NRC-0108 60

Wisconsin Land & Water Conservation Association, Inc. (WLWCA)

Wisconsin Association of Land Conservation Employees (WALCE)

Objections to Comm 65 - Why It's Bad For Water Quality

Submitted by: Perry Lindquist, Washington County Land Conservation Department/WLWCA/WALCE

Comm 65 is supposed to control sediment from the construction of commercial buildings. However, the current draft would relax erosion control requirements for builders and developers compared to long accepted national standards and any local ordinance. Because of this, the rule represents a significant step backward for local water pollution control efforts in urban and urbanizing areas. WLWCA and WALCE respectfully requests the Assembly Environment Committee to object to the entire rule. Below is a summary of what is wrong with Comm 65 and why it should not be approved, followed by recommendations for improvement.

The Weaknesses:

The draft rule would be very ineffective at controlling sediment from construction sites and is inconsistent with the enabling legislation. Examples include:

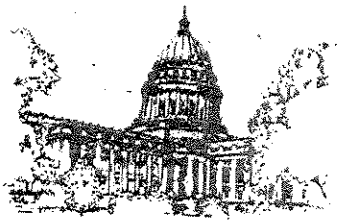
- ✓ Erosion control plans are not required to be submitted for review or approval by the department or a county, city, village or town as required by Section 101.1205(2) State Statute (and all local ordinances).
- ✓ The rule is silent on many issues that must be addressed in an erosion control plan (ex: runoff diversion).
- ✓ Inspection requirements are unclear and rely heavily on self inspection ("fox watching the hen house"). This is a symptom of awkward fit - trying to regulate grading activity through a building permit.
- ✓ The rule does not require compliance with any state standards for the design and installation of erosion control practices. Because of this, uniformity is lost and practice failure and law suites are certain. (Most important! Example: sediment basins, necessary for large sites, not even mentioned in the rule.)
- ✓ Site plans are automatically certified for erosion control if they are submitted by a licensed architect, who may have no applicable training or experience. (Specialty technical field, not an "after thought").
- ✓ The rule ignores post-construction stormwater management issues and leaves local contractors caught between conflicting codes/standards. Stormwater needs are based on drainage area, not building pads.
- ✓ Enforcement is left to building inspectors who may rarely visit the site and know (or care) little about erosion control/water pollution concepts or the engineering behind practice designs for large sites.
- ✓ Since many communities already had local ordinances, this rule creates much confusion and inconsistencies in jurisdiction and erosion control standards. Uniformity is again lost.

Recommendations:

Given the numerous problems listed above, the committee should object to the entire proposed rule. In addition, we strongly encourage the legislature to take the following actions:

- ✓ Request an audit of how well the erosion control requirements of the Uniform Dwelling Code have been implemented statewide, as compared to local ordinances, before expanding this approach to other codes.
- ✓ Require the Department of Commerce to work cooperatively with the Department of Natural Resources and other agencies on establishing uniform state standards for the design and installation of erosion control practices based on research, field experience and the best available technology.
- ✓ Encourage local ordinances as the most effective way to address the issue of construction site erosion. Make Comm 65 a minimum standard, or safety net, where no local regulatory efforts exist.

Nonpoint pollution is a rural and urban problem. Research shows that construction sites are the largest source of sediment in our lakes and streams on a per acre basis - averaging 10 times the rate of erosion on cropland. As farm runoff regulations continue to increase, please help ensure that urban pollution is equally addressed!



Mary Hubler

State Representative

November 20, 1998

Representative Marc Duff
Chair, Assembly Committee on Environment
306 North – State Capitol Building
Madison, WI 53702

Dear Marc:

Enclosed is correspondence from my constituent, Dale Hanson, Barron County Conservationist. Mr. Hanson has written to me in opposition to the proposed Administrative Rule COMM 65.

It is my understanding you are tentatively planning a briefing and public hearing on this proposed administrative rule on December 15. I would appreciate your entering Mr. Hanson's written testimony in opposition to proposed rule COMM 65 in the committee record.

Thank you. If you have any questions or would like to discuss the issue with me personally, please don't hesitate to contact me.

Sincerely,

Mary

Mary Hubler
State Representative
75th Assembly District

MH/jms
enc.

Office: State Capitol, P.O. Box 8952, Madison, WI 53708 • (608) 266-2519
Home: P.O. Box 544, Rice Lake, WI 54868 • (715) 234-7421
Toll-free Legislative Hotline • 1-800-362-9472

Barron County
Land Conservation Department

Agriculture Service Center
Courthouse
Barron, Wisconsin 54812

NOV 16 RECD

November 10, 1998

Representative Mary Hubler
State Capitol
P.O. Box 8952
Madison, WI 53708

Dear Representative Hubler:

Enclosed is a report on the proposed commerce department COMM 65 Administrative Rule, that was prepared by the Land Conservation Department in Washington County.

The proposed COMM 65 sets a policy for construction site erosion control. I would appreciate it if you would review the proposed administrative rule and oppose it.

On a typical construction site valued at $100,000.00, the cost of construction site erosion control rarely exceeds several hundred dollars. The proposed rule in essence eliminates any serious consideration of erosion control. Additionally, DILHR, DNR, and DATCP already have construction site erosion control rules, do we really need another?

If you have any questions, feel free to call me at 715-537-6315.

Sincerely,

Dale Hanson,
County Conservationist

Enclosure

DH/jj

COMM 65 (draft) - Why It Is Bad For Water Quality

COMM 65 is a draft administrative rule developed by the Wisconsin Department of Commerce to regulate construction site erosion on commercial building sites. It is scheduled to be submitted to the legislature soon (11/98), leaving a 30 day window for objections. Below is a summary of what is wrong with COMM 65 and why it should not be approved in its current form.

1. It Prevents Local Control.

COMM 65 proposes that no local construction site erosion control ordinances adopted after 1993 can be enforced on commercial building sites. Since COMM 65 is extremely weak (see below), this rule will relax erosion control requirements for builders and developers compared to any local ordinance standard. Even though s. 281.33(3) state statutes has encouraged these types of ordinances since the mid 1980's, the Department of Commerce has chosen to overrule them.

Research shows that construction sites are responsible for delivering more sediment to our lakes and streams than any other land use per acre - an average of 15 dump truck loads for a 10 acre construction site. Controlling nonpoint pollution has always been and should continue to be a function of local government. COMM 65 should be a minimum state requirement, not the only requirement. It should be used to address construction site erosion where there are no local program efforts. The rule should be revised to encourage local ordinances, not overrule them.

2. It Is Very Weak.

Some of the major reasons COMM 65 will not be effective at controlling sediment from construction sites are that:

- Erosion control plans are not required to be submitted for review and approval.
- No permit is required prior to land disturbing activity.
- The design and installation of most best management practices (bmp's) are not required to comply with any technical standards, making their effectiveness very unlikely.
- Site plans are automatically certified for erosion control if they are submitted by a licensed architect or surveyor, who may have no applicable training or experience.
- The rule ignores stormwater management issues and the interrelationship with erosion control efforts. (And leaves local contractors caught between conflicting codes.)
- Enforcement is left up to building inspectors who may rarely visit the site and know little about erosion control concepts or the engineering behind bmp design for large sites.
- Since many communities already had local ordinances, this creates much jurisdictional confusion and increases bureaucracy.

We have a long way to go to get construction site erosion resolved statewide. COMM 65 is a deliberate step backward. If passed in its current form, COMM 65 will prove to be a statewide disaster for water quality - with its effects felt for many years to come. It also reflects a gross ignorance of erosion control concepts and a blatant disregard of the role of local government in nonpoint pollution control and the damage construction sites can inflict on lakes and streams.

Help maintain local control and keep our waters clean. Stop COMM 65 before it's too late!

Department of Commerce Presentation
for
Assembly Environmental Standing Committee
on
Chapter Comm 65 Soil Erosion
December 15, 1998

Chairperson Duff, members of the Assembly Environmental Committee, my name is Michael Corry. With me is Jim Quast, program manager for the development of Comm 65, which will regulate our commercial construction site erosion control program.

Comm 65 is written to include construction site erosion control as part of the review and inspection programs of the department and local municipalities that implement the state commercial building codes. This is parallel to the construction site erosion control program in the Uniform Dwelling Code (UDC).

In accordance with s. 101.1205, Stats., Chapter Comm 65 establishes uniform soil erosion control standards at building sites for the construction of public buildings and places of employment. As a statewide uniform code, local governments that adopt codes regulating commercial construction site erosion must adopt Comm 65. Local governments with more stringent ordinances relating to soil erosion that were in effect on January 1, 1994 may continue those programs. Otherwise, under ss. 59.69(4c), 60.627 (2), 61.354 (2) and 62.234 (2), Stats., local municipalities cannot enact erosion control ordinances or enforce erosion control activities that involve construction of a building.

For purposes of erosion control, the department's jurisdiction over the site begins when the ground is broken for footing and foundation work and ends when the site is stabilized. Local government programs for erosion control ordinances covering pre-construction and post-construction activities, and other erosion control activities are not affected by the uniform code. In addition, local governments that adopt Comm 65 can specify local permits, plan review and inspection of construction site erosion control activities, either as agents of the department or independently.

The proposed code requires that all commercial sites that disturb more than 2,000-sq. ft. of soil register with the department. An erosion control plan is to be prepared and sent either to the reviewing agency or retained at the site for review by the inspector.

There are two groups of inspectors that will conduct erosion control inspections. The first is the certified building inspector who will inspect the erosion control activities during the normal course of their visits to the construction site. The second is a certified soil erosion control inspector. This classification will permit local government to utilize an inspection force other than building inspectors for erosion control regulation.

The rules establish performance standards for erosion control measures to be based upon a 2-year, 24-hour storm event for overland flow and a 10-year, 24-hour storm event for channelized flow. The rules also establish specification standards for specific types of erosion control measures relating to issues such as the quality of products or practices or their limitations of use. The rules require that erosion control measures be designed, installed and maintained to limit soil from either being transported from the property or from entering the waters of the state or conduits to the waters of the state.

The rules establish two site classifications: Class I sites are those with more than 5 acres of soil disturbing activity; and Class II sites are less than 5 acres. The code requires that the erosion control plans for Class I sites be prepared by an person licensed by the Department of Regulation and Licensing, such as an architect or an engineer, or by a department certified erosion control planner.

The department has been in discussion with the Department of Natural Resources (DNR) concerning the addition of construction site storm water management activities to the code. While the storm water management program is a responsibility of the DNR, the addition of this requirement to Comm 65 would allow builders to deal with one department and satisfy DNR's WPDES permit requirements. If acceptable to the Committee, the department would consider a germane modification to the rules to include construction site storm water management in Comm 65. There are a number of potential complexities for the department and its agents, especially in anticipation of changes to the storm water regulations. The department would need to work out the details with the DNR and review the changes with department code advisory committees.

If you have any questions about the proposed Comm 65, Mr. Quast and I would be happy to answer them.

Wisconsin Counties Association

MEMORADUM

TO: Honorable Members of the Assembly Committee on the Environment

FROM: Craig Thompson, Legislative Director CT

DATE: December 15, 1998

SUBJECT: COMM 65

The Wisconsin Counties Association (WCA) thanks you for the opportunity to make a few brief comments regarding COMM 65. WCA opposes administrative rule COMM 65 as it is currently proposed.

The Department of Commerce developed the rule to regulate construction site erosion on commercial building sites. It was the objective of 1993 SB 44/1993 Act 16 to: 1) protect water quality through erosion and sediment control at construction sites of public buildings and places of employment; 2) reduce agency overlap, and 3) satisfy the requirements of the Wisconsin Pollutant Discharge Elimination System as outlined by the U.S Environmental Protection Agency (EPA).

The Wisconsin Counties Association in conjunction with the Wisconsin Land and Water Conservation Association (WLWCA) and the Wisconsin Department of Natural Resources (DNR) does not believe that COMM 65, in its current form, accomplishes these objectives.

Of major concern is that COMM 65 as proposed threatens to undermine local erosion control ordinances. Subsection 65.04 states that a local municipality may only enforce an erosion control ordinance on building sites covered under COMM 65 if the local ordinance is: 1) more stringent than COMM 65, and 2) is adopted before January 1, 1994. Although the WCA supports an administrative rule that sets forth minimum erosion control standards for construction sites throughout Wisconsin, we respectfully request a statutory change to allow for the creation and enforcement of local construction site erosion control ordinances beyond the 1994 date. Local regulatory efforts aimed at minimizing water pollution through erosion control and storm water management ordinances should not be restricted as long as they meet minimum state requirements.

100 River Place, Suite 101 ◆ Monona, Wisconsin 53716-4016
608/224-5330 ◆ 800/922-1993 ◆ Fax: 608/224-5325

Mark M. Rogacki, Executive Director
Darla M. Hium, Deputy Director

Mark D. O'Connell, Legislative Director
Lynda L. Bradstreet, Administrative Director

In addition, we respectfully request that the following standards under the proposed rule be amended to strengthen erosion control enforcement:

- Require that erosion control plans and storm water management plans be prepared and submitted for review and approval by the department or local unit of government.
- Require that the certification of erosion control plans only be issued by planners and inspectors who have thorough documentation of directly applicable experience or training.
- Require that erosion control on construction sites be enforced by county land and water conservation staff or others certified under the provisions of chapter 470.

We ask that those comments that have been forwarded to you expressing concern over COMM 65 receive careful consideration as the rule moves through the legislative process.

If you have any questions, please do not hesitate to contact the WCA office.

Thank you for considering our comments.

Daniel M. Finley
County Executive

John C. Toshner
Director

Waukesha COUNTY

DEPARTMENT OF
PARKS AND LAND USE

November 30, 1998

Representative Marc Duff
Chairman, Assembly Environment Committee
P.O. Box 8952
State Capitol
Madison, WI 53708-8952

Dear Representative Duff:

The staff of the Waukesha County Department of Parks and Land Use have completed review of draft **COMM 65** as it relates to construction site erosion control or commercial building sites.

This correspondence is submitted to express concern over the draft rule. The proposed COMM 65 states that no local ordinance adopted after 1993 can be enforced on commercial building sites. Since many construction erosion control ordinances adopted by Waukesha County municipalities are uniform and adopted after 1993, this rule would undermine existing local authority. This authority is provided to counties, towns, cities and villages through their respective zoning statutes. It would be more appropriate for the rule to set minimum performance guidelines. These guidelines should be able to be made more restrictive than the minimum. This is a principle consistently applied in other land use regulations.

In addition, the proposed rules significantly weaken existing local requirements. Specifically the proposed COMM 65:

- ✘ Does not require erosion control plans to be submitted for review and approval;
- ✘ Does not require plan approval prior to land disturbing activities;
- ✘ The design requirements are not consistent with common engineering technical standards;
- ✘ The rule ignores stormwater management issues and their interrelationship to erosion control;

Division of Land Conservation
1320 Pewaukee Road • Room 260
Waukesha, Wisconsin 53188-3868
Phone: (414) 896-8300 • Non-Metro: 1-800-567-2366 • Fax: (414) 896-8298

- ✘ Since there are existing local regulations, separating out commercial buildings leads to increased confusion among permittees.

Please consider these comments as your Committee deliberates on proposed COMM 65. These issues need to be remedied before passage of this rule.

Should you have any questions, or need further information, please call me at (414) 548-7867.

Sincerely,

Dale R. Shaver
Land Conservation Manager

DRS:mfc

C: Michelle Farrow, Chief of Staff
Dave Krahn, Legislative Assistant

COMM 65 (draft) - Why It Is Bad For Water Quality

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Research shows that construction sites are responsible for delivering more sediment to our lakes and streams than any other land use per acre - an average of 15 dump truck loads for a 10 acre construction site. Controlling nonpoint pollution has always been and should continue to be a function of local government. COMM 65 should be a minimum state requirement, not the only requirement. It should be used to address construction site erosion where there are no local program efforts. The rule should be revised to encourage local ordinances, not overrule them.

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Help maintain local control and keep our waters clean. Stop COMM 65 before it's too late!

Assembly Environmental Committee Hearing on Draft COMM 65
December 15, 1998

Department of Natural Resources Comments
Comments given by Gordon Stevenson
Assistant Section Chief of the Runoff Management Section

I want to thank the Assembly Environmental Committee for giving the Department of Natural Resources this opportunity to comment on draft rule Comm 65 regulating construction site activity. It is our hope the comments given here today will improve the proposed regulation on construction site erosion control and storm water management.

The Department of Natural Resources, (DNR), is generally in support of the draft version of Comm 65. We believe that the inclusion of certified inspectors to perform site inspection along with the requirement that site erosion control plan be designed by certified erosion control planners is a significant improvement program. We also believe that the rule, over all, includes the necessary measures for an effective erosion control program. However, the (DNR), is concerned with the current draft of Comm 65 as it is written due to the absence of required provisions. The proposed draft does not provide language to address storm water management, nor does it require documentation of the construction site inspections made for the erosion control practices. The exclusion of these provisions weakens construction site regulations that the Department of Commerce currently carries out provisions under Comm 50.115 which would be repealed in the Comm 65 rule making. It also defeats the objective of 1993 SB 44/1993 Act 16 to create a program that: 1) protects water quality via erosion and sediment control at construction sites or public buildings and places of employment, 2) reduces agency overlap, and 3) satisfies the requirements of the Wisconsin Pollutant Discharge Elimination System, (WPDES), as delegated by the U. S. Environmental Protection Agency, (EPA), under the federal Clean Water Act [33 USC s. 1251 et. seq.].

Chapter NR 216, Wisconsin Administrative Code, was drafted to coordinate regulation between DNR and the Department of Commerce, (Commerce). Section NR 216.42(3) provides that commercial building sites regulated by the proposed Comm 65, "shall be deemed to hold a WPDES permit" if regulated "in a manner in compliance with this chapter". This was included in NR 216 to avoid double regulation. Since commercial sites were regulated extensively by the Commerce, adding storm water control to the Commerce's oversight was seen by the legislature as more efficient than concurrent regulation by the DNR for storm water control. The DNR believes that if building sites are regulated by proposed Comm 65, but do not include storm water plans required by NR 216.47 as well as 40 CFR s. 122.26(c)(1)(ii)(D), and Comm 50.115(1)(a), they can not be considered in compliance with NR 216. Therefore, these sites will not qualify for being "deemed to hold a WPDES permit" and would require and additional permit from the DNR to be in compliance. WPDES permits, including those for construction site

storm water discharges, satisfy the permit requirements of the federal Clean Water Act [33 USC s. 1251 et. seq.]. Discharges of pollutants without a Clean Water Act permit may be subject to USEPA enforcement. Such discharges may also subject a project, if regulated by Comm 65 as it currently reads, to a lawsuit by citizens under 33 USC s. 1365(a)(1)(A) alleging failure to prepare a long term storm water management plan. Citizens suits could be brought in federal court, which is authorized to award, at its discretion, costs of litigation to a prevailing party. We are aware of cases where environmental groups have brought such citizen suits and been awarded litigation costs.

I would like to inform the committee that the Department of Commerce has recently indicated to DNR that the Department of Commerce is considering including storm water management language in Comm 65. DNR looks forward to the discussions with the Department of Commerce and hope that the two agencies can come to a resolution.

Currently under Comm 50.115(1)(c), sites of five acres or greater that will have construction site activity requires that the landowner meet reporting and monitoring requirements specified in s. NR 216.48. NR 216.48(4) requires that the permittee conduct a site inspection of construction erosion control practices within 24 hours after rain events of 0.5 inches or on a weekly basis. It also requires that written reports be maintained for each inspection. The DNR again believes that sites not including this requirement would not be in compliance with the WPDES permit and would require an additional permit from the DNR. Therefore, Comm 65 should also include these requirements.

Finally, we believe that Comm 65 should require an erosion control plan to provide the location and nature of the receiving water where runoff from the site will discharge, as required by NR 216.46(4)(g) and 40 CFR s. 122.26(c)(1)(ii)(D).

It is the DNR's belief that the proposed version of Comm 65 has provisions that will improve water quality protection from construction sites. It is the DNR's believe that in order to meet state and federal legal requirements, the rule needs to include the above described provisions to remain in compliance with NR 216. Therefore the DNR requests that this committee advise the Department of Commerce to include the provisions for storm water management, documentation of construction site inspections, and description of receiving waters to better protect Wisconsin's surface waters, to avoid regulatory duplication, and to reduce exposure of owners of construction sites to potential legal action.

We would also like to inform this committee that DNR staff have communicated the above concerns to the Department of Commerce throughout the development and review of Comm 65, both informally and in writing.

Washington County

Land Conservation Department

333 E. Washington St., Suite 3200, West Bend, WI 53095 Phone (414)335-4800 FAX (414)335-4171

To: Representative Marc Duff

From: Dan Stoffel, Land Conservation Committee Chair
Perry Lindquist, County Conservationist

Date: November 12, 1998

Subject: **Opposition to Draft Administrative Rule COMM 65**

COMM 65 is a draft administrative rule that is supposed to regulate construction site erosion on commercial building sites. Instead, it threatens to undermine local erosion control ordinances and relaxes water pollution control efforts for the benefit of builders and developers. The rule is now awaiting legislative approval. Please help stop this rule from becoming law in its current form.

For the past three years, Washington County has been actively coordinating local regulatory efforts aimed to minimize water pollution from new urban developments. The key component to these efforts is a new model Erosion Control and Stormwater Management Ordinance. Developed in cooperation with the Towns Association, the model ordinance has been promoted statewide as a cost effective method of addressing both the erosion and stormwater issues through a single local permit process. COMM 65 is very weak, arguably illegal and proposes to overrule all local ordinances enacted after 1993. The enclosed fact sheet elaborates on why the rule is bad for water quality, and just plain bad public policy.

We have submitted our concerns through the standard public hearing process, but they have been ignored by the Department of Commerce. The department falsely claims that the statutes do not allow them to delegate their authority to local units of government. Local delegation is clearly allowed under section 102.1205(4) of state statutes. The enclosed fact sheet explains how the legislature has encouraged local ordinances since the mid 1980's. We would also like to point out that the enabling legislation for COMM 65 requires the submittal of erosion control plans for commercial construction sites. COMM 65 proposes that this be a voluntary process, which is one of the reasons we believe it is illegal.

Time is running out. The 30 day legislative review period apparently started on October 30. We strongly believe that erosion control on large construction sites should be left up to local experts, not Madison bureaucrats. Please demonstrate your support for our efforts by helping stop this rule from becoming law. Thank you.

cc: State Legislators representing Washington County
Senate Committee on Business, Economic Development and Urban Affairs
Assembly Environment Committee
Ken Miller, County Board Chair
Doug Johnson, Administrative Coordinator
Adam Payne, WLWCA Executive Director

OFFICE OF THE CALUMET COUNTY CLERK
206 COURT ST
CHILTON, WI 53014

Tuesday, December 15, 1998

Representative Marc Duff, Chair
Assembly Environment Committee
FAX (608)282-3698

Dear Representative Duff:

The Calumet County Legislative Committee would like to go on record in strong opposition to the draft administrative rule COMM 65 in its present form. The current language proposed that no local construction site erosion control ordinance adopted after 1993 can be enforced on commercial building sites. Since the mid 1980's state statute 281.33(3) has encouraged these types of ordinances. COMM 65 needs to recognize the role of local government in nonpoint pollution control. This rule should be revised to encourage local ordinances, not overrule them.

Furthermore, COMM 65 will not be effective at controlling construction site erosion because it is very weak.

- Erosion control plans are not required to be submitted for review and approval.
- No permit is required prior to land disturbing activity
- The design and installation of most best management practices are not required to comply with any technical standards, making their effectiveness very unlikely.
- Site plans are automatically certified for erosion control if they are submitted by a licensed architect or surveyor, whomay have no applicable training or experience.
- The rule ignores stormwater management issues and the interrelationship with erosion control efforts. (And leaves local contractors caught between conflicting codes.)
- Enforcement is left up to building inspectors who may rarely visit the site and know little about erosion control concepts or the engineering behind bmp design for large sites.
- Since many communities already had local ordinances, this creates much jurisdictional confusion and increases bureaucracy.

COMM 65 needs to be strengthened in order to be effective in controlling erosion from construction sites.

Thank you for the opportunity to comment.

Sincerely, Donald A. Schwoke, Chm. David A. Ballering Donald Sommer

Calumet County Legislative Committee

Assembly Environmental Committee Hearing on Draft COMM 65
December 15, 1998

Department of Natural Resources Comments
Comments given by Gordon Stevenson
Assistant Section Chief of the Runoff Management Section

I want to thank the Assembly Environmental Committee for giving the Department of Natural Resources this opportunity to comment on draft rule Comm 65 regulating construction site activity. It is our hope the comments given here today will improve the proposed regulation on construction site erosion control and storm water management.

The Department of Natural Resources, (DNR), is generally in support of the draft version of Comm 65. We believe that the inclusion of certified inspectors to perform site inspection along with the requirement that site erosion control plan be designed by certified erosion control planners is a significant improvement program. We also believe that the rule, over all, includes the necessary measures for an effective erosion control program. However, the (DNR), is concerned with the current draft of Comm 65 as it is written due to the absence of required provisions. The proposed draft does not provide language to address storm water management, nor does it require documentation of the construction site inspections made for the erosion control practices. The exclusion of these provisions weakens construction site regulations that the Department of Commerce currently carries out provisions under Comm 50.115 which would be repealed in the Comm 65 rule making. It also defeats the objective of 1993 SB 44/1993 Act 16 to create a program that: 1) protects water quality via erosion and sediment control at construction sites or public buildings and places of employment, 2) reduces agency overlap, and 3) satisfies the requirements of the Wisconsin Pollutant Discharge Elimination System, (WPDES), as delegated by the U. S. Environmental Protection Agency, (EPA), under the federal Clean Water Act [33 USC s. 1251 et. seq.].

Chapter NR 216, Wisconsin Administrative Code, was drafted to coordinate regulation between DNR and the Department of Commerce, (Commerce). Section NR 216.42(3) provides that commercial building sites regulated by the proposed Comm 65, "shall be deemed to hold a WPDES permit" if regulated "in a manner in compliance with this chapter". This was included in NR 216 to avoid double regulation. Since commercial sites were regulated extensively by the Commerce, adding storm water control to the Commerce's oversight was seen by the legislature as more efficient than concurrent regulation by the DNR for storm water control. The DNR believes that if building sites are regulated by proposed Comm 65, but do not include storm water plans required by NR 216.47 as well as 40 CFR s. 122.26(c)(1)(ii)(D), and Comm 50.115(1)(a), they can not be considered in compliance with NR 216. Therefore, these sites will not qualify for being "deemed to hold a WPDES permit" and would require and additional permit from the DNR to be in compliance. WPDES permits, including those for construction site

storm water discharges, satisfy the permit requirements of the federal Clean Water Act [33 USC s. 1251 et. seq.]. Discharges of pollutants without a Clean Water Act permit may be subject to USEPA enforcement. Such discharges may also subject a project, if regulated by Comm 65 as it currently reads, to a lawsuit by citizens under 33 USC s. 1365(a)(1)(A) alleging failure to prepare a long term storm water management plan. Citizens suits could be brought in federal court, which is authorized to award, at its discretion, costs of litigation to a prevailing party. We are aware of cases where environmental groups have brought such citizen suits and been awarded litigation costs.

I would like to inform the committee that the Department of Commerce has recently indicated to DNR that the Department of Commerce is considering including storm water management language in Comm 65. DNR looks forward to the discussions with the Department of Commerce and hope that the two agencies can come to a resolution.

Currently under Comm 50.115(1)(c), sites of five acres or greater that will have construction site activity requires that the landowner meet reporting and monitoring requirements specified in s. NR 216.48. NR 216.48(4) requires that the permittee conduct a site inspection of construction erosion control practices within 24 hours after rain events of 0.5 inches or on a weekly basis. It also requires that written reports be maintained for each inspection. The DNR again believes that sites not including this requirement would not be in compliance with the WPDES permit and would require an additional permit from the DNR. Therefore, Comm 65 should also include these requirements.

Finally, we believe that Comm 65 should require an erosion control plan to provide the location and nature of the receiving water where runoff from the site will discharge, as required by NR 216.46(4)(g) and 40 CFR s. 122.26(c)(1)(ii)(D).

It is the DNR's belief that the proposed version of Comm 65 has provisions that will improve water quality protection from construction sites. It is the DNR's believe that in order to meet state and federal legal requirements, the rule needs to include the above described provisions to remain in compliance with NR 216. Therefore the DNR requests that this committee advise the Department of Commerce to include the provisions for storm water management, documentation of construction site inspections, and description of receiving waters to better protect Wisconsin's surface waters, to avoid regulatory duplication, and to reduce exposure of owners of construction sites to potential legal action.

We would also like to inform this committee that DNR staff have communicated the above concerns to the Department of Commerce throughout the development and review of Comm 65, both informally and in writing.

Wisconsin Counties Association

MEMORADUM

TO: Honorable Members of the Assembly Committee on the Environment

FROM: Craig Thompson, Legislative Director CT

DATE: December 15, 1998

SUBJECT: COMM 65

The Wisconsin Counties Association (WCA) thanks you for the opportunity to make a few brief comments regarding COMM 65. WCA opposes administrative rule COMM 65 as it is currently proposed.

The Department of Commerce developed the rule to regulate construction site erosion on commercial building sites. It was the objective of 1993 SB 44/1993 Act 16 to: 1) protect water quality through erosion and sediment control at construction sites of public buildings and places of employment; 2) reduce agency overlap, and 3) satisfy the requirements of the Wisconsin Pollutant Discharge Elimination System as outlined by the U.S Environmental Protection Agency (EPA).

The Wisconsin Counties Association in conjunction with the Wisconsin Land and Water Conservation Association (WLWCA) and the Wisconsin Department of Natural Resources (DNR) does not believe that COMM 65, in its current form, accomplishes these objectives.

Of major concern is that COMM 65 as proposed threatens to undermine local erosion control ordinances. Subsection 65.04 states that a local municipality may only enforce an erosion control ordinance on building sites covered under COMM 65 if the local ordinance is: 1) more stringent than COMM 65, and 2) is adopted before January 1, 1994. Although the WCA supports an administrative rule that sets forth minimum erosion control standards for construction sites throughout Wisconsin, we respectfully request a statutory change to allow for the creation and enforcement of local construction site erosion control ordinances beyond the 1994 date. Local regulatory efforts aimed at minimizing water pollution through erosion control and storm water management ordinances should not be restricted as long as they meet minimum state requirements.

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Mark M. Rogacki, Executive Director
Darla M. Hium, Deputy Director
Mark D. O'Connell, Legislative Director
Lynda L. Bradstreet, Administrative Director

In addition, we respectfully request that the following standards under the proposed rule be amended to strengthen erosion control enforcement:

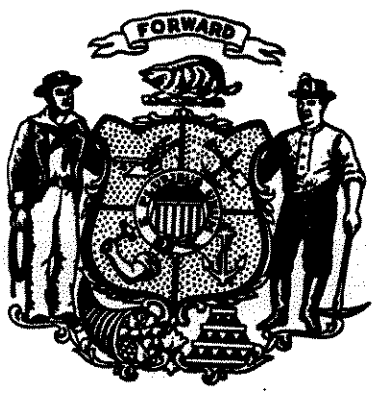
- Require that erosion control plans and storm water management plans be prepared and submitted for review and approval by the department or local unit of government.
- Require that the certification of erosion control plans only be issued by planners and inspectors who have thorough documentation of directly applicable experience or training.
- Require that erosion control on construction sites be enforced by county land and water conservation staff or others certified under the provisions of chapter 470.

We ask that those comments that have been forwarded to you expressing concern over COMM 65 receive careful consideration as the rule moves through the legislative process.

If you have any questions, please do not hesitate to contact the WCA office.

Thank you for considering our comments.

END



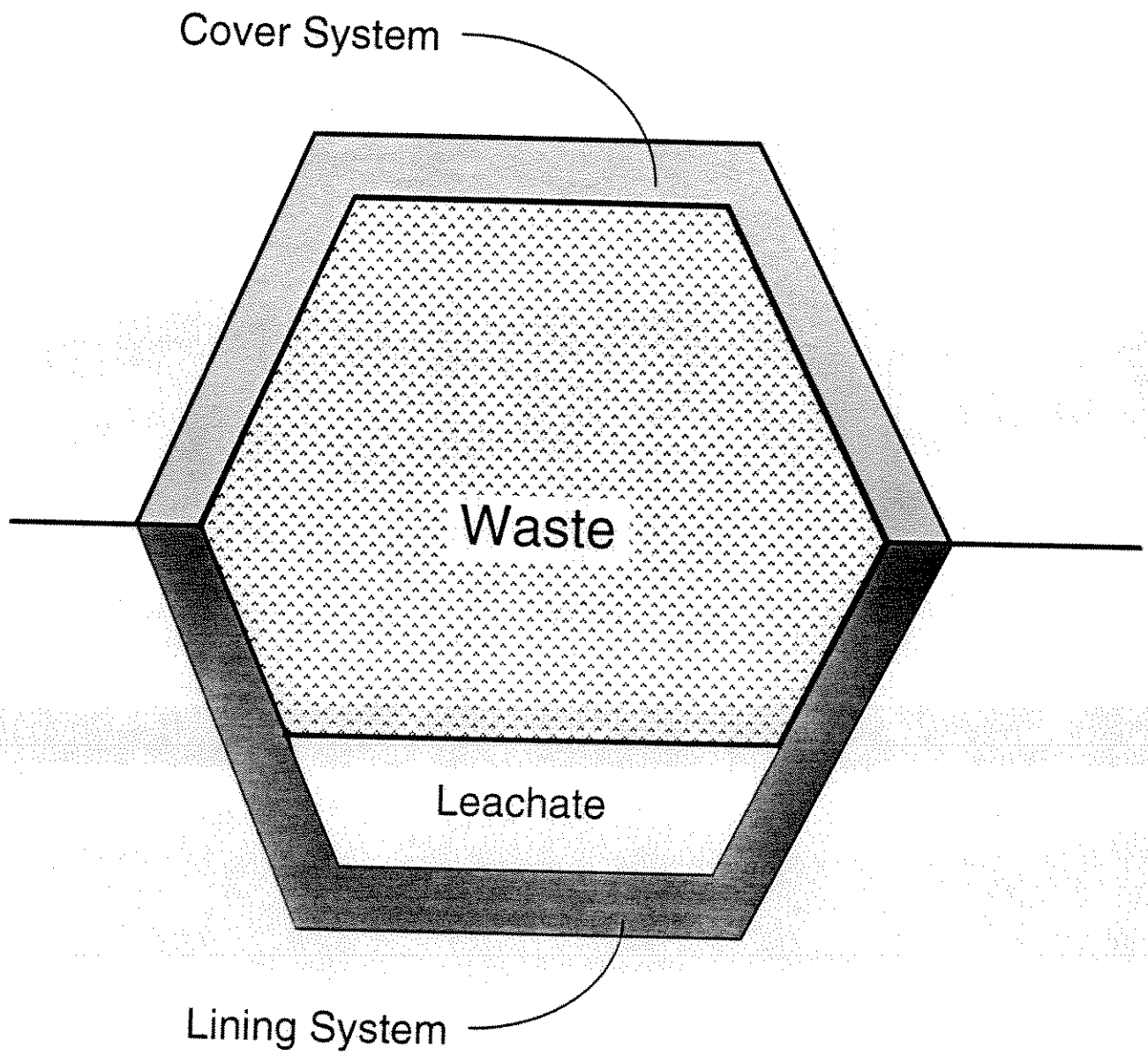
END

Waste Containment Systems

Dr. Craig H. Benson

Prof. of Civil and Environmental Engineering
University of Wisconsin-Madison

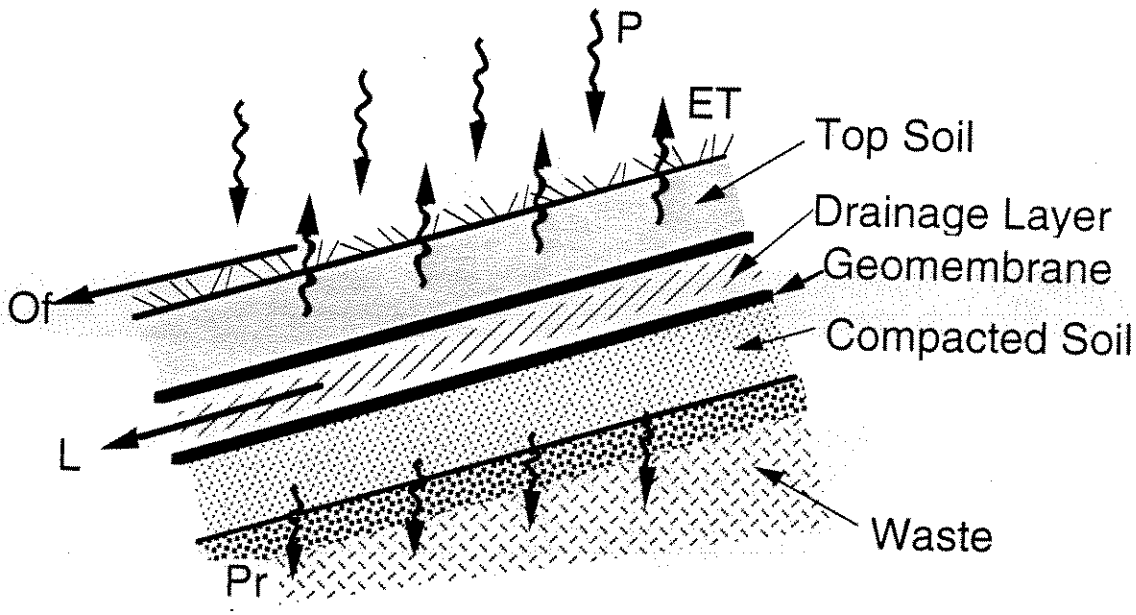
April 15, 1997


Cover System
Waste
Leachate
Lining System

Covers and Caps

Objective: Limit entry of water and oxygen

Layers: Vegetative Layer, Rooting/Protective Layer, Drainage Layer, Barrier Layer



Importance of Cover/Cap

- Long-term barrier to infiltration

- Long-term barrier to oxygen diffusion

- Repairable without extensive cost

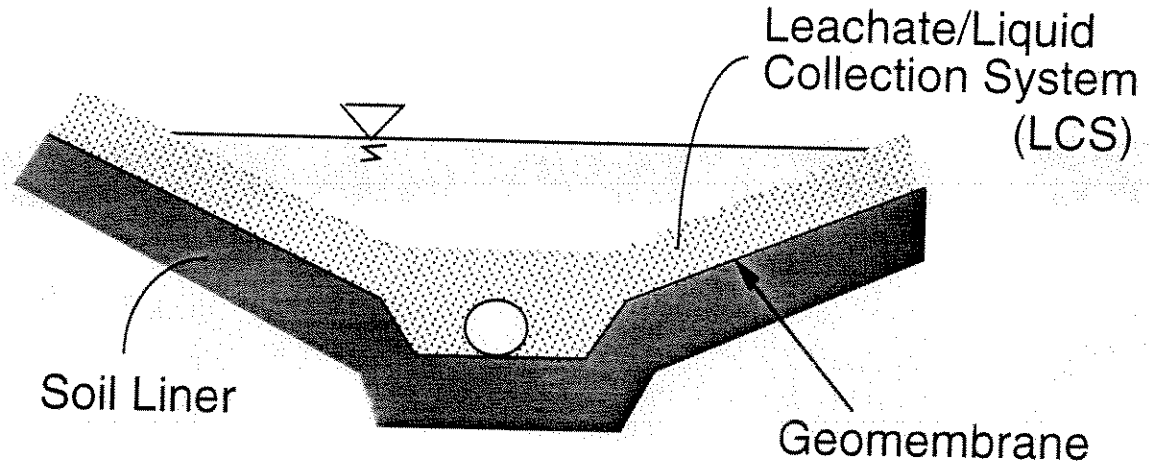
- Long-term exfiltration from waste limited to percolation through cap

- Percolation through composite cap is approximately 0.5 mm/yr with little maintenance

Liners

Objective: Facilitate leachate collection, limit contaminant migration

Layers: Drainage Layer, Barrier Layer



Materials of Construction

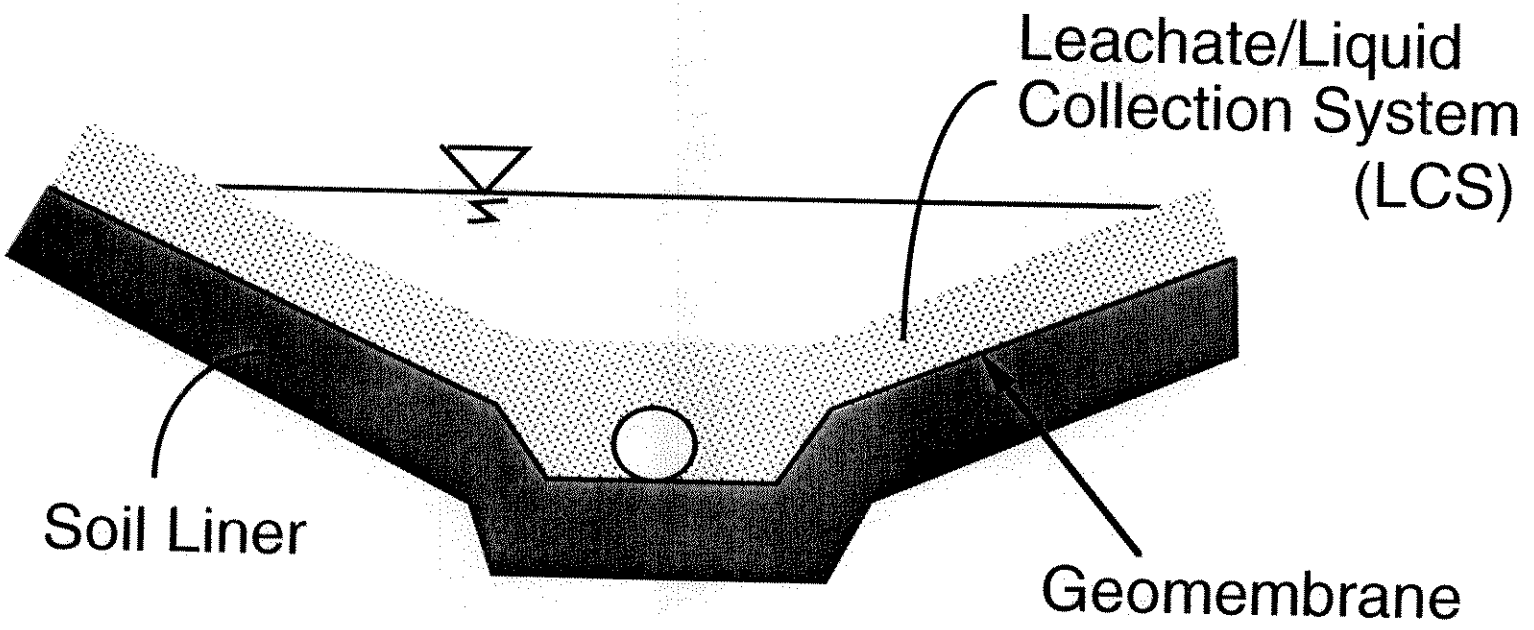
Drainage Layers:

- Sands, Gravels, Geonets
- Examples

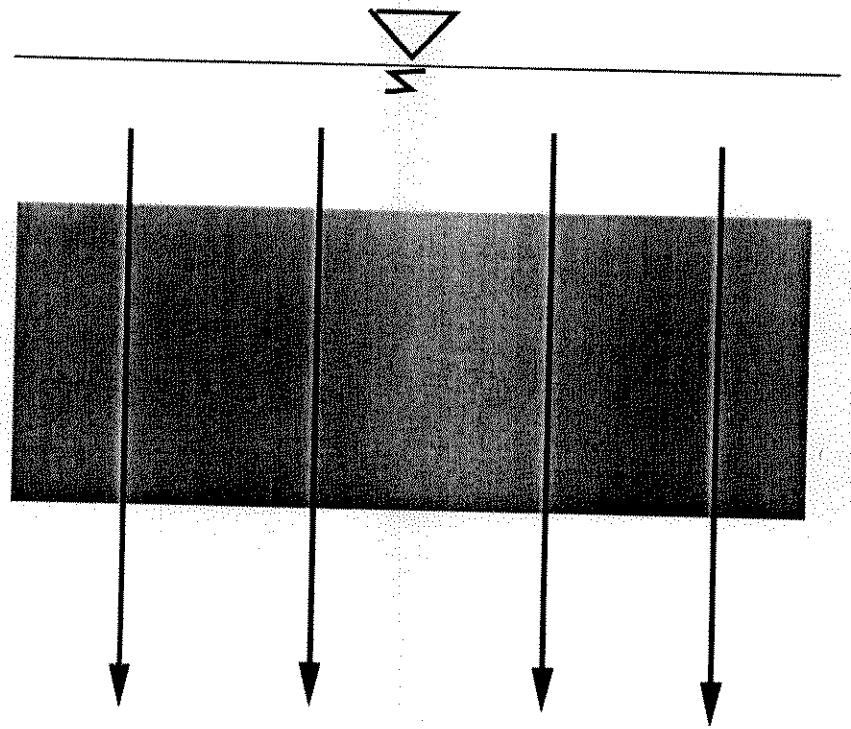
Barrier Layers:

- Clays, Geomembranes, GCLs
- Examples

Composite Liners

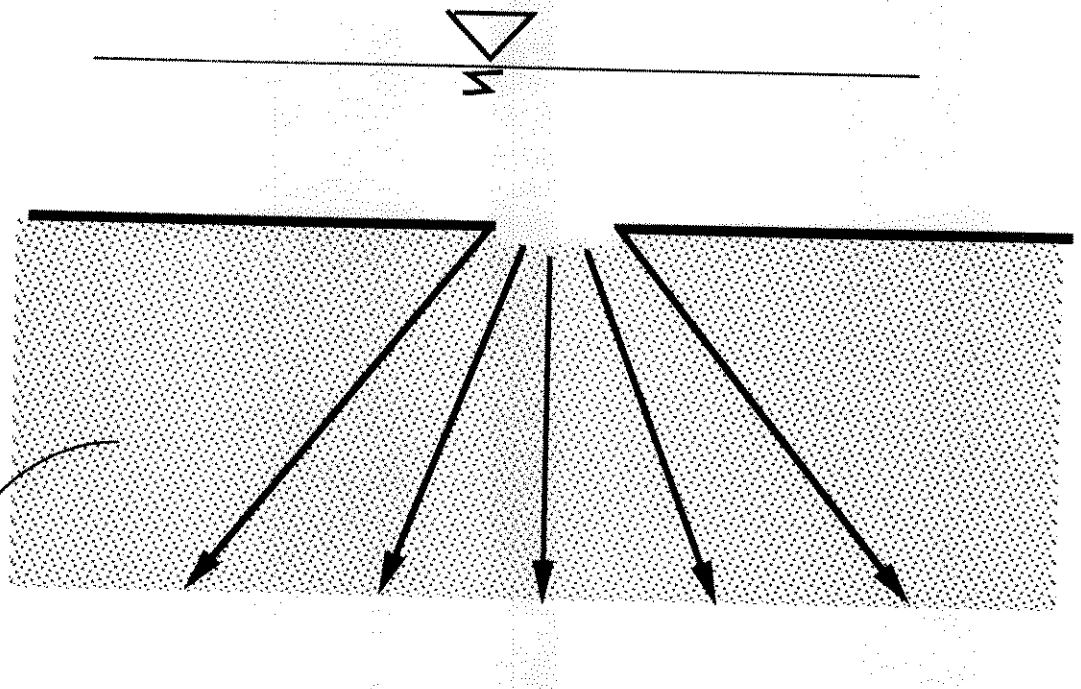


Soil Liner Alone



Large Cross-Sectional Area for Restricted Flow

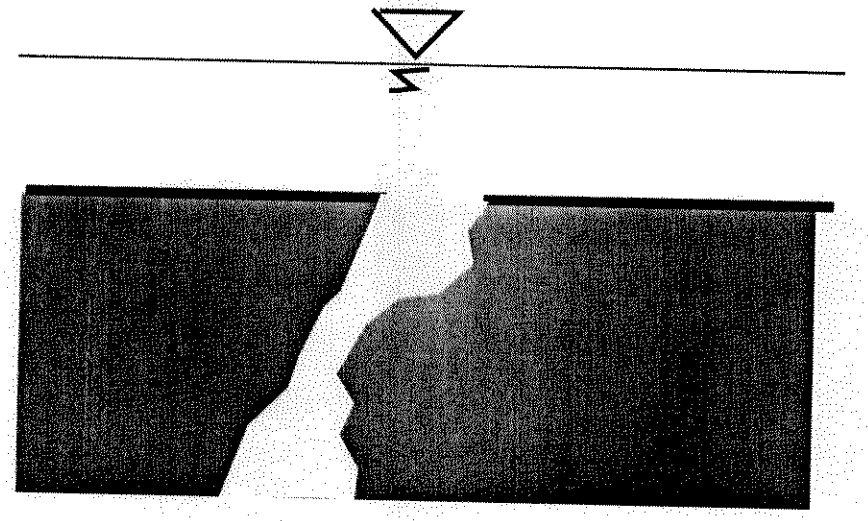
Geomembrane Alone



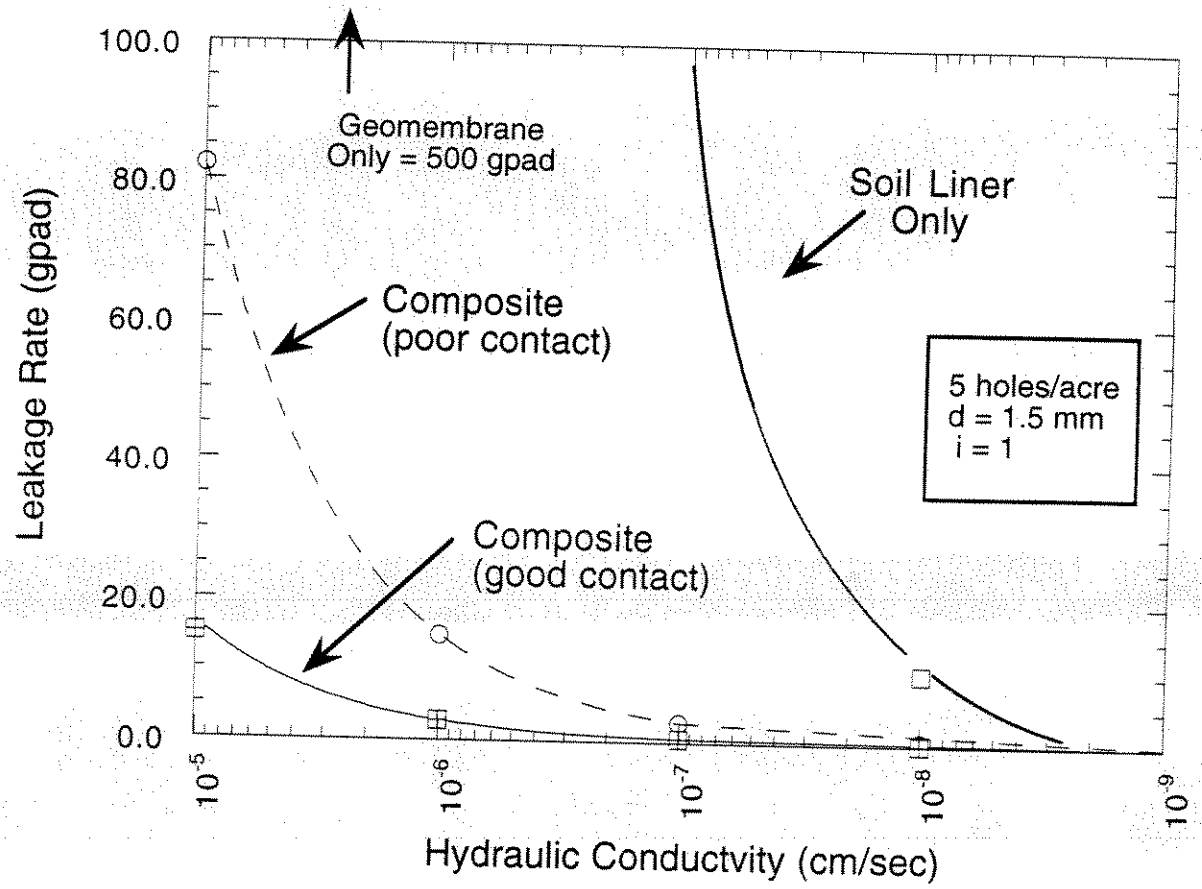
Conductive Sub-base

Restricted Cross-Section but no Resistance to Flow

Composite Liner



Reduced Cross-Section and Restricted Flow


100.0
80.0
60.0
40.0
20.0
0.0
Leakage Rate (gpad)
Geomembrane
Only = 500 gpad
Soil Liner
Only
Composite
(poor contact)
Composite
(good contact)
5 holes/acre
d = 1.5 mm
i = 1
10-5
10-6
10-7
10-8
10-9
Hydraulic Conductvity (cm/sec)

Geomembranes

- Polymer: High Density Polyethylene

- Why: Durable, Chemically Resistant, Easily Installed, Readily Welded

- Examples of Use:

  - Children's Toys (Little Tykes)
  - Gasoline Tanks in Cars
  - Chemical Storage Tanks
  - Liquid and Gas Pipelines
  - Pesticide Tanks

Applications require rigorous, flexible material that is extremely chemically resistant

Construction of Geomembrane Liners

- Deployed in rolls
- Welded with precision welders designed for lining systems
- Double-track weld used for continuous testing of seams
- Each seam completely leak tested by pressure or vacuum
- Each seam mechanically tested to ensure weld is as strong as parent material
- Entire liner can be tested using spark testing or electrical leak location survey

Lifetime of Geomembrane Liners

- Oxidation is primary factor degrading polymer structure

- Geomembrane lifetime consists of three stages

  - antioxidant depletion

  - induction time

  - degradation

- Research funded by USEPA and National Science Foundation shows that

  - anti-oxidant depletion time typically > 200 yr.

  - induction time (oxygen diffuses into geomembrane) ~ 200 yr.

  - degradation to 50% change in properties (e.g., leakage rate) ~ 100 years

Estimated Time for Significant Deterioration ~ 800 to 1000 yr.

Lifetime of Clay Liners or GCLs

GCLs:

- Bentonite age is measured in geologic terms
- Properties have unchanged for 10,000 years

Clay Liners:

- Mineralogical composition unchanged for 10,000 years
- Extremely low leakage rates if properly placed
- Maintain integrity if properly protected from drying, frost, and biota (rooting/protective layer)
- Natural clay barriers exist for thousands of years as hydrogeological units: aquitards

Long-Term Performance

Applicable Technology ~ 15 yr. old.

- municipal solid waste
- hazardous waste

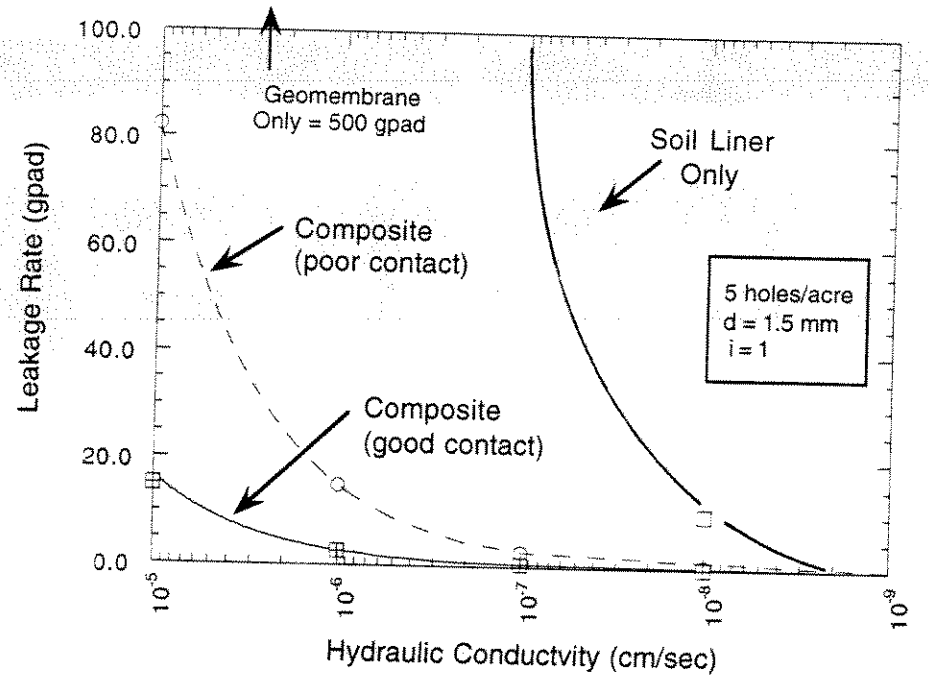
Long-Term Performance Studies:

- USEPA studies on existing liners and covers
- German study
- Wisconsin experience

USEPA Study on Performance of Liners:

- Composite liner leakage rates from 194 cells
- Clay composite-lined cells typically less than 2 l/ha-d (~ 1 quart per acre per day)
- GCL composite-lined cells ~ 0

~ 0.01% of natural recharge



USEPA Study on Performance of Covers:

- Caps on 194 cells
- Percolation range 0.002 to 1 mm/yr

German Study at Hamburg Landfill

- constructed five different types of covers
- instrumented each cover to follow water movement
- composite cap leakage < 0.5 mm/yr

Wisconsin Experience:

- no groundwater contamination problems from engineered facilities

Construction Quality:

The Key to Successful Waste Containment

- Careful attention to construction details and specifications
- Intensive testing and evaluation
- Detailed construction documentation
- Continual peer and regulatory review
- Importance illustrated by EPA Guidance Document
- WDNR example was model for national practice

Mining Applications:

- heap leach pads (very strenuous application)
- caps over tailings piles, sulphidic rock
- S. Dakota, Arizona

Hazardous Waste Applications:

- standard technology for modern hazardous waste landfill design

- design for remedial action units, e.g. RMA, with 1000 year design life

BRIEFING BEFORE THE ASSEMBLY COMMITTEE
ON ENVIRONMENT
by
Lawrence J. Lynch, Department of Natural Resources
April 15, 1997

Good afternoon Chairman Duff and members of the committee. My name is Larry Lynch. I am a hydrogeologist with the Department of Natural Resources' Bureau of Waste Management and I also serve as the leader of the department's statewide mining team. With me is Dr. Craig Benson, an associate professor of civil and environmental engineering at the University of Wisconsin-Madison. In addition, there are several other department staff present, who may be called upon to respond to certain questions. For the sake of continuity, we would prefer to address your questions after both Dr. Benson and I have completed our presentations. However, if you have a question which you feel is of an immediate nature, please feel free to interrupt. Our presentation will last about one hour and will consist of two main parts. I will begin by discussing the problems associated with mining and mining waste management and Dr. Benson will discuss current technology available to address those problems. I will then conclude the presentation with some brief comments.

Obviously, much of the ongoing debate regarding mining in Wisconsin is currently centered on the proposed Crandon project. The department has not yet completed its evaluation of the project. Therefore we are not in a position, today, to discuss with you our projections of the specific impacts of that project, nor can we indicate whether the design proposed by the company satisfies the approval criteria specified in our administrative rules. We can, however, discuss the company's proposal and how the agency is conducting its review if you would like to ask questions following the presentation. Further, I must emphasize, that nothing I say here today should be construed as an endorsement or approval by the department of a given technology. The effectiveness of a particular technology cannot be determined without conducting a thorough project-specific review of its application. Our presentation is simply intended to provide you with a better understanding of the issues and various potential solutions.

For purposes of our discussion, we will focus on the potential long term contamination of surface water and groundwater from mines and mining waste facilities and the available technology to address those concerns. We recognize that there can be many other possible impacts associated with proposed mining projects and it is not my intent to diminish the importance of those matters. However, the long term threats to surface water and groundwater quality seem to be the issues that dominate the debate and are also generally perceived to be the most difficult of the issues to address.

Waste materials generated in association with mining of a sulfide orebody can contain significant quantities of sulfide minerals, such as the iron sulfides, pyrite and pyrrhotite, as well as some of the unrecoverable, economic sulfide minerals. The presence of sulfide minerals is important because these minerals are the primary source of acidic drainage associated with many mining sites around the world. Sulfide minerals, when exposed to oxygen and water can progress through a series of chemical reactions through which acid is eventually produced. The dissolution of iron sulfide minerals generates the majority of acid produced by mining wastes. Initially, the rate of this reaction is quite slow and gradual, but as the system becomes more acidic, the rate can be dramatically accelerated by the presence and activity of iron- and sulfide- oxidizing bacteria. As the waters within the waste become more acidic, other metal sulfide minerals present in the waste also begin to dissolve, contributing metal ions to the solution as well. When allowed to proceed unabated, a fully developed acid drainage situation can be characterized by waters that have an extremely low pH and contain high levels of dissolved solids, and heavy metals.

While sulfide mineral dissolution does occur naturally, the mining process may result in much greater extent of reaction and higher reaction rates. This is because the mining process relocates the sulfide minerals from an isolated location in the ground to the surface, where the minerals are much more readily exposed to water and oxygen. Also, mining tends to break the rock into smaller fragments, dramatically so in the case of tailings, thereby increasing the surface area of the sulfide minerals available for oxidation. Both of these factors serve to substantially increase the rate at which the sulfide mineral

dissolution occurs and, therefore, the development of acidic conditions is also accelerated.

Another important chemical process which can take place in nature and in waste piles is the dissolution of carbonate minerals such as calcite, the main constituent in limestone. As opposed to the sulfide minerals, which have the capacity to generate acid, carbonate minerals can react with the acidic water created by oxidation of the sulfide minerals and can buffer or neutralize the solution thereby inhibiting the dissolution of other metal-bearing minerals.

There are four known mineral deposits in northern Wisconsin which could some day be developed. These deposits are classified as submarine volcanogenic massive sulfide deposits, meaning they originated with volcanic activity in an oceanic environment and they consist of over 50% sulfide minerals by weight. Some of the sulfide minerals contain valuable and recoverable metals, such as copper and zinc, while pyrite typically makes up a large portion of the other sulfide minerals. In the process of mining such an orebody, several types of waste materials would be generated. These include overburden, consisting of glacial till and sand and gravel which could overly the orebody and must be removed in the case of a surface mine, and various types of waste rock, which either overly or abut the ore zones and must also be removed in order to access the ore. Of these materials, waste rock is generally the only waste type which could pose a significant long term environmental threat, as it could contain significant sulfide mineralization.

Another source of waste is related to ore processing facilities. In order to ultimately recover the metals contained in these deposits, the ore must go through a smelting and refining process. However, prior to smelting, the ore will generally need to undergo an intermediate step called concentration. The most likely concentration process for the known mineral deposits in Wisconsin would be froth flotation. This is a physical separation process through which the valuable minerals are separated from the rest of the ore, forming what is called a concentrate, which is then shipped to a smelting facility. The waste minerals remaining after recovery of the concentrates, are called tailings and

are usually transported in slurry form to an on-site disposal facility, where the solid particles are allowed to settle and the clarified water is returned to the mill for reuse. In some underground mines, such as the proposed Crandon project, a portion of the tailings can be used for backfilling the underground workings to provide structural support and facilitate more complete and efficient removal of the orebody.

In order to best manage the mining waste it is desirable to have an understanding of whether or not the waste material, as a whole, will generate acidic drainage. Predictive testing procedures have evolved over the years to help answer this question. There are basically two distinct approaches which can be used to determine the reactive nature of prospective waste materials. The first of these are termed static tests and are intended to determine the overall acid-producing and acid-consuming potential, or neutralization potential, of the waste materials. These two parameters are calculated based on simple chemical analyses and provide a quick and inexpensive means to determine the gross potential of the waste to generate acidic drainage. These tests are used as an initial screening tool to identify those wastes which are clearly acid-producing or conversely those with either little acid-generating material or excessive neutralizing material. Uncertainty arises when the results indicate that the wastes are only marginally acid producing or neutralizing.

If the static tests produce marginal results or if prediction of the chemical characteristics of the leachate is desired, a second type of test, termed kinetic tests, must be employed. These tests are essentially laboratory simulations of the weathering and oxidation processes. Actual procedures may vary, but most tests include exposure of the wastes to air and water and subsequent collection and analysis of the drainage emanating from the test cell. The tests are conducted over a long period of time and the characteristics of the leachate give an indication of the rates of the various chemical reactions taking place and the ultimate drainage water quality. The results of the kinetic tests can then be used to determine the proper handling and possible treatment of the wastes during the mining operation.

Conventional acid mine drainage, the release of acidic waters out of the actual mine workings is based on the same chemical processes which cause acidic conditions at mining waste facilities. The sulfide minerals present in the orebody and surrounding rock are exposed by the mining process and remain exposed in the wall rocks of the mine, resulting in the generation of acidic drainage water. Under suitable hydrologic conditions, this water can then flow out of the mine workings and enter surface waters or can accumulate and eventually percolate to the groundwater system.

The problem of acid mine or acid rock drainage is not a new phenomena. Rather it has been widely recognized in the United States for well over a century. Initially, acid drainage was associated with coal mining in the Appalachian region in the eastern U.S. but over time, the problem has been identified throughout the country and is not just restricted to coal mining. Historically, mining waste disposal sites were located more out of a matter of operational convenience and economics rather than concern for the potential environmental impacts of the facility. Waste rock was simply dumped in areas adjacent to the mine and tailings were typically deposited in valleys or other low areas which served to contain the slurried wastes. Once mining was completed, the operators commonly abandoned the sites without conducting any site restoration except to salvage useable equipment or other materials from the site. Barren piles of waste would be left, posing a long-term threat to water quality through erosion and sedimentation, as well as the development of acid drainage as described above and mined out workings would simply be abandoned.

As general environmental awareness progressed and the problems became more visible, mining and mining waste disposal practices also began to change. In the United States, this was first institutionalized on the federal level for the coal mining industry with the passage of the Surface Mining Control and Reclamation Act in 1977, which imposed controls on coal mining operations and required reclamation of these mining operations. The situation in regard to metallic mining has lagged behind the coal mining industry. There is no federal equivalent to the Surface Mining Control & Reclamation Act which

pertains to metallic mining sites. Rather, individual states have developed laws and rules which best suit their particular environment and needs.

Recently, a great deal of research focussing on metallic mining sites has been initiated and much of this work has been conducted in Canada in areas of geologic similarity to Wisconsin. In addition, experience gained in the solid and hazardous waste management industry in landfilling wastes is also applicable to mining sites, since management of each kind of waste shares the primary goal of isolating the waste from the surrounding environment. This is especially important since the design and construction of solid waste facilities has reached a high level of sophistication and effectiveness. As is the case in Wisconsin, several other states also approach the design of a mining waste facility in a manner similar to other solid waste facilities.

In cases where mining wastes are determined to be potentially acid-producing, steps can be taken to either prevent the acid drainage from forming or to control the release of contaminated water from the facility to the surrounding environment. Based on an assessment of the research it is apparent that each individual site must be evaluated on the basis of its unique nature to determine the most effective and practicable prevention and control measures for implementation at that particular location. Further, it is also clear that there are no universally applicable measures. Although in theory, some approaches could have widespread applicability, they may not be practicable due to other factors, such as legal constraints, availability of materials, or prohibitive costs.

Two practices aimed at controlling the rate of sulfide mineral oxidation which have been researched and used in the field, albeit more commonly in the coal mining industry, are the use of alkaline material and bactericides. Use of such applications are predicated on the acceptance that some oxidation of sulfide minerals will occur and the additives are intended to mitigate the eventual impacts of the sulfide oxidation. Addition of alkaline material, such as limestone or lime, functions by controlling the pH of the fluids moving through the waste material through the buffering process described previously. Similarly, bactericide addition is intended to limit the rate of sulfide oxidation by inhibiting the

activity of iron oxidizing bacteria so that the oxidation process is limited to an inorganic process, which is much slower than the bacterially enhanced reaction. Neither of these approaches prevent the oxidation of sulfide minerals, but they control the rate of such oxidation. They area likely not long term solutions but they may be effective in the period immediately after closure of a waste facility to help control the oxidation rate at the surface of the wastes until permanent control measures are in place.

For purposes of providing long-term environmental protection, measures should be taken to prevent or minimize the oxidation process. Preventing the formation of acidic drainage from mining sites can be achieved by limiting the availability of at least one of the three components necessary to generate acidic drainage, specifically, sulfide minerals, water and oxygen.

Options for directly reducing the availability of sulfide minerals in a waste mass or abandoned mine are limited. One such method is to recover and thus remove the pyrite from the waste material. Pyrite flotation, using a process similar to that discussed above, is possible and would serve to remove most of the sulfide minerals from tailings, in the form of a pyrite concentrate. However, total recovery of all sulfides is not achievable, so that the remaining wastes may nevertheless be acid-generating. These remaining materials will likely require disposal in an engineered facility. In addition, the concentrated sulfide material which is recovered still needs to be either treated, disposed of in a secure location, or an alternative use for the material would need to be identified. At this time, a viable market for large volumes of sulfide minerals from mining wastes does not exist since North America has abundant sources of both iron and sulfur.

Two other innovative approaches to waste treatment or processing which could reduce the potential for sulfide waste minerals to oxidize include in-situ vitrification and phosphate encapsulation. In-situ vitrification essentially involves melting the waste material and allowing it to solidify into a more impermeable and hence less reactive mass. Treating the waste with phosphatic solutions induces formation of an encapsulating coating of iron phosphate on the mineral grains which then serves as a

barrier to oxidation of the sulfide minerals. Neither of these options have been used to any extent in actual applications, and cannot yet be considered viable treatment alternatives.

Given the paucity of options to remove or reduce the oxidation potential of the sulfide minerals themselves, most modern control technologies focus on means to prevent or decrease the availability of oxygen or water to the sulfide waste materials. The primary method to achieve the goal of reducing oxygen or water influx is construction of some sort of cover system over the waste material. A variety of different materials have been explored for use as covers, but the emphasis should be on selection of materials which are readily available, technologically feasible to construct, and have assurance of long-term stability.

The use of water as a barrier to oxygen influx to waste material has been gaining great attention over the past decade. Under this approach, waste material is deposited under water and is permanently submerged below a free standing column of water. Water is an effective barrier because the solubility of oxygen in water is very low and the rate of oxygen diffusion through water is also extremely low. These two characteristics combine to reduce the availability of oxygen to the submerged waste material. Research and experience with facility closures primarily in Canada, Norway and Sweden have demonstrated that oxidation of reactive sulfide-mining wastes is drastically reduced when the wastes are inundated. The results indicate that if fresh tailings are deposited under water and kept in a saturated condition, the rate of oxidation is very slow and generally limited to a thin surface layer. Highly acidic conditions do not develop and, the rate of metals release from the submerged waste material is also extremely low. Given those findings, many regulators and researchers, particularly in Canada, view water covers as the most promising means of dealing with acid-generating mining waste materials.

Subaqueous or underwater storage and permanent disposal storage of waste rock and tailings material may be accomplished in either natural or man-made impoundments, including mined-out open pits. While natural lakes have been used successfully as

tailings disposal facilities in Canada and elsewhere, under the constitutional public trust doctrine in Wisconsin, tailings disposal in a natural lake would be prohibited. Man-made impoundments and artificial reservoirs for tailings disposal are attractive in terms of preventing oxidation of sulfide wastes, but there are also various concerns with such an approach. Water retention facilities must be carefully designed, constructed and maintained to ensure long term stability, an adequate source of water must be secured to maintain the appropriate water cover over the wastes in times of drought, and maintenance of a column of water may ultimately result in increased seepage through the bottom of the facility. Nevertheless, artificial impoundments merit serious consideration when designing waste management facilities for future mining sites.

Use of water as an oxidation barrier is important for two additional potential applications. First, even if permanent subaqueous tailings disposal is not a workable option, storage of tailings in a ponded condition is recognized as an effective and workable method to reduce substantial oxidation of sulfide minerals during the operational phase of a project. Second, in the case of mines backfilled with mining waste, eventual flooding of the mine and the waste material, will serve to inhibit further oxidation of the contained sulfide minerals.

Given the above mentioned concerns with permanent subaqueous disposal of sulfide mining wastes, the most viable alternative appears to be dry cover systems which are designed to reduce exposure of the waste to oxygen and water. Investigators have evaluated a variety of natural and manufactured materials for use as covers, but for our purposes today we will concentrate on what are considered to be the most effective and practical options. Given Wisconsin's humid climate and our water-rich environment, it is likely that any waste facility sited in the state will require installation of a liner system to reduce seepage out of the base of the site, in addition to a cover system. The fundamental approach would be to encapsulate the material to reduce its exposure to the environment.

In contrast to the mining waste facility design practices of the 1970's, most states with significant mining activity now require installation of liner and cover systems at facilities containing potentially acid-generating wastes. For the most part, these systems will rely on placement of low permeability materials to inhibit the movement of air and water into the waste and similarly retard the seepage of leachate out of a waste site. Components of the designs used at mining waste facilities in other states include single liners, double synthetic liners, a double liner with a leachate collection system, double clay liners and combined clay and synthetic liners, known as composite liners. The most appropriate design for any given facility is generally determined on a case-by-case basis taking into account the nature of the waste and the characteristics of the site. However, the containment technology applied at mining sites to control the migration of water out of the waste facility is essentially the same as that employed at other solid waste facilities in Wisconsin and other states.

Facility owners, product manufacturers, government agencies, and academic investigators have conducted considerable research into the properties of infiltration barriers and final cover systems. This effort has extended over several fields of application, such as solid and hazardous waste disposal, low-level radioactive waste disposal, uranium mill tailings reclamation, coal mining waste reclamation and heap leach operations. The theory and practice of barrier layers and waste containment is broadly applicable, regardless of waste type.

As is currently taking place in the mining waste management field, the design technology for solid waste management facilities went through a similar evolution in terms of control measures. Specifically in terms of liner design, solid waste facilities have progressed from unlined sites to retarder liners, to thick clay liners in the 1970s and 1980s to the current approach of composite liners (clay liner plus a synthetic membrane liner) with leachate collection systems. As the designs have improved, so has the effectiveness of the containment systems. The principles of solid waste management are directly applicable to future mining waste sites, and it is anticipated that such sites will incorporate the prevailing liner and cover technology applied to solid waste facilities. Dr. Benson will now discuss current containment technology in greater detail.

Wisconsin Mineral Deposits

- Volcanogenic massive sulfides
- Over 50 % sulfide minerals
- Recoverable metals
    - copper, lead, zinc
- Sub-economic minerals (pyrite)

Mining Wastes

- Overburden
- Waste rock

Tailings

- Production
- Backfilling of mine
- Disposal

Chemical Processes

I. Sulfide Mineral Oxidation
- Pyrite is the main mineral of concern
- Pyrite, water and oxygen are all needed
- Reaction speeds up as pH drops
- Resultant water quality
    - low pH (high acidity)
    - high metals
    - high dissolved solids

Impact of mining on natural reactions
- Increases sulfides availability
- size reduction
- exposure

II. Carbonate Mineral Dissolution
- Calcite buffering

Mining Waste Management-Planning Stage

Waste Characterization

- Physical
- Mineralogical
- Chemical

Predictive Testing

- Static tests
  - Acid generating potential
  - Neutralization potential
  - Classify waste as net acid generator or net acid neutralizer or consumer

Kinetic Tests

- If static test results are marginal
- If leachate characterization is desired
- Simulate weathering/oxidation processes

  ==> Reactions, Reaction rates

Mining Waste Management
Historical Aspects

Mining practices

- Economics and convenience were main criteria for waste site location
- Abandoned/unreclaimed sites
- Long term threats to water quality
  - mine openings
  - waste sites

Conventional Acid Mine Drainage

- Topographic controls
- Surface water contamination source

Acid Rock or Waste Drainage

- Eastern coal mining areas
- Western coal and metal mining areas

Mining Waste Management
Historical Aspects II

Regulation of Mining and Mining Waste

- Surface Mining Control & Reclamation Act
  - 1977 - Fed. regulation of coal mining
  - Operational controls
  - Mandatory reclamation
- Metallic Mining Regulation
  - State by state-varied requirements
  - Wisconsin
  - 1974 Metallic Mining Reclamation Act
  - 1978 - Specific Authorization for mining waste regulation
  - 1982 - NR 182

Mining/Mining Waste Technology

Technological/Research Developments
- Coal Mining Industry
- Mine Environment Neutral Drainage (MEND)
- U. S. Bureau of Mines
- Other Industrial Sectors

Technology Implementation
- Should be site specific
    - waste characteristics
    - environmental setting
    - regulatory setting

- Short Term Controls
    - do not prevent oxidation of sulfides
        - Alkaline addition
        - Bactericide application

Mining/Mining Waste Technology II

Long Term Controls

- Eliminate one of the three needed ingredients

  - Eliminate sulfide minerals
    - pyrite separation
      - incomplete removal
      - marketability
    - in-situ vitrification
    - phosphate encapsulation

  - Isolate the waste from water and oxygen
    - water Covers
      - operating principle - O_2 solubility and diffusion
      - experience and results -
        Lakes, impoundments, pits
        Findings

Mining/Mining Waste Technology III

- Water covers (cont.)
  - Drawbacks
    - Legal
    - Physical stability
  - Uninterrupted water source
  - Secondary application of theory
    - Operational life of tailings pond
    - Backfilled mines

Dry Cover Systems
- Oxygen and water barrier
- Encapsulation approach
  - covers & liners
    - reduce infiltration and seepage
  - options for materials
    - clay soils, synthetics, combinations
- Rely on applications from other industries
  - e.g. Evolution of solid waste sites

Institutional Controls

Comprehensive and Conservative Evaluation
- Redundant design

Quality Assurance/Quality Control

Comprehensive Monitoring Requirements

Surveillance

Contingency Planning - Early Intervention

Financial Guarantees