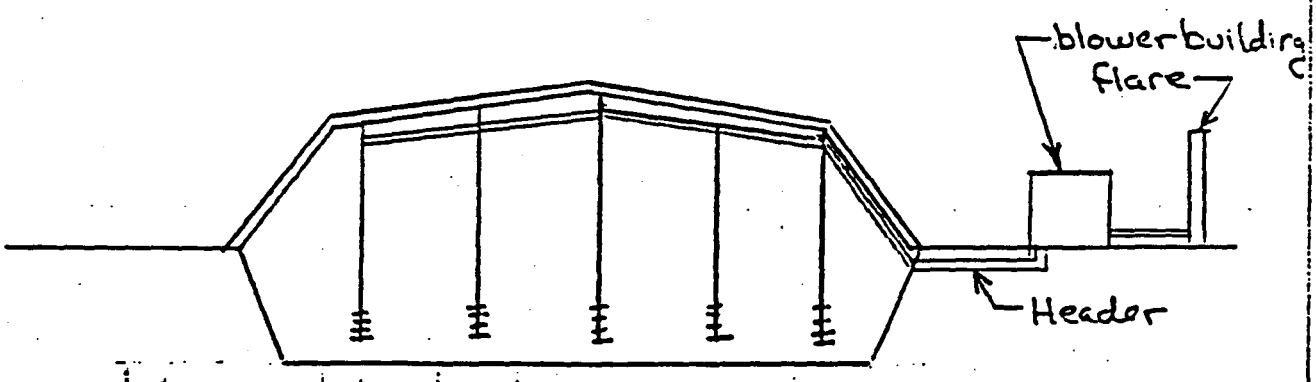
2/15/91



perimeter gas system



passive gas system
(entire site)



Vertical gas extraction
(active)

sites, the Solid Waste section has required composite caps which consist of the NR 504.07 cap with the addition of a geomembrane layer over the clay component. The decision to require a composite cap has been made on a case-by-case basis within the Solid Waste section. The major factor leading to this requirement has been the presence of significant groundwater contamination.

Evaluation Items

The landfill cap should serve several purposes. The cap should: a) minimize leachate generation by reducing infiltration through the cap and subsequent leaching from the waste; b) prevent direct contact with the landfill waste; c) contain the landfill contaminants; d) limit air intrusion into the waste in order to prevent landfill fires; e) stabilize the final surface through appropriate slopes and vegetation; and f) provide for and enhance the removal of leachate and gas.

Evaluation of a capping remedy should not arbitrarily eliminate consideration of other remedial actions. Additional remedial actions can be used to enhance the cap performance, or to act in concert with the cap to provide the above services. If several remedial actions are to be performed, staged implementation of the remedial actions should be considered. Early installation of the cap and gas/leachate extraction system can limit groundwater contamination while subsequent investigations or remedial actions are on-going. This approach is comparable to U.S. EPA guidance which suggests using an operable unit approach to expedite cap installation. This strategy may also minimize the extent of additional remedial actions required.

Capping Systems

Numerous design items need to be considered when selecting the appropriate cap materials for a landfill. The Department believes that the NR 504.07 cap is generally appropriate for most ER and Superfund sites being closed as solid waste landfills, and should limit infiltration through the waste. The addition of a geomembrane component to this capping system may result in an additional reduction in infiltration through the cap, with a resulting reduction in leachate production. However, a geomembrane cap should not automatically be selected.

A low-permeability soil layer (e.g., 2 feet of compacted clay) is necessary below the geomembrane to not only limit infiltration through geomembrane holes, but to provide redundancy should the geomembrane fail.[1] The installed

[1]At papermill sludge landfills, the landfill contents do not provide a stable surface upon which to compact clay. In these instances, geomembranes (without an underlying low-permeability soil layer) have been used as the low-permeability component of a layered capping system.

CORRESPONDENCE/MEMORANDUM

DATE: July 26, 1991

TO: ER Staff - District and Bureau
Superfund Staff - District and Bureau
Bureau Unit Leaders
District Program Supervisors
District Unit Leaders

FROM: Celia VanDerLoop SW/3

SUBJECT: Design Considerations for Selecting Capping Systems at Superfund and Environmental Repair Landfill Sites Interim Guidance

The Environmental Repair (ER) program is developing guidance regarding remedy considerations at ER landfills and Superfund sites. I'm writing this memo to summarize items which should be evaluated when a landfill cap is considered for a remedy.

Authority and Previous Caps Required

Wisconsin regulations require an NR 504.07 cap (grading layer, clay layer, soil cover layer, and topsoil layer) be proposed and installed at all new solid waste landfills. For existing solid waste landfills which have approved closure plans or plans of operation, the cover required in the plan approval is the minimum cover acceptable under normal operating conditions. For those solid waste landfills which do not have a closure plan approved, the cover system required by NR 506.08(3) (2 feet compacted earth, 6 inches topsoil) is the minimum cover acceptable under normal operating conditions. The Department has authority under NR 506.08(3) to require a NR 504.07 cap if necessary to prevent or abate exceedances of NR 140 standards. The Department also has authority under NR 140 to require additional actions or further cover upgrades if necessary to attain NR 140 standards.

In practice, the ER and Superfund programs have consistently required caps that meet the NR 504.07 requirements at solid waste landfills where groundwater impacts exceed 140 standards. These cap upgrades have been required both for sites which have approved closure plans and for sites which do not have approved closure plans. It is unlikely that a less stringent cap, such as the NR 506.08(3) cap, would be approved for a leaking ER or Superfund landfill without other design requirements which mitigate groundwater impacts.

The ER program is considering a composite clay/geomembrane cap as a part of the selected remedy at a Superfund landfill. At several existing and proposed

system. The stability of the cap subgrade can be improved by recompacting the top of the waste, by addition of a thicker soil grading layer, or by incorporating a layered system of geofabrics or geogrids into the cap design.

The value of a large degree of infiltration reduction needs to be evaluated when selecting a capping system. For landfills with a large amount of waste which is below the water table, the waste which is below the water table will continue to contribute contaminants to the groundwater even if an extremely low permeability cap, such as a composite cap, is installed. Alternate or additional methods of limiting or containing groundwater contamination, such as installing a cut-off wall, pumping and treating groundwater to control gradients and prevent migration of the contaminant plume, or consolidation of the waste to an area above the water table, may be appropriate. However, it is important to consider a low permeability cap to limit contaminant migration from the portion of the waste above the water table, and to control the water table within the waste if necessary.

NR 504.05(10)(h) requires that all new facilities be designed with final slopes greater than 5 percent and less than 25 percent. These slopes are preferable for closure of all landfills. However, for older landfills with shallow slopes, regrading to these slopes is not always practical. For these landfills, the slopes required by NR 506.08(3)(c), a minimum of 2 percent and a maximum of 33 percent, are the least that would be acceptable. In these cases, a composite cap can minimize infiltration due to slow drainage of surface water better than a soil cap. In all cases, ponding can exacerbate settlement problems and should be minimized regardless of capping materials selected.

As wastes decompose, municipal landfills generate landfill gases which contain methane and VOCs. For those existing municipal landfills with design capacities of greater than 500,000 cubic yards, an active gas extraction system is required, or the facility must "test out" of this requirement. Extraction of the landfill gases can affect VOC loading to groundwater. Active gas extraction systems are required at all new municipal waste landfills. In order for the active gas extraction system to extract landfill gas and not pull air through the cap into the waste, the landfill must have a continuous low permeability cap to prevent air intrusion. This barrier layer also allows use of a higher vacuum within the extraction system. For those landfills with shallow waste depths, use of horizontal extraction systems may be appropriate. If horizontal systems are used, a high quality, low permeability cap is necessary to prevent air intrusion. For all active gas extraction systems, the design should include the ability to collect, monitor, and remove condensate.

The Department has reviewed several cap designs which incorporate a sand drainage layer above the low permeability layer(s) in the cap. This layer is intended to drain liquids laterally off of the cap, to prevent root penetration into the clay layer, and to maintain moisture content within the clay layer. Addition of this drainage layer may enhance the cap performance

geomembrane should be expected to have some holes, the number of which depends on the quality of construction and materials. The overall leakage through the geomembrane holes is dependent upon characteristics of the underlying materials. It is important to have good contact between the geomembrane and the underlying low-permeability layer. An intermediate drainage system serves to maximize leakage through the geomembrane by causing holes or failures to create "pipe flow" conditions. The leakage is then transferred through the intermediated drainage system, including to points of leakage in the underlying layer. If the underlying low-permeability layer contains macro-structure due to desiccation cracking, improperly placed materials, or settlement, the flow through geomembrane holes can create a resulting high level of leakage through the capping system.

The low-permeability soil layer should meet clay material and placement specifications in order to minimize this leakage, and to act as a back-up in case of geomembrane failure. Lesser quality materials such as low-plasticity clays may be considered in unusual circumstances if better quality clay cannot be located. Significant time and effort can be necessary to locate and obtain an adequate clay source. The facility should begin a search for good quality clay as soon as possible within the process, in order not to be rushed into accepting lesser quality materials.

With an existing soil cap, high permeability soils or significant fractures and macro-structure are likely to be present. If existing clay soils are to be re-used as the low-permeability soil portion of the cover system, they should be removed and replaced such that the completed clay layer meets the specifications of NR 504.07(4). All NR 504 material and placement specifications should be met throughout the two foot soil thickness before placement of a geomembrane, and the clay layer should be redocumented per NR 516 to ensure that both material and placement specifications are met. Additional clay soils may need to be brought on-site to ensure a two foot thick recompacted clay layer is present and to avoid exposing the waste mass.

The geomembrane composite cap may be more difficult to design, construct and maintain than the basic NR 504.07 cap. Installation of the geomembrane often requires a separate contractor. Proper design and construction of the landfill cap drainage features and other details, such as leachate headwells or gas extraction wells, are extremely important for composite caps. A drainage system is necessary above the geomembrane component to prevent saturation and sloughing of overlying materials. The geomembrane design should incorporate the ability to be stable against sliding from both the soil layer below and the drain layer above.

The ability to repair geomembrane tears or severe settlement problems should also be considered before selecting a composite capping system. Settlement can damage both clay and composite capping systems. Repair of clay capping systems can often be done by local contractors; specialty contractors will often be necessary for composite caps. If settlement is expected, the top of the cap subgrade should be stabilized prior to placement of the capping

if drainage features are adequately designed, and should prevent water buildup and sloughing within the sand layer on the landfill sideslopes. This drainage layer can be an important design component for composite capping systems in order that the layers above the geomembrane remain stable.

Often water balance models are used to simulate the performance of capping systems. It is important to remember that these models are tools, and do not provide a measure of actual field performance. Models can not be used to compare the performance of existing cover systems with the hypothetical performance of the NR 504.07 cap. The NR 504.07 cap is a minimum cover technical specification, and is not a performance standard for infiltration. The models are dependent on input parameters and model assumptions, which can be easily manipulated to obtain the desired results. It is important to understand the basic assumptions of the model, and to carefully evaluate input parameters and their sensitivities. While models can be valuable tools when comparing the performance of various alternatives, models can not provide an "answer" in terms of what is the appropriate remedy, or how much a cap will leak. For example, the HELP model is often used to model infiltration through landfill capping systems. A major assumption of the HELP model is that flow occurs only through soil pores. With a landfill cap, fractures, clods, material variability, and other macro-structure are likely to be present, of which the extent can vary depending on the quality of construction, the age of the cap, or the degree of settlement of the landfill contents. Flow through this macro-structure may be much more significant than the porous media flow, but is not taken into account in the model.

Summary

Many factors should be considered when selecting the appropriate remedy for a leaking landfill. Although the selected remedy may include additional components, installing a low permeability cap will be necessary at almost all ER and Superfund landfills. Where a low permeability cap is necessary, the NR 504.07 cap is the minimum cap which should be accepted at leaking ER or Superfund landfills. Early installation of the cap and associated extraction systems should be considered, in order to limit contamination while subsequent investigations and actions are evaluated.

Noted:

Mark F. Giesfeldt 7/26/91

Mark F. Giesfeldt, Chief
Environmental Response & Repair Section
Bureau of Solid & Hazardous Waste Management

10. Drip leg immediately before the blower to separate condensate from gas or slope the piping back from the blower to a drip leg. All drip legs should be design so that break through does not occur when the blower is operating at maximum suction.

11. Double piping or clay encasement of all condensate piping located outside of the limits of waste as well as all gas header piping that is also designed to carry substantial quantities of condensate.

12. Ability to collect and treat all condensate, measure volumes, and collect samples

13. Flare requirements are regulated by the Bureau of Air Management (see November 7, 1990 memo from Steve Dunn - AM/3)

I have listed below standard gas monitoring requirements for active gas extraction systems.

Monitoring Points	Frequency
a. Gas Extraction Wells	
% methane	monthly
% nitrogen or % oxygen	monthly
pressure	monthly
temperature	monthly
flow rate	monthly
valve setting	monthly
b. Blower	
flow rate	twice monthly
pressure	twice monthly
% methane	twice monthly
% nitrogen or % oxygen	twice monthly
VOCs in gas	quarterly to annually
c. Condensate	
volume	weekly
pH, COD, TSS, Conductivity	quarterly
priority pollutants (dioxins, PCBs, and pesticides not required)	annually
VOC scan (for unlined facilities)	quarterly

The date, time of sampling, barometric pressure, barometric pressure trend, and ground surface condition should be recorded at each sampling round. Any recent precipitation and a qualitative description of the vegetation and/or cap condition should also be noted. Results of the gas system monitoring should be reported with the quarterly groundwater monitoring results and also tabulated and submitted with the annual report.

gasext.smf

cc: SWM Engineers

State of Wisconsin

CORRESPONDENCE/MEMORANDUM

DATE: November 19, 1992

TO: Dennis Mack SW/3

FROM: Susan Fisher SW/3

SUBJECT: Gas Extraction System Design and Monitoring

I have listed below present design guidelines for active gas extraction systems. Items listed below are directly applicable to municipal and co-disposal landfills and generally applicable to industrial waste landfills if methane and volatile organic compounds (VOCs) are emitted from the waste mass.

1. Unless pump testing is performed on a specific landfill which demonstrates otherwise, 150 foot maximum radius of influence for each gas extraction well. Lesser design radiuses should be used for sites located near structures or property lines, and also should be considered for those wells to be placed near the perimeter of all sites regardless of their location.

2. Extension of all gas extraction well to the base of the landfill and provisions for leachate extraction if heads greater than approximately five feet are found at the base, for landfills which do not contain a leachate collection system. Extension of all gas extraction wells to ten feet above the leachate collection system for landfills which contain a leachate collection system.

3. Schedule 80 PVC pipe in the borehole

4. Slotted PVC pipe in lower 2/3 to 3/4 of the borehole

5. 1-1 1/2 inch washed stone for backfill around the perforated pipe in the borehole preferably not limestone. Bentonite seal above the washed stone backfill adjacent to the solid wall pipe. Bentonite should be hydrated immediately after placement. Fine grained soil or soil-bentonite backfill above bentonite seal to just below final cover, and replace final cover.

6. "Loop" design for the header system to allow alternative flow paths for gas

7. 2% minimum slope on the all gas/condensate piping within waste limits, 0.5% minimum slope on gas/condensate piping outside waste limits

8. PE pipe used for the header pipe and laterals to all wells

9. Valve and flow measuring access ports on each gas extraction well

Interim Policy for Promoting the In-State and On-Site Management of Hazardous Wastes in the State of Wisconsin

Goal of the Policy:

The goal of this policy is to maximize the on-site or in-state management of any hazardous wastes (including PCBs) generated during clean-up actions. To accomplish this goal, this policy establishes remedy selection criteria and administrative procedures which are to be used when making clean-up decisions involving hazardous wastes. This policy will apply to state-funded, federally-funded, and responsible party clean-ups. Upon finalization, this policy will be incorporated in to Wisconsin's Capacity Assurance Plan.

Background:

In 1986, Congress included a provision in the Superfund amendments which mandated that each state assess its capacity to manage hazardous waste for the next twenty years. More specifically, section 104(c)(9) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), required that by October 17, 1989, states demonstrate they have "adequate capacity for the destruction, treatment, or secure disposition of all hazardous wastes that are reasonably expected to be generated within the State in the next twenty years". The federal statute directs that a state will not be eligible to receive Superfund remedial action funds (i.e., construction and operation and maintenance monies) if that state fails to provide the required assurance.

Wisconsin submitted its Capacity Assurance Plan (CAP) to the Environmental Protection Agency (EPA) by the October 1989 deadline. The State was able to assure EPA that adequate hazardous waste capacity existed for the next twenty years by entering into a "regional" agreement with the other EPA Region V states. Although the State's CAP was conditionally approved by the EPA, Wisconsin's CAP documented that this state continues to be a net exporter of hazardous waste.

In recognition of this, the Wisconsin CAP established five goals and initiatives which are intended to diminish the state's reliance on out-of-state capacity. One of those five initiatives was the development of "a policy for managing environmental clean-up waste on-site or in-state." This initiative, as well as the others, were included in the

State of Wisconsin

CORRESPONDENCE/MEMORANDUM

DATE: March 14, 1991 FILE REF: 4440

TO: District Solid and Hazardous Waste Program Supervisors
District ERR/LUST Unit Leaders
District Hazardous Waste Unit Leaders
Bureau Section Chiefs
Bureau Unit Leaders

FROM: Paul P. Didier, Director
Bureau of Solid and Hazardous Waste Management

SUBJECT: Transmittal Memo for the "Interim Policy for Promoting the In-State and On-Site Management of Hazardous Wastes in the State of Wisconsin."

Purpose:

This memorandum transmits to program managers and staff the "Interim Policy for Promoting the In-State and On-Site Management of Hazardous Wastes in the State of Wisconsin." The objective of this policy is to promote the recycling of hazardous wastes and the on-site and in-state treatment and disposal of hazardous waste resulting from clean-up actions. The policy is attached to this transmittal memo.

This interim policy applies to clean ups conducted by responsible parties, the federal government, and the State under the hazardous substance spills law, hazardous waste closure authorities, hazardous waste corrective action authorities, and applies to clean ups taken by the Superfund, LUST, and Environmental Repair programs. In addition, program managers and staff should strive to promote this policy when dealing with any hazardous waste generated in the State.

Background:

Before selecting a remedy which involves the management of hazardous wastes, a comparative analysis of the clean-up options utilizing this policy's "waste management strategy" and the "eight evaluation criteria" is to be undertaken and documented in a memo or report. In some instances, WDNR staff will have enough information available to them to prepare this comparative analysis between clean-up options. With others, we will have to include a provision in a State-funded contract with a consultant to conduct this analysis or in the case of responsible party clean ups, request them to prepare this analysis.

Once the analysis is complete, remedial actions may proceed for those sites where recycling or in-state and on-site management of hazardous waste is selected. For those sites where out-of-state treatment and/or disposal is proposed, the written documentation of how the waste management strategy and the eight evaluation criteria were applied must be submitted to the Director

of the Solid and Hazardous Waste Management Bureau for review and approval. No out-of-state shipment of hazardous waste from clean-up actions shall be approved by WDNR staff, without concurrence from the Bureau Director on the proposed action.

Implementation:

These interim guidelines and procedures shall be in place for a period of six months so that they may be evaluated. Therefore, from now until September 1, 1991, these procedures must be followed. During the month of August 1991, we will evaluate the effectiveness of applying these criteria. Based upon the findings of that evaluation, appropriate changes will be made before further implementation of this process.

In closing, we all agree that every effort should be made to limit the out-of-state shipment of hazardous waste for treatment or disposal. I believe that this interim policy is useable, and necessary to ensure that the State of Wisconsin has capacity to manage hazardous wastes produced in the State. One of the means of accomplishing this is by reducing our dependence on other states' capacity.

If you have any further questions regarding this policy, please contact me directly at (608) 266-1327.

Attachment

cc:

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Mark Giesfeldt - SW/3
Esther Chapman - SW/3
Bureau Program Coordinators - SW/3
Guidance Notebook

1989 CAP to assure the EPA and the other Region V states (who were crucial to our success in demonstrating capacity) that Wisconsin was making a good faith effort to minimize the export of hazardous waste. The policy and procedures established here were developed to fulfill the 1989 CAP commitment and will be a key component of the State's 1991 CAP submittal.

Implementation:

The specific implementation components of this policy include:

1. A waste management strategy and related guidelines;
2. Remedy selection criteria;
3. Administrative and documentation procedures; and
4. Public participation requirements.

1. Waste Management Strategy and Guidelines

This policy adopts the waste management strategy established by the Wisconsin Pollution Prevention Act (1989 Wisconsin Act 325), with a few "capacity-specific" modifications. This waste management strategy establishes a hierarchy of waste management options, from the most-preferred option to the least-preferred. State agencies, federal agencies and responsible parties conducting clean-ups in the State should follow, "to the extent possible or practicable," the waste management strategy outlined below:

First	Prevent the formation or production of pollutants at the source;
Second	Reuse or recycle any wastes that cannot be prevented;
Third	Provide treatment on-site or in-state for any waste that cannot be prevented or recycled;
Fourth	Ensure safe disposal on-site or in-state for any waste that cannot be prevented, recycled or treated; and
Fifth	Ensure safe treatment or disposal of waste out-of-state, giving preference to treatment of the waste over land disposal.

As is evident, the first preference at any clean-up should be given to the recycling of the waste. The feasibility of recycling any hazardous waste or treatment residuals should be analyzed as a routine part of the clean-up analysis (e.g., in the feasibility study, remedial action plan, corrective action plan, or closure plan). For example, if heavy-metal contaminated sludge will be generated as part of the groundwater treatment system at a site, the feasibility of recycling or reusing this sludge should be pursued.

If a recycling market can be found for the hazardous waste or contaminated media, it should be recycled regardless of whether that market is in the State of Wisconsin or not. In addition, the waste should be recycled or reused regardless of whether it will be rendered non-hazardous or not. Attachment One provides information on waste recycling or reuse markets and hazardous waste exchange services. [This attachment, however, does not include a list of all recycling markets.] These markets and services should be explored, as well as any others not mentioned in Attachment One, as a routine part of the clean-up process.

In the event that the hazardous wastes cannot be recycled or reused, the next preference would be to treat the waste or contaminated environmental media on-site or in-state. Mobile treatment units or treatment of the materials in place should be evaluated. When treatment is not feasible, then the option of safely disposing of the waste on-site or in-state should be explored. If in-state or on-site disposal is not available or feasible, then treatment out-of-state should be evaluated. Disposal of untreated waste at an out-of-state facility is the DNR's least-preferred waste management option, and would likely be infeasible due to the RCRA land disposal restrictions.

To further define the "waste management strategy", the Wisconsin DNR has developed waste management "guidelines". These guidelines provide more specific examples of the preferred waste management approaches at clean-up actions. These guidelines are integral to minimizing the export of hazardous waste, and are presented below in Exhibit One.

Exhibit One: WDNR's Waste Management Guidelines

Hazardous materials and treatment residuals should be recycled or reused whenever possible or practicable;

Remedies chosen will treat, store or dispose of hazardous waste on-site and/or in-state, to the extent feasible;

Remedial options which involve out-of-state shipment of hazardous wastes – especially those involving no prior treatment of wastes – will be chosen only when in-state and/or on-site actions are infeasible;

Appropriate remedies often will combine on-site/in-state treatment and on-site disposal of hazardous wastes, including treatment residuals;

Innovative technologies should be considered when there are no conventional treatment options available and on-site disposal is impracticable due to site-specific conditions or risks associated with untreated wastes;

On-site containment will be considered for wastes that pose low, long-term threats or where treatment is impracticable (usually due to waste type or volume); and

For wastes that need to be stabilized/secured (i.e., emergency actions) prior to completion of a long-term response at a site, the on-site storage of any hazardous wastes is preferred over the out-of-state shipment of waste. In the future, stabilized wastes should be incorporated into the longer-term response, when that option is timely and feasible.

2. Remedy Selection Criteria

The Wisconsin DNR's waste management "guidelines" represent the typical remedies that should be chosen at clean-up actions conducted in the State. However, the DNR recognizes that the final determination on whether or not recycling and in-state/on-site management of hazardous wastes is feasible will be made on a case-by-case basis. In order to ensure that remedy selection decisions are made in accordance with this policy's goal and waste management strategy, the DNR has adopted a set of eight remedy selection criteria. These criteria will assist state agencies, federal agencies, and responsible parties in providing the rationale for why the in-state/on-site management or recycling/reuse of hazardous wastes was feasible or not.

The eight remedy selection criteria which are used to determine the most appropriate remedy for a site are listed in Exhibit Two. These criteria are: protection of human health and the environment; attainment of legally-enforceable state and federal laws; long-term effectiveness; reduction of toxicity, mobility and volume through treatment; implementability; short-term effectiveness; cost; and public acceptance. These criteria are organized into 3 categories -- threshold criteria, balancing criteria and considerations, as illustrated in Exhibit Two.

The application of these criteria works as follows. For any remedial option to be viable for selection, it must meet the threshold criteria of being protective and complying with federal and State environmental laws, or it cannot be chosen.[1] For those remedial options that pass this screen, they then are analyzed "comparatively" against each other using the criteria of: long-term effectiveness, short-term effectiveness, implementability, and reduction of mobility, toxicity and volume through treatment. This is a qualitative analysis utilizing site-specific information and professional judgement. From this comparative analysis, a preferred remedial option will be identified. This will be the remedial option that provides the best overall balance of tradeoffs (i.e., advantages and disadvantages) when analyzed against the four balancing criteria.

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[1] / In complying with federal and state environmental laws, it is important to recognize the difference between compliance with the substantive portions of a law versus the administrative (i.e., procedural) requirements. The substantive requirements (e.g., numeric clean-up and performance standards) of the Solid Waste, Hazardous Waste, Air Management, Waste Water regulations, for example, must be met. However, administrative requirements, such as permitting and licensing procedures, should not delay or jeopardize the timely, on-site management of hazardous wastes.

The final step considers the criteria of cost and public acceptance. These criteria will be used generally to modify the preferred alternative, but not to change to another clean-up option. In the event that there is not unanimous public acceptance of an on-site/in-state remedy, this is not enough to warrant the out-of-state management of hazardous waste. Every effort should be made to communicate to the public and responsible parties the importance of managing our own hazardous wastes within the boundaries of the State of Wisconsin. Furthermore, costs should be considered as the last reason to send hazardous wastes out-of-state.

The DNR's eight remedy selection criteria and the sub-factors which define the criteria are presented in Exhibit Two. In order to select remedies in accordance with this policy directive -- and to document those selections -- these eight criteria should be utilized when making remedy selection determinations. Each program will be responsible for determining the appropriate way to document this analysis.

3. Administrative and Documentation Procedures

As previously discussed, a comparative analysis of the clean-up options should be conducted before selecting a remedy which involves the management of hazardous wastes. This analysis should take into consideration the goal of this policy, the waste management strategy and guidelines, and it should utilize the eight evaluation criteria to compare the clean-up options. Once completed, this should be documented in a memo or report (e.g., feasibility study or corrective action plan). In some instances, WDNR staff will have enough information available to them to prepare this analysis. With others we will have to include a provision in a State-funded contract with a consultant to conduct this analysis or in the case of responsible party clean ups, request them to prepare this analysis.

Once the analysis is complete, remedial actions may proceed for those sites where recycling or instate and on-site management of hazardous waste is selected. For those sites where out-of-state management is proposed, written documentation explaining how the eight evaluation criteria were applied must be submitted to the Director of the Solid and Hazardous Waste Management Bureau for review and approval. (The Bureau Director should be notified as early in the process, as possible.) No out-of-state shipment of hazardous waste from clean-up actions shall be "approved" by the WDNR until the WDNR's Director of the Solid and Hazardous Waste Management Bureau has concurred. If a responsible party (RP) proposes to dispose of or treat hazardous waste out of state, the WDNR staff will need to notify the Bureau director in writing. The Bureau Director will determine whether the RP's proposed action complies with this policy. It should be noted, however, that compliance with this

policy should not jeopardize or unduly delay clean-up actions conducted by responsible parties.

4. Public Participation

The success of this policy will rely, to a great extent, on communicating to the public and responsible parties the importance of recycling and managing hazardous waste on-site or in-state. The method that will be used to inform the public of this policy will be to incorporate it into the existing community relations programs for clean-up actions. Those individual programs will be responsible for ensuring that this policy is communicated to the public and factored into the decisionmaking process at each site. When community relations is not required by law at a site (e.g., voluntary clean-ups), the WDNR recommends that the responsible parties conduct community relations as a routine part of the clean-up process.

The WDNR has a number of clean-up programs that routinely conduct community relations activities. For example, the federal Superfund has a legally-mandated public participation program. The focus of this program is on communicating to the public the Environmental Protection Agency's recommended plan for cleaning up a site. The state's Leaking Underground Storage Tank (LUST) program has developed a public participation plan for that program's clean-up actions. State-funded, clean-up actions taken pursuant to the Environmental Repair Law are required by law to conduct community relations at the remedy selection stage in the process. The state's hazardous waste regulations contain public participation provisions for regulated treatment, storage or disposal facilities undergoing closure, licensing and corrective action.

It should be noted that all public participation requirements directly associated with obtaining a hazardous waste license are not currently required under existing rules, when a waiver or a variance from the licensing requirements is granted by WDNR. For example, if a clean-up action involving the treatment of hazardous waste is proposed, those parties conducting the clean up may pursue a waiver or variance from obtaining a hazardous waste license (under specific circumstances). If granted by the WDNR, a hazardous waste license would not be required, nor would the participation requirements associated with that permit. However, there is a requirement to provide a public notice if a waiver is granted.

Even if a hazardous waste waiver or variance is granted, there likely is public participation requirements associated with the clean-up action itself. For example, if a Superfund site is granted a waiver from obtaining a hazardous waste permit, that waiver does not "release" the Superfund program for meeting the legal requirement to

Exhibit Two: Remedy Selection Criteria

Threshold Criteria:

Protection of Human Health and the Environment
-How risks are controlled, eliminated or reduced

Compliance with Federal and State laws
-Whether alternative complies with environmental laws

Balancing Criteria:

Long-term Effectiveness
-Adequacy and reliability of alternative over time
-Risk from, or volume of, waste remaining on-site
-State's responsibility/costs for long-term O & M compared to capital costs for treatment

Reduction of Toxicity, Mobility and Volume through Treatment
-Ability to recycle or reuse hazardous waste and treatment residuals
-Treatment process used and materials treated
-Amount of hazardous substances destroyed or treated
-Degree of reduction expected
-Degree to which treatment is irreversible
-Type and quantity of residuals remaining after treatment
-Ability to treat and manage as solid waste
-Ability to treat so waste no longer exhibits a RCRA "characteristic"

Short-term Effectiveness
-Protection of community during the remedial action
-Protection of workers during remedial actions
-Environmental impacts
-Time until clean-up goals/standards are achieved

Implementability
-Availability of treatment process, in-state or on-site
-Availability of innovative technologies
-Ability to dispose of waste on-site/in-state
-Ability to construct and operate the technology
-Ability to obtain approvals from other agencies

Considerations:

Cost
-Capital costs
-Operation and maintenance costs
-Present worth costs

Community Acceptance
-Community concerns/preferences
-Responsible party concerns/preferences

conduct community relations under its own statute. This is true for other environmental programs as well; the granting of a hazardous waste waiver or variance does not eliminate the legal requirement to conduct community relations required by other environmental authorities.

Additionally, if a waiver or variance is granted for a clean-up action, the parties conducting the clean-up will not be allowed to operate a "commercial-like" hazardous waste operation. The treatment, storage or disposal unit that has been granted the waiver or variance will only be allowed by the DNR to manage, over a specified period of time, the type and volume of hazardous waste approved by WDNR in its submittal. Generally, a waiver or a variance will only cover the hazardous waste that is to be generated on-site, from the clean-up action.

Water Regulation and Zoning ARAR's
Superfund Remedial Meeting, Stevens Point
April 12, 1990

Floodplain

Under ch. NR 116, Wis Adm. Code, local communities must adopt a floodplain zoning ordinance if adequate floodplain data is available for the area. The Department oversees the enforcement of such ordinances. Site remedial alternatives that affect flood elevations must be analyzed to determine their impact in accordance with the procedures ch. NR 116, Wis. Adm. Code. If an alternative affects flood elevations by increasing backwater more than 0.01' from the current profile, easements must be obtained from upstream property owners to allow the increase.

Persons responsible for project implementation are required to determine if the project will affect flood elevations. Normally, there is a DNR District review and local approval process to determine if the activities are allowed under the ordinance. While it is understood that, under the CERCLA on-site permit exemption, state and local permits or approvals are not required for on-site actions affecting floodplains, the substantive technical requirements imposed through the state review and local approval processes are still applicable. Therefore, the analysis of floodplain impacts is still required. This should be done as part of the FS review and RD processes.

Shoreland-Wetland

Under ss. 59.971, 61.351, 62.231 and 144.26, Wis. Stats., and chs. NR 115 and NR 117, Wis. Adm. Code, local communities must adopt a shoreland-wetland zoning ordinance. The Department oversees the enforcement of such ordinances.

Site remedial alternatives that involve excavation, dredging and filling activities are generally prohibited in a shoreland-wetland district, except where these activities are specifically allowed because they are associated with a certain permitted use. A wetland may not be removed from a shoreland-wetland district (to allow excavation, dredging or filling) if that removal would result in a significant adverse impact upon certain identified wetland functions.

Persons responsible for project implementation are required to determine if the project will have a significant adverse impact on wetland functions. Normally, there is a DNR District review and local approval process to determine if the proposed activities are allowed under the ordinance, or if the wetland may be removed from a shoreland-wetland district. While it is understood that, under the CERCLA on-site permit exemption, state and local permits or approvals are not required for on-site actions affecting wetlands or shorelands, the substantive technical requirements imposed through the state review and local approval processes are still applicable. Therefore, the analysis of shoreland-wetland impacts is still required. This should be done as part of the FS review and RD processes.

Chapter 30

These statutory requirements regulate dredging, relocation, enlargement,

grading and structures in or near navigable waters of the state. Permits are required for those activities, and are issued by the DNR District office. Site-specific permit conditions are usually developed for each project. As above, while we understand that ch. 30 permits are not required for on-site actions, the substantive technical requirements imposed through the permitting process are still applicable. Therefore, the specific technical conditions that would be contained in such permits apply. Site-specific conditions should be developed as part of the FS review and RD processes.