A Guide to Developing Reclamation Plans for Nonmetallic Mining Sites in Wisconsin

PUBL-WA-834 2002
Produced by the Wisconsin Department of Natural Resources
Bureau of Waste Management

WISCONSIN
DEPT. OF NATURAL RESOURCES

Wisconsin's
Nonmetallic
Mining
Reclamation
Program

A Guide to Developing Reclamation Plans for Nonmetallic Mining Sites in Wisconsin

PUBL-WA-834 2002

February 2002

Produced by the Wisconsin Department of Natural Resources
Bureau of Waste Management
P.O. Box 7921
Madison, WI 53707

Authors

Tom Portle, Phil Fauble and Ryan Jakubowski

ACKNOWLEDGEMENTS

The authors are indebted to the various individuals who provided thoughtful comments and suggestions that greatly improved the content of this document. A special thanks is extended to the WDNR Nonmetallic Mining subteam, Dan Graff, David Kafura, Kevin Kessler, Paul Koziar, David Kunelius, Larry Lynch, Jessica Maloney, John Melby, David Misterek and Deb Pingel. The authors also wish to acknowledge the support of the Nonmetallic Mining Advisory Committee for their reviews, Bruce Brown, Marty Lehman, Jennifer Sunstrom, Jim Burgener, Sue Courter, Ed Reesman, Ron Garrison, Mike Erickson and Gary Werner. Additional external comments from Jim Hanson, Jim Schmitt, Justin Cavey and Tom Hunt were beneficial. Adan Lara, Bob Queen and Vera Starch provided additional technical support.

DISCLAIMER

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PHOTOGRAPHS

The cover photographs were taken at two separate mining sites, an abandoned and reclaimed site. Both mine sites are located in Marathon County, Wisconsin. These photographs illustrate the difference between an unstable and dangerous site with no productive post-mining land use and a well-reclaimed site that now affords wildlife habitat. By properly reclaiming the site after mining was complete the site has actually increased in value. All photographs, unless otherwise noted, were taken by Tom Portle.

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I. INTRODUCTION AND PURPOSE

This document is intended to assist nonmetallic mine operators in preparing reclamation plans for their nonmetallic mining sites. Reclamation plans are required by local or county ordinance in the State of Wisconsin and all plans must be prepared in accordance with the uniform reclamation standards detailed in the Nonmetallic Mining Reclamation Rule, Chapter NR 135 of the Wisconsin Administrative Code. In addition, we have listed numerous resources that may be helpful for operators that choose to prepare a reclamation plan without outside assistance. These resources are provided throughout the document and Appendix B contains numerous resources available to the user for free or for a nominal charge. Many can be accessed on-line.

Successfully achieving the approved post-mining land use(s) is the ultimate goal of any reclamation plan. As such, the post-mining land use will dictate the level of detail required in the reclamation plan. Whether the final land use is as simple as restoring the land to an agricultural field or as complex as creating multiple wildlife habitats, the purpose of the reclamation plan is to serve as a guide to the operator for achieving the post-mining land use.

We hope that by presenting the reclamation plan requirements in a simple, step-by-step manner, we can take some of the confusion out of the process and encourage consistency in the preparation and review of post-mining reclamation plans. It is also our intent to provide enough information to allow operators the option of preparing reclamation plans on their own, if they choose. Naturally, the size of the site and the complexity of the final land use will determine whether or not outside assistance is needed.

For more information please refer to the Wisconsin Department of Natural Resources' Bureau of Waste Management Nonmetallic Mining webpage. This site can be reached by opening the following address http://www.dnr.state.wi.us/org/aw/wm/mining/nonmet.htm. This site can also be accessed by opening the Department's webpage http://www.dnr.state.wi.us and selecting "Environmental Protection", "Waste", "Mining" and finally, "Nonmetallic Mining in Wisconsin".

Located in Jackson County, the Inland Steel mine site was successfully reclaimed to a county park, a post-mining land use that offers many recreational opportunities.

II. OVERVIEW OF THE NONMETALLIC MINING RECLAMATION PROGRAM

In response to concerns about abandoned nonmetallic mining sites, Wisconsin Act 464 was enacted in April of 1994. Through this law, the Legislature directed the WDNR to write a reclamation rule that could be used to implement uniform statewide mine reclamation standards. After several revisions and public comment, Chapter NR 135 Wis. Adm. Code was published in September of 2000 and became effective in December 2000. The purpose of NR 135 is to establish county and municipal reclamation programs through the enactment of an applicable ordinance as a means of ensuring that uniform reclamation standards are applied consistently throughout the state. In this way, NR 135 provides assurance that a stable and productive post-mining condition will be achieved at all active nonmetallic mines in the State of Wisconsin. This new rule made it mandatory for counties to enact ordinances by June 1, 2001 for the purpose of establishing and administering programs to address the reclamation of nonmetallic mining sites. Although mandatory for counties, the rule allows the option of enacting an ordinance establishing a reclamation program for cities, villages and towns.

It is important to note that reclamation is a separate program and is in addition to all existing and applicable federal, state, county and local requirements. In writing the reclamation law, the legislature conveyed its intent that land use decisions continue to be addressed within the existing county or local zoning process. **The requirements contained in NR 135 serve only to create a uniform standard of reclaiming nonmetallic mining sites.** Thus, NR 135 confines itself to the implementation of the reclamation standards while the regulation of mine operations and the actual siting of nonmetallic mines continues to be a local decision.

Active nonmetallic mining operations in Wisconsin may obtain reclamation permits in two different ways. The first process is for mining operations that were active in 2001 and applied for a reclamation permit by August 1, 2001. These mining sites were granted automatic reclamation permits by September 1, 2001 in accordance with Ch. NR 135.21(1), Wis. Adm. Code. As a condition of the automatic reclamation permit, mine operators committed to submitting a complete reclamation plan for their site(s) within two to three years.

The second process applies to mining operations that did not obtain an automatic permit and are opened or reopened after August 1, 2001. Once a mineable deposit is located, an operator needs to develop a reclamation plan and submit it to the regulatory authority for approval in order to receive a reclamation permit. In accordance with NR 135.20, Wis. Adm. Code, the regulatory authority (RA) must publish a public notice and provide opportunity for a public informational hearing on the contents of the reclamation plan. The RA must approve the reclamation plan and issue a reclamation permit before the operator can initiate mineral extraction at the site.

In general, a new or reopened mining site will follow these steps in developing a reclamation plan:

* The applicant will need to obtain the information necessary to complete the application, addressing the specific requirements that may arise while the mine reclamation plan is being drafted. (Please refer to Appendix B when searching for sources of existing information available to the public).

* In order to develop a mine reclamation plan an applicant must first decide upon and propose a target post-mining land use or uses. It may be beneficial to discuss the proposed land use(s) with the RA.

* Once all maps and background information have been assembled and developed into the reclamation

plan, the applicant shall submit the plan to the regulatory authority for review. The RA provides an opportunity for affected members of the public to request an informational hearing on the reclamation plan.

* The RA's review of the reclamation plan will focus on whether or not the plan provides adequate detail on how reclamation will be conducted. The RA will evaluate the plan to determine how well it may meet the uniform statewide reclamation standards and whether or not the target post-mining land use(s) can be achieved.

* When all requirements are met the RA will inform the applicant of its decision to approve the plan, deny the plan, or approve it with conditions. If approved, the RA will issue a reclamation permit or other approval decision to the applicant.

* Once the operator pays the annual fees (for unreclaimed acreage) and provides for financial assurance, they may commence mining.

III. A GUIDE TO PREPARING RECLAMATION PLANS FOR NONMETALLIC MINING SITES

This guidance is intended to assist nonmetallic mine operators in preparing reclamation plans for their nonmetallic mining sites. All reclamation plans must be prepared so they are in compliance with the reclamation standards in Ch. NR 135 of the Wisconsin Administrative Code. This guidance summarizes the main requirements for preparing reclamation plans. Each item discussed below must be addressed in the plan, although the level of detail necessary will vary depending on the size, location and proposed post-mining land use(s) for each mining site. While preparing the reclamation plan, try to keep in mind the site's post-mining land use. How can the operations be structured to minimize double handling of materials? How will the reclaimed site fit in with the surrounding community?

Does the site already have a reclamation plan? If so, try to incorporate as much information from the existing document as possible. Be aware that, if the existing plan was approved as part of a conditional use permit, the operator may still be responsible for compliance with those conditions. Consult with the local regulatory authority for more details.

As a means to provide readers with additional information and resources, we have included a series of appendices attached to the end of the document. These can be easily located simply by looking for the large arrow symbols and italicized font. Also, it may be helpful to look at the conceptual reclamation plan contained in Appendix G.

⇨ *Would you like a quick way to check your reclamation plan for completeness? See **Appendix A** for a **Reclamation Plan Checklist and Code Citations**. The checklist also contains the applicable NR 135 code references for each section.*

⇨ *Would you like to know how to obtain some of the public information mentioned below? See **Appendix B** for a listing of **General Information and Resources** including addresses and web sites.*

1. Site Information:

A. Maps: Operators will need to submit a series of maps so the local regulatory authority can properly evaluate the proposed reclamation plan. One of the best ways to prepare these maps is to start with one detailed base map and modify it to provide the required information. Also, when possible, it's smart to combine the information from separate maps into one map, so you can satisfy several requirements at once. Just remember to prepare the maps with an appropriate scale so that they aren't cluttered or too small to read.

1. General Location:

When preparing this map, be sure to include enough detail to allow someone to easily locate the property on a road map. Topographic maps work well for this purpose, as do county plat maps. Also, check to see if recent aerial photos are available. If you are in an area where GIS mapping has been done, using this tool could prove to be the best way to convey the required information.

2. Property Boundaries:

Be sure to include each adjacent landowner, at a minimum. County plat maps work well as a source.

3. Areal Extent:

Draw in the current and/or future boundaries of the site's extraction area, especially if mining is being conducted in phases. Also note any support areas, such as stockpiles, berms, storage pads or haul roads.

4. Geologic Composition and Depth of the Mineral Deposit:

In most cases an operator will not have to hire a geologist or make a detailed report on the geologic properties of a site. Some general descriptions (i.e. sandy dolomite in the upper half grading into brown sandstone at the base) should suffice. If available, the county or regional geologic map would be very helpful. These maps are available from the Wisconsin Geological and Natural History Survey (WGNHS).

5. Distribution, Thickness and Type of Topsoil:

Again, try to use information that is already available to prepare this map. County soil survey maps from the Agricultural Stabilization and Conservation Service (ASCS) or UW-Extension can provide all the detail necessary to adequately describe the surface soils.

6. Approximate Elevation of Ground Water:

In most cases an operator will not need to drill wells to adequately assess the ground water elevation near the mining site. Regional ground water table maps are available through the WGNHS for many parts of the state. If the mining site isn't covered by a regional map, try to find water wells nearby that could be used to determine the depth to ground water.

7. Location of Surface Waters:

A topographic map is an excellent source to determine nearby lakes, ponds, streams and rivers.

8. Existing Drainage Patterns:

A topographic map is a great place to start when evaluating local drainage. On a site-specific level, note on a map where runoff water leaves the site and note any sedimentation basins, channels or rip-rapped areas.

9. Existing Topography:

Once again, the topographic map for the site is a great initial resource. The local regulatory authority may require a greater level of detail, so the site may have to be surveyed either from the air or on the ground. Try to use existing surveys if they are available and still relatively current.

10. Location of Manmade Features:

This is something that could easily be combined with a location/base map. Note nearby buildings, roads, fences and transmission lines.

11. Previously Mined Areas:

This requirement applies only to existing mines or mines that are proposed within, or adjacent to, a previously mined area. Remember that NR 135 does not apply to abandoned mining sites, or portions of active mining sites that have been abandoned, in which all mining had permanently ceased prior to August 1, 2001.

Operators *continuing to mine in, or directly adjacent to, pre-existing mining sites* (where portions are pre-law or even attributable to a previous operation) should be specific about documenting and delineating areas previously affected by mining on a map, plan sheet, aerial photos or other graphical representation. Also, the operator should be specific about previously affected areas that will not be mined in the future. This will avoid potential confusion and unwarranted reclamation liability.

Likewise, if you are planning to *reopen a mine on a previously mined site* the same steps apply.

In any event, it is highly recommended that you contact your county or municipal RA and arrange an inspection or otherwise obtain their concurrence with your representation of the situation on the ground.

B. Biological Information:

Operators will need to provide information regarding biological resources, including plant communities and wildlife present at, and adjacent to, the mining site. Once again, this section should be based on information gathered from existing resources. The site's Wisconsin Point Source Discharge Elimination System (WPDES) Storm Water General Permit may contain valuable biological or archeological information obtained through the WDNR review. Another good place to start is **Appendix B**, which contains numerous sources of information available free of charge (and often on-line), that may helpful in the application process.

Also, personal observations made at the site regarding plants or animals may be helpful. Is the surrounding area mostly marsh, forest, fields or agricultural? Has anyone noted any fox, deer, or birds at the site? If there are any adjacent public lands, especially if they are State Natural or

Wildlife Areas, biological inventories may be available from the WDNR or county.

2. Post-mining Land Use:

This is the most important part of the reclamation plan. All elements of the reclamation plan will ultimately be dictated by the post-mining land use. The mining site can be reclaimed in numerous ways, but there are some important constraints that must be considered prior to selecting a final use for the mining site property.

First of all, the final land use must be consistent with local land use plans and zoning. If the proposed final use for the property is not consistent with current local zoning or land use plans, the operator will need to petition for a change in the zoning or conditional use from the appropriate local authority.

Also be aware that any proposed post-mining land use must be consistent with any applicable state, local or federal laws in effect at the time the plan is submitted. This may include laws dealing with surface water, wetland impacts, erosion control or water quality standards.

Other than that, there are many possible end uses to consider. In many cases, grading, topsoil placement and seeding will be the most efficient and cost effective solution, especially for sand and gravel operations above the water table. But why not consider upgrading a bit and replanting the site with species that can support wildlife? Or, if the site is below the water table, consider contouring and grading the site so it can support aquatic vegetation.

For rock quarries, remember that leaving intact highwalls is acceptable in the rules. However, an operator should consider benching the highwalls as a means to both support vegetation and render the cliff face less conspicuous. Also consider leaving the highwall accessible if it contains unique geologic features that would be of interest to future geology students.

*Still unsure about the best final land use for the mining site? See **Appendix H** for a list of **Potential Post-mining Land Uses** and other suggestions for integrating your final use plans with local planning.*

3. Reclamation Measures:

In this portion of the plan an operator must detail exactly how they will implement the mining site reclamation plan. The operator will need to submit a set of plans that describes the methods and procedures that will be used during reclamation of the site, including a proposed schedule and sequence for completion of each phase of the project.

Information provided above, including pre-mining site conditions, adjacent land uses, natural resources (soils, groundwater, wildlife and vegetation) and location of manmade structures, will help in the design of the mine reclamation plan. Such information will also assist the operator in determining appropriate locations for stockpiles of topsoil, subsoil, overburden and waste rock, to prevent or minimize double handling of materials.

The specific types of information that must be submitted in your reclamation plan are given

below. Some information is best presented in narrative form or in a table, but some information will have to be presented on plan sheets or maps. Again, it may be easier to present the information as plan sheets that overlay a base map. To make things even easier, use the same base map prepared in the "Site Information" portion of the plan and consider combining two or three of these required elements onto one map.

A. Earthwork and Site Grading:

Provide a description of the proposed earthwork and reclamation measures that will address the following (where applicable):

- final slope angles,
- high wall reduction,
- benching,
- terracing,
- or any other structural slope stabilization measures.

Remember that leaving intact high walls in rock quarries is acceptable. For new quarries, the acceptability of leaving highwalls as part of the proposed post-mining land use will be determined in the process of obtaining a reclamation plan from your regulatory authority. Slopes that will be covered with topsoil and revegetated to support the site's final land use cannot be steeper than 3:1, unless a steeper slope is demonstrated to be stable and approved as an alternative by the RA.

B. Topsoil:

Describe the methods of topsoil or topsoil substitute material removal, storage, stabilization and conservation that will be used during reclamation. The topsoil must be removed and stored in a manner that prevents significant erosion and soil runoff. In practice many operators preserve the topsoil by storing it as a low mound or screening berm. This method can also serve as an opportunity to improve the appearance of the mining site to adjacent property owners.

C. Topography:

Prepare a plan sheet or map that shows the final, anticipated topography of the reclaimed site. The locations of any water impoundments or artificial lakes that are part of the final land use should be included here.

D. Structures:

Prepare a plan sheet or map that shows surface structures, roads and related facilities after mining at the site ceases. This is a good map to combine with (or overlay on to) the final topographic map.

E. Cost:

Provide a cost estimate for each stage of the reclamation or for the entire site if the reclamation will not be performed in stages. This will help the RA determine the amount of financial

assurance for reclamation that an operator must provide. This information is probably best presented as a table. Please see **Appendix F** for more information.

*Would you like more detailed information regarding financial assurance? See **Appendix F**.*

F. Revegetation Plan:

Prepare a revegetation plan that describes the plans for stabilizing the slopes and protecting the topsoil. This plan will generally include the following elements (as applicable):

- plant selection,
- rates and methods of seeding,
- timing of the seed application,
- seedbed preparation, including application rates and types of soil amendments,
- and a description of mulching, netting or any other stabilizing techniques to be used.

*Would you like more detailed information regarding revegetation of the site? See **Appendix C** for **A Guide to Plant Selection** including a listing of native species suitable for mine reclamation.*

G. Revegetation Success Standards:

The reclamation plan must contain some method for measuring the success of the revegetation efforts. These success standards will be used to show that the site is stable and that the revegetation goals that go with the proposed final land use have been achieved. These standards can be set based on an evaluation of percent cover of vegetation, and/or productivity as well other applicable criteria.

*Would you like a little more detail on establishing revegetation success standards? See **Appendix D** for additional information on the **Determination of Revegetation Success and Retrieval of Financial Assurance**.*

H. Erosion Control:

Prepare an erosion control plan that shows the placement and function of erosion control measures to be employed during site reclamation. The placement of the erosion control measures should be indicated on a base map such as the final topography map discussed previously. The map should be followed up by a brief description of how each erosion control structure or method will function.

*See **Appendix E** for a listing of **Erosion and Sediment Control Measures** including some useful reference sources.*

I. Interim Reclamation:

Provide a description of any areas that will be reclaimed on an interim basis and subsequently disturbed prior to final reclamation. This requirement is only necessary if the operator plans on applying for a waiver of the annual fees or a reduction in the amount of financial assurance for

areas reclaimed prior to final reclamation of the site (as authorized under Ch. NR 135.41, Wis. Adm. Code). If the operator chooses to pursue this option, the reclamation plan will need to identify the proposed areas subject to interim reclamation, interim reclamation methods and timing of both the interim and final reclamation. This information is probably best presented on a plan sheet or map with some brief follow-up narrative.

4. Certification of the Reclamation Plan:

As a final step, each reclamation plan must contain a signed certification by the operator stating that the reclamation plan will be carried out as approved. If someone other than the operator owns the site, the landowner and lessee must also provide signed certification that they concur with the plan and will allow its implementation. There are two exceptions:

The landowner and/or lessee do not need to provide a signed agreement if,

- the mine operator is submitting a reclamation plan for an existing mine in accordance with an automatic permit issued prior to September 1, 2001,
- or the lease agreement or memorandum of lease for the mine property was recorded prior to August 1, 2001.

Please see **Appendix G** for example certification statements that can be incorporated into the reclamation plan.

5. Financial Assurance:

Upon approval of a reclamation plan and prior to the initiation of mining the operator must submit adequate financial assurance. The object of financial assurance is to ensure that the regulatory authority has access to enough funds to perform the site reclamation in the event that the operator goes into default. Once the reclamation is complete and certified by the RA, the financial assurance funds will be released back to the operator.

A well-conceived mining and reclamation plan is designed so that mining will be conducted in phases. By doing so the operator holds unreclaimed acres to a minimum. Reclaiming in phases is advantageous because it lessens the amount of annual fees and financial assurance.

The amount of financial assurance will vary depending on the size and complexity of the site. This amount must equal as closely as possible the cost to the regulatory authority of hiring a contractor to complete reclamation. This is an important point: the financial assurance must reflect the cost of hiring an outside contractor to do the work, not the cost to the operator if they performed the work.

The best way to calculate and present the anticipated costs is in a table that breaks down each activity and the associated cost. Consult with local contractors to obtain some realistic cost estimates in your area. Also remember to break down the costs by section if the plan calls for conducting the reclamation in phases.

There are numerous financial options available to operators for posting financial assurance. Any of the financial assurance mechanisms listed below may be used. It is recommended that you consult with your regulatory authority ahead of time to ensure the acceptability of your choice.

- Bonds
- Cash
- Certificates of Deposit
- Irrevocable Letter of Credit
- Irrevocable Trusts
- Escrow Accounts
- Net Worth Tests
- Government Securities
- Combinations
- Other

*See **Appendix F** for some useful information on the types of financial assurance and tables to help in calculating the **Financial Assurance**. Also, please see **Appendix B,** Part 11 for a recent publication on Bonding.*

6. Criteria for Releasing Financial Assurance

As mentioned before, the reclamation plan needs to contain specific criteria for measuring the success of site reclamation. Typically, a large part of this determination involves assessing the success of the revegetation efforts. The criteria involve specific, quantifiable measures that are proposed in the reclamation plan by the operator and approved by the regulatory authority. In other words, there needs to be a well-defined and objective method for the RA to evaluate the reclaimed site and assess the success of reclamation. This evaluation serves as the basis for the determination that final reclamation of the mining site has been achieved. After the RA issues a certificate of completion (COC), the financial assurance for that site must be released.

*Please see **Appendix D** for more information on this aspect of the plan.*

7. Submitting the Plan

Once the reclamation plan is complete, the operator is ready to submit it to the appropriate regulatory authority. In most instances that will be a County agency (such as the Zoning or Land Conservation Department), but be sure to check with the local Town or City to see if they have enacted a reclamation ordinance independent of the County. Please refer to Appendix B for a list of potential contacts. After submitting the completed reclamation plan to the regulatory authority, they will have between 30 and 90 days (unless a public hearing is held) after receiving the plan to either:

1) approve the plan and issue a permit,
2) approve the plan and issue a permit with conditions,
3) or deny the permit.

In any event, the regulatory authority must notify the operator of their decision in writing.

⇨ *Still a bit unsure about what a reclamation plan should look like? See **Appendix G** for a **Conceptual Reclamation Plan** modeled on the reclamation of a combined quarry and sand and gravel mining operation.*

APPENDIX A

RECLAMATION PLAN CHECKLIST AND CODE CITATIONS

IMPORTANT: *The checklist below is based on a restatement of the reclamation plan requirements of s. NR 135.19. However, it is only a summary, and users should refer to the code text itself when interpretations are needed or in order to resolve any ambiguities. The checklist is included both to assist in the process of preparing and submitting a "complete" reclamation plan for review and for use by plan reviewers. There is no intent to imply that all items on this checklist are necessary in all reclamation plans. Should you have questions on the need for your plan to include a given item, please contact your regulatory authority.*

NR 135.19(1) PLAN REQUIRED. An operator who conducts or plans to conduct nonmetallic mining on or after August 1, 2001 shall submit to the regulatory authority a reclamation plan that meets the requirements of this section and complies with the standards of Subch. II. To avoid duplication, the reclamation plans may, by reference, incorporate existing plans and materials that meet the requirements of Chapter NR 135.

☐ **Site Information:**

NR 135.19(2) SITE INFORMATION. The reclamation plan shall include information sufficient to describe the existing natural and physical conditions of the site, including, but not limited to:

☐ **Maps:**

NR 135.19(2)(a) Maps of the nonmetallic mining site including the general location, property boundaries, the areal extent, geologic composition and depth of the nonmetallic mineral deposit, the distribution, thickness and type of topsoil, the approximate elevation of ground water, the location of surface waters and the existing drainage patterns.

Note: Some of or all of the information required above may be shown on the same submittal, i.e. the site map required by par. (a) may also show topography required by par. (c).

☐ **General Location:**

☐ **Property Boundaries:**

☐ **Areal Extent:**

☐ **Geologic Composition and Depth of the Mineral Deposit:**

☐ **Distribution, Thickness and Type of Topsoil:**

☐ **Approximate Elevation of Ground Water:**

☐ **Location of Surface Waters:**

☐ **Existing Drainage Patterns:**

☐ **Existing Topography:**

NR 135.19(2)(c) Existing topography as shown on contour maps of the site at intervals specified by the regulatory authority.

Note: Some of or all of the information required here may be combined to avoid duplication, e.g. a single map may show anticipated post-mining topography required by par. (c) as well as structures and roads as required by par. (d).

☐ **Location of Manmade Features:**

NR 135.19(2)(d) Location of manmade features on or near the site.

☐ **Previously Mined Areas: (IF APPLICABLE)**

NR 135.19(2)(e) For existing mines, a plan view drawing showing the location and extent of land previously affected by nonmetallic mining, including the location of stockpiles, wash ponds and sediment basins.

☐ **Biological Information:**

NR 135.19(2)(b) Information available to the mine operator on biological resources, plant communities, and wildlife use at and adjacent to the proposed or operating mine site.

☐ **Post-mining Land Use:**

NR 135.19(3) POST-MINING LAND USE. ***(a)*** The reclamation plan shall specify a proposed post-mining land use for the nonmetallic mine site. The proposed post-mining land use shall be consistent with local land use plans and local zoning at the time the plan is submitted, unless a change to the land use plan or zoning is proposed. The proposed post-mining land use shall also be consistent with any applicable state, local or federal laws in effect at the time the plan is submitted.

Note: A proposed post-mining land use is necessary to determine the type and degree of reclamation needed to correspond with that land use. The post-mining land use will be key in determining the reclamation plan. Final slopes, drainage patterns, site hydrology, seed mixes and the degree of removal of mining-related structures, drainage structures and sediment control structures will be dictated by the approved post-mining land use.

NR 135.19(3)(b) Land used for nonmetallic mineral extraction in areas zoned under an exclusive agricultural use ordinance pursuant to s. 91.75, Stats., shall be restored to agricultural use.

Note: Section 91.75(9), Stats., contains this requirement. Section 91.01(1), Stats., defines the term "agricultural use".

☐ **Reclamation Measures**

NR 135.19(4) RECLAMATION MEASURES. The reclamation plan shall include a description of the proposed reclamation, including methods and procedures to be used and a proposed schedule and sequence for the completion of reclamation activities for various stages of reclamation of the nonmetallic mining site. The following shall be included:

☐ **Earthwork and Grading:**

NR 135.19(4)(a) A description of the proposed earthwork and reclamation, including final slope angles, high wall reduction, benching, terracing and other structural slope stabilization measures.

☐ **Topsoil:**

NR 135.19(4)(b) The methods of topsoil or topsoil substitute material removal, storage, stabilization and conservation that will be used during reclamation.

☐ **Topography:**

NR 135.19(4)(c) A plan or map which shows anticipated topography of the reclaimed site and any water impoundments or artificial lakes needed to support the anticipated future land use of the site.

☐ **Structures:**

NR 135.19(4)(d) A plan or map which shows surface structures, roads and related facilities after the cessation of mining.

☐ **Cost:**

NR 135.19(4)(e) The estimated cost of reclamation for each stage of the project or the entire site if reclamation staging is not planned.

☐ **Revegetation Plan:**

NR 135.19(4)(f) A revegetation plan which shall include timing and methods of seed bed preparation, rates and kinds of soil amendments, seed application timing, methods and rates, mulching, netting and any other techniques needed to accomplish soil and slope stabilization.

☐ **Revegetation Standards:**

NR 135.19(4)(g) Quantifiable standards for revegetation adequate to show that a sustainable stand of vegetation has been established which will support the approved post-mining land use. Standards for revegetation may be based on the percent vegetative cover, productivity, plant density, diversity or other applicable measures.

☐ **Erosion Control:**

NR 135.19(4)(h) A plan and, if necessary, a narrative showing erosion control measures to be employed during reclamation activities. These shall address how reclamation activities will be conducted to minimize erosion and pollution of surface and groundwater.

☐ **Interim Reclamation: (OPTIONAL)**

NR 135.19(4)(i) A description of any areas which will be reclaimed on an interim basis sufficient to qualify for the waiver of fees pursuant to s. NR 135.41 and which will be subsequently disturbed prior to final reclamation. Descriptions shall include an identification of the proposed areas involved, methods of reclamation to comply with the standards in Subch. II and timing of interim and final reclamation.

☐ **Criteria for Successful Reclamation**

NR 135.19(5) The reclamation plan shall contain criteria for assuring successful reclamation in accordance with s. NR 135.13.

☐ **Certification of the Reclamation Plan**

NR 135.19(6) CERTIFICATION OF RECLAMATION PLAN. ***(a)*** The operator shall provide a signed certification that reclamation will be carried out in accordance with the reclamation plan. The landowner and lessee, if different from the operator, shall also provide signed certification that they concur with the reclamation plan and will allow its implementation, except as provided in par. (b).

NR 135.19(6)(b) For the following situations, the landowner and lessee, if different from the mine operator, are not required to submit a written certification in accordance with par. (a). For these situations, the operator shall provide written evidence that the landowner and lessee, if different than the operator, have been provided with a written copy of the reclamation plan.

1. The mine operator has submitted a reclamation plan for an existing mine in accordance with s. NR 135.18(1).

2. The operator has submitted a reclamation plan for a new or reopened mine in accordance s. NR 135.18(2) which is located on land for which a lease agreement or memorandum of lease between the landowner and applicant was recorded prior to 8 months following December 1, 2000 *(i.e. August 1, 2001)*.

Note: Please see the certification statement examples in Appendix G for more information.

☐ **Financial Assurance**

NR 135.40(1-13)

Note: Please see Appendix B, Part 11 and Appendix F for more information on financial assurance.

☐ **Submitting the Plan**

NR 135.19(7) APPROVAL. The regulatory authority shall approve, approve conditionally or deny the reclamation plan in writing in accordance with s. NR 135.21(1)(f) for existing mines and s. NR 135.21(2) for new or reopened mines. Conditional approvals shall be issued according to s. NR 135.21(3), and denials of permit applications shall be made according to s. NR 135.22.

Reclaimed mine site located in Green Lake County. Badger Mining Corporation reclaimed the unconsolidated, bank-sand pit into a shallow lake with wetland habitat. The naturally contoured shoreline blends in well with the surrounding environment. The photograph was taken by Ryan Jakubowski.

APPENDIX B

GENERAL INFORMATION AND RESOURCES

This list of assets is intended to assist operators in locating publicly available information for use in developing reclamation plans. The list of assets contained in this appendix is not comprehensive and the user is encouraged to seek other sources of available information.

1. STATE AND COUNTY CONTACT INFORMATION

- DNR Nonmetallic Mining Program

The DNR's Bureau of Waste Management webpage for the nonmetallic mining reclamation program provides a good deal of background information, guidance and DNR contact information. This site can be reached by opening the following address http://www.dnr.state.wi.us/org/aw/wm/mining/nonmet.htm. This site can also be accessed by opening the Department's webpage http://www.dnr.state.wi.us and selecting "Environmental Protection", "Waste", "Mining" and finally, "Nonmetallic Mining in Wisconsin".

- County Land Conservation Offices

A listing of county land and water conservation committees (LCC's) and land and water conservation departments (LCD's) is available containing contacts listed by county. This listing may be obtained by accessing the following webpage: www.execpc.com/~wlwca.

- Local Governments

For information on topics including Smart Growth, you may wish to visit the webpage for the Local Government Assistance Network, www.lean.org.

2. FEDERAL CONTACT INFORMATION (check for useful publications)

- Office of Surface Mining, U.S. Department of the Interior

http://www.osmre.gov (general mine reclamation, slope stability, etc.)

Questions can be emailed to getinfo@osmre.gov.

- Natural Resource Conservation Service (NRCS), U.S. Department of Agriculture

http://www.nrcs.usda.gov/ (information on soils)

State Conservationist
6515 Watts Road, Suite 200
Madison, Wisconsin 53719

Public Information contact: Renae Anderson, 608-276-USDA, ext 227, renae.anderson@wi.usda.gov

Directory Information contact: Mari Wolter, 608-276-USDA ext. 229, mari.wolter@wi.usda.gov

- U.S. Department of Agriculture (USDA)
http://www.usda.gov (soils information and NRCS)

- U.S. Environmental Protection Agency (USEPA)
http://www.epa.gov

- U.S. Army Corps of Engineers (USACE)
http://www.usace.army.mil/ (may have pertinent information on wetlands) or
http://www.usace.army.mil/sitemap.htm (loads much quicker)

3. BASELINE OR SITE BACKGROUND INFORMATION

These references may assist a mine operator with completing their application for a reclamation permit. Data required for the permit application will likely include background environmental and physical information, previously mined areas, general location, location of human structures, legal description and mining site information. All of this data could potentially be referenced on a map or series of maps.

A good place to start is with the Wisconsin Geological and Natural History Survey's (WGNHS) "Directory of Map Resources". The state survey also has a hard-copy list of publications available by calling the map sales office at (608) 263-7389 or accessed on the internet at http://www.uwex.edu/wgnhs/, search under "Publications".

Some pertinent information available to the public through the WGNHS includes geologic composition and depth of deposit (bedrock and glacial deposit maps), approximate elevation of groundwater and existing topography. Information available will vary from county to county.

Maps and Aerial Photographs

United States Geological Survey (USGS) **topographic maps** are available from the WGNHS as well as the USGS. For some counties this data may already be in digital format and contained within a geographic information system (GIS). Also, Regional Planning Commissions may have GIS datasets and other mapping information readily available.

The USGS Mapping webpage is posted at http://mapping.usgs.gov. Look under "Prices and Ordering" for information or call 1-888-ASK-USGS. A list of map dealers in Wisconsin can be found at http://rockyweb.cr.usgs.gov/public/acis/map_dealers/wi.html.

Maps that delineate the **depth to groundwater** may be available from the WGNHS, depending upon the county. Also, wells adjacent to the site could be used to determine where

the groundwater table is located and the regional groundwater flow pattern.

Floodplain maps may be available from local or county zoning administrators, http://www.dnr.state.wi.us/org/water/wm/dsfm/shore/county2.htm.

Wetland inventory datasets or maps may be available from the WDNR.

Aerial photographs may be available from the WDNR or the Agriculture Stabilization and Conservation Service. Also check the WI State Cartographer's Office at (608) 262-3065 or on-line at http://www.geography.wisc.edu/sco/, select "Aerial Photography". Again, ask the local RA for some possible leads.

- Wisconsin Geological and Natural History Survey (WGNHS)
3817 Mineral Point Road
Madison, WI 53705
(608) 263-7389
Map sales: (608) 263-7389
www.uwex.edu/wgnhs/

- UW-Cooperative Extension Office
Cooperative Extension Publications
45 North Charter Street
Madison, WI 53715
(608) 262-3346
Publications available are listed at http://www1.uwex.edu/topics/Publications_and_news.cfm

- Wisconsin State Cartographer's Office
160 Science Hall
550 N. Park Street
Madison, WI 53706
(608) 262-3065
http://www.geography.wisc.edu/sco/

Vegetation

- Curtis, J.T. *Vegetation of Wisconsin: An Ordination of Plant Communities* (1959). University of Wisconsin Press. 657 pp.

- Bureau of Endangered Resources
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707-7921
(608) 266-7012
http://www.dnr.state.wi.us/org/land/er/

Soils

- County Soil Survey

Please consult the United States Department of Agriculture Natural Resources Conservation Service (now NRCS, formerly Soil Cons. Service) soil survey for your county contact.

- Natural Resources Conservation Service

Wisconsin State Office
6515 Watts Road, Suite 200
Madison, Wisconsin 53719-2726
http://www.wi.nrcs.usda.gov

- Hole, Francis D. *Soils of Wisconsin* (1976) University of Wisconsin Press. 223 pp.

Soil Sampling

- Schulte, E.E., Bundy, L.G., and Peters, J.B. *Sampling Soils for Testing* (2001) University of Wisconsin Cooperative Extension. PUB A2100.

4. AUXILLARY SITE INFORMATION (information required under another permit)

Zoning Approvals

Prior to submitting a mine reclamation permit, an operator may be required to obtain a special use or conditional use permit to satisfy zoning requirements. This varies from one county or municipality to another according to the county or local zoning ordinances. It is best to contact a zoning official. The following list is available on-line for your convenience: http://www.dnr.state.wi.us/org/water/wm/dsfm/shore/county2.htm.

Storm Water Discharge and NR 216

A general permit is required for wastewater discharges from nonmetallic mining operations and mining sites (WI-0046515-3). This permit includes provisions for storm water management that are roughly equivalent to a Tier 2 Industrial Storm Water Permit. In granting these permits, the WDNR addresses biological (threatened and endangered) resources. Please refer to: http://www.dnr.state.wi.us/org/water/wm/nps/stormwater.htm.

The regional staff contact may be obtained at:
http://www.dnr.state.wi.us/org/water/wm/nps/contact.htm.

Dredging and Mining Near Navigable Waterways: Chapter 30, NR 340

Rules contained in Ch. NR 340, Wis. Adm. Code, require nonmetallic mining within or adjacent to navigable waterways to be carried out under permits from the Department. This is a separate process than permits issued pursuant to NR 135, but NR 340-permitted mines must be reclaimed to meet the standards in NR 135's Subchapter II. The following webpage may

be useful in answering some of an operator's questions pertaining to mining near navigable waters: http://www.dnr.state.wi.us/org/water/fhp/waterway/mining.htm.

A *Waterway and Wetland Handbook: Chapter 105 Nonmetallic Mineral Mining and Reclamation* exists to aid in obtaining a Chapter 30 permit and ensuring compliance with Chapter NR 340. There is information in this document that may assist an operator in preparing a mine reclamation plan, even if no Chapter 30 permit is required. The document can be opened or downloaded from the following webpage: http://www.dnr.state.wi.us/org/water/fhp/handbook/.

It is recommended that the applicant review the information listed on page 12 because there is a listing of reclamation considerations and possibilities that were developed in the context of a "Pre-application Meeting". The document contains other useful information including general forms used by the Fisheries Management Habitat Water Regulation Program.

Air Management

Air permits are mostly applicable for crushing and grinding plants when the processing of nonmetallic minerals are involved. Chapter NR 440 (specifically 440.668) is the Wisconsin DNR rule that implements the new source performance standards (NSPS) that are required by Federal rules 40 CFR Part 60, Subpart OOO.

For more information reference the DNR's Air Management Program at http://www.dnr.state.wi.us/org/aw/air/index.htm and conduct a search using the term "nonmetallic mining" or "crusher". Or write to the DNR and request publication PUBL-AM-268 98, *Nonmetallic Mining Guidance for the Development of the 1998 Air Emissions Inventory* (1999).

- Bureau of Air Management
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707-7921
(608) 266-7718

5. EROSION AND SEDIMENT CONTROL (also refer to Appendix E)

The Wisconsin Department of Transportation (DOT) has detailed information on a wide range of erosion control products. This documented can be found on the DOT webpage, http://www.dot.state.wi.us. Select "Index" and then "P" to select "PAL information - Erosion Control Product Acceptability List".

- State of Wisconsin, Department of Transportation. *Standard Specifications for Highway and Structure Construction* (1996). Sections 627 to 630.

- State of Wisconsin, Department of Natural Resources, Bureau of Forestry. *Best Management Practices for Water Quality* (1995). PUB-FR-093 95.

• State of Wisconsin, Department of Natural Resources, Bureau of Watershed Management. *Wisconsin Construction Site Best Management Practice Handbook* (1993). PUB-WR-222 93.

DNR documents can be requested from:
Document Sales
202 S. Thornton Avenue
P.O. Box 7840
Madison, WI 53707
(608) 266-3358

• "Wisconsin Storm Water Manual"

Part One of this manual was originally published by WDNR in 1994. This technical manual was developed to aid all parties affected by storm water permit requirements. Part One is targeted at urban situations but contains useful planning information and serves as an overview with chapters on Storm Water Planning, Pollution Prevention and Best Management Practices.

Part Two of the manual was published in early 2000 (and reprinted in 2001) and is an elaboration of **technical design guidelines for storm water management practices** including sections on hydrology, infiltration basins and trenches, wet detention basins, artificial wetland storm water management systems, filter strips and grassed waterways.

The technical manual mentioned above can be ordered from:
UW-Extension
Cooperative Extension Publications
45 North Charter Street
Madison, WI 53707
(608) 262-3346 or 1-877-947-7827

6. RECLAMATION METHODS

• Minnesota Department of Natural Resources, Division of Lands and Minerals, *A Handbook for Reclaiming Sand and Gravel Pits in Minnesota* (1992) (out of print and under revision). This document may be found at libraries and contains useful reclamation information including some material on reclaiming ponds and lakes, shoreline profiles, enhancing fish habitat, etc.

A series of fact sheets and other publications are available on the Minnesota Department of Natural Resources, Division of Lands and Minerals webpage posted at: www.dnr.state.mn.us/lands_and_minerals.

• Alberta Environment, *A User Guide to Pit and Quarry Reclamation in Alberta* (1991). RRTAC Report 91-3.

Currently this document costs $15.00 and is available from the Queens Printer or contact (780) 427-4952. The publication may also be accessed through the:

Alberta Legislature Library
216 Legislature Building
10800 - 97 Avenue
Edmonton, AB T5K 2B6
Phone: (780) 427-2473
Fax: (780) 427-6016
E-mail: library@assembly.ab.ca

- Utah Division of Oil, Gas and Mining, *The Practical Guide to Reclamation in Utah* (2000) ftp://dogm.nr.state.ut.us/PUB/MINES/Coal_Related/RecMan/Reclamation_Manual.PDF

The above-mentioned document includes general information on reclamation planning, slopes, stability and other aspects of reclamation that are relevant beyond the Rocky Mountain Region (the pdf file takes about one-minute to load).

- Washington Division of Geology and Earth Resources and Oregon Department of Geology and Mineral Industries, *Best Management Practices for Reclaiming Surface Mines in Washington and Oregon* (1997). http://www.wa.gov/dnr/htdocs/ger/pdf/bmp.pdf.

The above-mentioned document is another comprehensive review of modern reclamation methods.

7. SELECTION OF PLANT SPECIES AND SEEDING RATES FOR MINE RECLAMATION

The following references may assist an operator with assembling a reclamation plan as it pertains to plant selection, appropriate seeding rates, sources of plant materials (nurseries), soil amendments, mulch and maintenance including weed control.

- State of Wisconsin, Department of Natural Resources, *Plant Composition of Wisconsin Prairies* (1995). Technical Bulletin No. 188.

- The State of Wisconsin Department of Transportation (DOT) has published a document that may be consulted as a general reference on the selection of appropriate plant species, topsoil management and fertilizer, lime and mulch applications. The document is titled:

Standard Specifications for Highway and Structure Construction (1996 Edition), refer to information contained in Sections 625 to 632.

Wisconsin Department of Transportation
4802 Sheboygan Road
HFSOB Room 601
P.O. Box 7916
Madison, WI 53707-7916
http://www.dot.state.wi.us

- Also see Appendix C in this document

• Other sources include: Agriculture Stabilization and Conservation Service, County Land Conservation Office and UW-Cooperative Extension Office.

8. NATIVE PLANT NURSERIES AND RESTORATION CONSULTANTS

A complete handout compiled by the DNR may be requested from:

Bureau of Endangered Resources
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707
(608) 266-7012 or Kelly Kearns (608) 257-5066

9. WEED CONTROL METHODS AND PROBLEM PLANTS

For a listing of regulated noxious weeds for all states, including Wisconsin, visit the USDA webpage posted at www.aphis.usda.gov/npb/statenw.html. Information may also be researched on the DNR's Bureau of Endangered Resources webpage posted at http://www.dnr.state.wi.us/org/land/er/index.htm, select "Invasive Species" for an exhaustive list.

The Nature Conservancy also has a Weed Control Handbook available as well as other information posted at their webpage, http://tncweeds.ucdavis.edu/.

• State of Wisconsin, Department of Natural Resources, Bureau of Endangered Resources, *Manual of Control Recommendations for Ecologically Invasive Plants* (1997). PUB-ER-090 97.

10. WETLAND RESTORATION

The Wisconsin DNR has some information available online at: http://www.dnr.state.wi.us/org/water/fhp/wetlands/. Interested operators should consult a DNR document titled "Wetland Restoration Handbook for Wisconsin Landowners" (2000) PUB-SS-944 00. The document can be downloaded by selecting "Restoration and Management" from the above link. To obtain a hard copy of this handbook you may contact (608) 266-0531 or Martin Griffin (608) 226-0842, griffmp@dnr.state.wi.us.

• Wisconsin Wetland Association
222 South Hamilton St., Suite #1
Madison, WI 53703
(608) 250-9971
www.wiscwetlands.org

11. BONDING AND FINANCIAL ASSURANCE

A recent publication addressing bonding (financial assurance) for hardrock mines is available from the National Wildlife Federation (NWF), *Hardrock Reclamation Bonding Policies in the Western United States* (2000). This publication gives an overview of the reclamation bonding practices in the western states and provides a detailed account of hardrock mining reclamation practices and case studies to illustrate how this information has been interpreted at individual mines. To obtain a copy, send $8.00 for full report or $4.00 for a summary report to the below address. This document is available through the NWF's Rocky Mountain Field Office by contacting:

Rocky Mountain Field Office
National Wildlife Federation
2260 Baseline Road, Suite 100
Boulder, CO 80302
(303) 786-8001 voice
(303) 786-8911 fax
atkinson@nwf.org
www.nwf.org (use the search button and type "Hardrock Reclamation Bonding")

APPENDIX C

A GUIDE TO PLANT SELECTION

This information is presented to assist the operator in choosing an appropriate vegetative mix for reclaiming their mining site. Because a limited number of seed mixes are presented, each specific mix may not adequately address the wide range of slope, soil type, exposure and site moisture conditions that may be encountered at any given site. The appropriate seed mix for your site and approved post-mining land use may be different than those included here.

More detailed native mix seed mixes are available upon request from the WDNR. Sources listed in Appendix B can provide additional information on nonnative seed mixes

The post-mining land use and unique site conditions dictate decisions regarding the proper seed mix. When the post-mining land use includes wildlife habitat, passive recreation or green space, consider using plants native to the area when proposing the seed mix. Native plants have many advantages over exotic (non-native) species. Native plant stock is hardier, needs less care and is more attractive to wildlife. By contrast, non-native plant species can be invasive and aggressive, resulting in a vegetative cover that lacks the necessary productivity or nutritive value for wildlife.

Although the issue sometimes arises, we strongly discourage the notion that sites can "self-reclaim" if they are left alone and allowed to revegetate naturally. If site revegetation is delayed (i.e. by not seeding an area) there is a higher probability that severe erosion will occur on the site property—and possibly off the site as well—which can result in noncompliance with the local ordinance and NR 135. Plant diversity and overall site productivity will be compromised and it is unlikely that the goal of achieving the target post-mining land use will be met.

Seed mix descriptions and selection criteria

MIX 1 - PASTURE

Common Name	Scientific Name	pounds per acre*
Timothy	*Phleum pratense*	4
Tall Fescue	*Festuca arundinaceae*	5
Canada Wild Rye	*Elymus canadensis*	3
Agricultural Rye	*Secale cereale*	4.5
Alfalfa**	*Medicago sativa*	10
Alsike clover**	*Trifolium hybridum*	4.5
		31 pounds total

MIX 2 – STABILIZATION/WILDLIFE/GRAZING (Mix 3 would be suitable too)

Common Name	Scientific Name	pounds per acre*
Agricultural Rye	*Secale cereale*	4
Timothy	*Phleum pratense*	2
Tall Fescue	*Festuca arundinaceae*	3
Switchgrass	P*anicum virgatum*	1
Big Bluestem	A*ndropogon gerardi*	1
Canada Wild Rye	*Elymus canadensis*	3
Alsike Clover**	*Trifolium hybridum*	4
Red clover**	*Trifolium repens*	4
Alfalfa**	*Medicago sativa*	5
		27 pounds total

MIX 3 – NATIVE MIX FOR WILDLIFE/PASSIVE RECREATION

Grasses, sedges and similar plants

Common Name	Scientific Name	pounds per acre*
Big Bluestem	*Andropogon gerardi*	1
Canada Wild Rye	*Elymus canadensis*	3
Switchgrass	*Panicum virgatum*	1
Indiangrass	*Sorghastrum nutans*	3
		8 pounds total

Forbs and legumes**

Common Name	Scientific Name	ounces per acre*
Purple Prairie Clover**	*Dalea purpurea*	2
Canada Tick-trefoil**	*Desmodium canadensis*	5
New England Aster	*Aster novae-angliae*	0.2
Purple cone flower	*Echinacea purpurea*	4
Dotted Mint	*Monarda punctata*	4
Bergamot	*Monarda fistulosa*	5
Yellow coneflower	*Ratibida pinnata*	3
Blackeyed Susan	*Rudbeckia hirta*	0.5
Blue Vervain	*Verbena hastada*	1
		24.5 oz. total

MIX 4 – WET SOILS/POND EDGE/WEDLAND AREA

Common Name	Scientific Name	quantity per acre*
Canada Wild Rye	*Elymus canadensis*	3 pounds
Switchgrass	*Panicum virgatum*	1 pound
Timothy	*Phleum pratense*	2 pounds
Blue Joint Grass	*Calamagrotis canadensis*	3.2 ounces
Annual oats	*Avena sativa*	8 pounds
Alsike clover**	*Trifolium hybridum*	1 pound
Red clover**	*Trifolium repens*	1 pound
Culver's root	*Veronicastrum virginicum*	2 oz.
Canada Tick-trefoil**	*Desmodium canadensis*	5 oz.
Blackeyed Susan	*Rudbeckia hirta*	0.2 oz.
Smooth Aster	*Aster laevis*	2 oz.
New England Aster	*Aster novae-angliae*	0.6 oz.
Joe pye weed	*Eupatorium maculatum*	1 oz.
		~17 pounds total

* Seeding rates assume broadcast seeding and may be multiplied by 0.5 to approximate rates if drilled.
** Denotes legumes, which must be inoculated according to the seed provider's instructions prior to seeding.

These seed mixes are provided for demonstration purposes only. Mixes 3 and 4 are most applicable when the post-mining land use dictates the use of native plants. We advise the user to consult with a professional to determine the appropriateness of these mixes and seed application rates for their particular site. Please see Appendix B for additional references and sources of information.

Nurse Crops

It is usually necessary and desirable to establish a nurse crop at the time of seeding to protect the more permanent plantings until they can get established. A nurse crop is used to stabilize the site against erosion in early stages, to decrease competition from weeds and to provide some shade and cover for the still vulnerable perennial seedlings.

These nurse crop species may be used in most situations, but should be reviewed to consider the specific site conditions and the desired post-mining land use. A typical nurse crop might contain any of the following:

- annual rye at 5 pounds per acre
- oats at 65 pounds per acre
- barley at 70 pounds per acre
- Canada wild rye at 2 pounds per acre

When attempting to establish a native plant community, it is best to keep the site free of non-native (exotic) agronomic species (i.e. oats, annual rye, millet or barley) because they may prove difficult to

eradicate later. Exotic plants may negatively impact the character of the site and these impacts could be permanent. Canada wild rye, an easily established, fast-growing native grass may be used as a nurse crop alone or in combination with the nurse crop species recommended above. This may help to obtain a good stand of vegetation quickly and inexpensively, while minimizing the need for nurse crops consisting of non-native annual agronomic species. Take care to avoid aggressive and persistent non-native species such as perennial rye grass, and especially agronomic species like white or yellow sweet clover, crown vetch and birdsfoot trefoil. Once the site is stabilized discretionary enhancements with forbs (non-grass species) may be done to add diversity and color.

APPENDIX D

DETERMINATION OF REVEGETATON SUCCESS AND RETRIEVAL OF FINANCIAL ASSURANCE

When preparing a mine reclamation plan the operator must identify methods that will be used to verify that reclamation and revegetation of the site is complete. These revegetation success criteria will provide a reference point to evaluate the success of the reclamation in an objective manner. Success criteria are necessary so it will be clear to both the operator and the regulatory authority when the end point of the reclamation period has been reached. **The success criteria information provided below are recommendations only and may not be appropriate for every mine reclamation plan.** These examples simply form a basis for discussion. The post-mining land use and unique site conditions will dictate the appropriate success criteria for your reclamation project. Likewise, the absence of any possible success criterion in this appendix implies nothing about the usefulness of that criterion.

The following table represents an example of some possible success criteria that could be used to evaluate the success of revegetation at a reclaimed site.

Post-mining Land Use and Success Criteria Table

Post-mining Land Use	**Seed Mix From Appendix C**	**Stage/Phase**	**Success Criteria**	**Years to Show Success**
Wildlife	#1 and/or #3	1, 3, 4, 5, 6	% cover, diversity, biomass (yield)*	3
Pasture	alfalfa, fescue, clover, etc.	2	% cover, biomass (yield) with a minimum 90% of comparable site*	1
Pond margins or wetlands	#4	final reclamation	% cover, diversity	2

* Based on consultation with local Land Conservation and/or UW-Extension office or other appropriate sources of yield (productivity) information considering the soil type, seasonal variables or similar local sites under the same seasonal conditions.

Upon completion of reclamation activities, whether this includes a portion of the site or the entire mining site, the regulatory authority will inspect the site in order to verify if reclamation was

successful. The criteria for this determination of success are linked to the approved post-mining land use. These criteria are contained within the approved reclamation plan. As a means to integrate the costs of revegetation into the financial assurance, as well as general specifics, please refer to Appendix F.

It is important to understand the relationship of the approved reclamation plan to the financial assurance requirement. Financial assurance is intended to guarantee that the reclamation plan is faithfully executed. Care should be taken to ensure that realistic, effective and objective criteria (success standards pursuant to s. NR 135.13) are documented in the reclamation plan as required according to s. NR 135.19 (4)(g).

Criteria for Measuring the Success of Revegetation

The criteria for assessing when reclamation is complete, and therefore when the financial assurance may be released, shall be specified in the reclamation plan per s. NR 135.13. Possible methods that could be used to determine if compliance with the revegetation success standards are met are listed in ss. NR 135.13(2) through (5)

There are several different techniques that can be used to evaluate the success of revegetation and thus reclamation:

- Compare the recently revegetated area to some reference area that represents an older, stabilized reclaimed site or an undisturbed area nearby that contains vegetation representative of the site's final goal (e.g. native prairie or oak savanna).

- Collect baseline data on the vegetative cover (i.e. density, diversity, percent cover) that exists prior to mining and compare it to the reclaimed, revegetated areas.

- Compare the density, diversity and percent cover of the reclaimed area to an approved alternate technical standard contained in an accepted reference publication (i.e. from the local Land Conservation or UW-Extension office).

Since a primary objective of this work is to stabilize the site, it is important to provide a high degree of vegetative cover, as quickly as possible. This will result in greater protection of the soil from the effects of raindrop impacts, which will be absorbed by the vegetative "canopy". This protection translates into reduced erosion and sedimentation.

The criteria that may be used to evaluate the success of revegetation may include percent cover, biomass and/or diversity. Among these, percent cover and biomass are generally the most widely used parameters since they are easier to measure and compare with existing data or established criteria. In addition, survivorship or another analysis of community development may be used as appropriate.

Percent Cover

Percent cover is determined by estimating the percentage of an area covered by vegetation. Cover may be thought of as the percentage of an area that is covered, shaded or intercepted by vegetation. Percent cover is used as a revegetation success standard because it is easy to measure and a useful

predictor of site stability. A typical standard for percent cover should be 70 percent cover (primarily leaf and stem area) averaged over the site at 90 percent statistical confidence level. Count may be physical and photodocumentation (that includes the quadrat) is advised. The measurement of cover should be timed to correspond with the period of peak vegetative growth, generally in August.

A prescribed number of quadrats, typically a 1.0 meter square (roughly equal to a square yard), can be used to represent the vegetative cover of the entire site. The necessary number of quadrats is based upon total acreage but in no case will be less than five and is performed for each type of land use. This number is dependent upon the size and complexity of the site and the post-mining land use.

Biomass

Biomass can also be thought of as productivity in a given area and is fairly equivalent to how agricultural "yield" is measured (i.e. bushels or tons per acre). Biomass gives a good indication of the productivity of the reclaimed site, and thus is useful in comparing to pre-mining productivity or to a local expectation (based on established records) or a technical standard. Plant material is collected, dried and weighed. Success may be determined by comparing the biomass data at the time the notice of completion to the time when the site is being evaluated for the certificate of completion. If the post-mining land use involves a forest or a wetland it may not be practical to use this criterion.

Diversity

Diversity is important in establishing long-term stability in the plant community. It also helps to ensure that the plant community is not susceptible to being taken over by weeds during times of stress. Such stability is especially important in withstanding stress such as climatically unfavorable or extreme years, disease, pest infestation, disturbance from grazing, wildlife utilization, insect infestation, fire, drought or windfall. The method of measuring diversity should be included in the reclamation plan and based upon appropriate scientific methodology.

Survivorship

This may be an important parameter to quantify for forest type plantings.

Other

If wetland restoration is selected it may be necessary to use evaluation measures such as frequency of occurrence by species, species similarity of the standing crop to initial planting, density and percent cover along transects.

APPENDIX E

EROSION AND SEDIMENT CONTROL MEASURES

The purpose of general site erosion control is to minimize erosion and limit the potential for sediment run-off into surface waters. It is important to plan ahead because erosion is often very difficult to control (with 100% accuracy) once it begins. Erosion control plans generally address this problem by following these principles:

1. Diverting runoff from the undisturbed area around the actively mined area to the extent possible.
2. Stabilizing any area that has recently been disturbed with quick-growing vegetation, mulch or equivalent methods as soon as possible.
3. Installing permanent and temporary sedimentation ponds and catchment basins.
4. Ensuring proper siting and stabilization of soil and overburden stockpiles.

There are many different ways to reduce or eliminate erosion and control sedimentation. Here is a partial list of best management practices for erosion control at mining sites:

- Check dams
- Energy dissipaters
- Buffer areas
- Straw bales
- Erosion control blankets
- Mulch or artificial surface cover
- Silt fences
- Sediment basins
- Surface water diversions
- Cover crop of vegetation

If you need additional resources, please access the Wisconsin Storm Water Management Program webpage: http://www.dnr.state.wi.us/org/water/wm/nps/stormwater.htm.

Although we are not directly addressing urban runoff, applicable schematics for the proper use of straw bales and silt fences is available. The document is titled *Erosion Control for Homebuilders* (1993). This publication can be ordered from the UW-Extension at (608) 262-3346 or (toll free) 1-877-947-7827 and from the WI Department of Administration Document Sales at (608) 266-3358. Alternatively, the document can be downloaded as a pdf file by opening the following webpage: http://clean-water.uwex.edu/pubs/sheets/index.html.

You might also want to consult with the *Wisconsin Construction Site Best Management Practice Handbook* (1993) also available from the WI Dept. of Admin. Document Sales.

Another useful document was prepared by the Utah Division of Oil, Gas and Mining entitled *The Practical Guide to Reclamation in Utah* (2000). There are numerous graphical representations of erosion sediment control features and structures in this document, available on-line, that can assist in the understanding, planning and preparation of a reclamation plan. Please see Appendix B to learn how to obtain and/or to visit the document on-line.

Additional references are included in Appendix B. This may be useful when determining the necessary level of erosion and sediment control for your project site.

APPENDIX F

FINANCIAL ASSURANCE

The objective of financial assurance is to ensure that the regulatory authority has access to funds necessary to implement site reclamation in the event that the operator does not perform the agreed-upon duties. The funds shall accurately reflect the cost for the RA to hire outside help to perform reclamation. The main purpose of financial assurance is to ensure that the operator will faithfully execute the requirements of the approved reclamation plan, the applicable reclamation ordinance and Ch. NR 135. Refer specifically to s. NR 135.40 for details of state wide financial assurance requirements, as well as the applicable county or municipal reclamation ordinances.

The mine reclamation plan should be structured to keep the number of unreclaimed acres to a minimum at any given point in time. This can be accomplished by mining in phases: extract the material and promptly perform reclamation prior to initiating mining elsewhere. Generally, a smaller amount of acreage being effected by mining will result in less financial assurance to be posted. It is even plausible that one bond (or other means of financial assurance) could be posted to cover the various mining phases (intermittent mining) dictated in the mine reclamation plan.

Because much of the financial assurance is dependent upon the mine reclamation plan, it is important for an operator who has drafted a plan to contact the RA and bring them up to date. At this point, the RA shall decide if the plan will require revisions or if it can be accepted as is. In any case, the plan must meet the requirements of Ch. NR 135.

The following list has been created to serve as a flow chart for operators to follow when drafting their financial assurance. The list is only a summary of the requirements of s. NR 135.40 and users should refer to the official code or contact their regulatory authority for specific requirements.

1. The operator contacts the regulatory authority and discusses their plans for a post-mining land use. Eventually, both parties shall reach consensus.

2. The operator prepares the reclamation plan, accounting and tallying the costs as the plan is being drafted. In the reclamation plan, the operator should suggest an amount to put-up for financial assurance.

3. The reclamation plan is submitted to the regulatory authority.

4. If the plan is approved, the RA must provide written notification to the operator specifying the amount of financial assurance required per s. NR 135.40(1).

5. As a condition of the permit, financial assurance, which must be payable exclusively to the regulatory authority, is filed with the RA per s. NR 135.40(2).

6. A bond or an alternate option must be established to cover financial assurance per s. NR 135.40(4). (A short list with a brief description shall follow).

7. The amount of financial assurance is reviewed periodically by the RA to assure that it equals

outstanding reclamation costs per s. NR 135.40(3).

8. The length of financial assurance is dictated by the period of time required to establish the post-mining land use specified in the approved mine reclamation plan. This may extend beyond the permit if required to accomplish reclamation per s. NR 135.40(3).

9. Any interest from the financial assurance must be paid to the operator per s. NR 135.40(4).

A few options that may benefit smaller operators in satisfying financial assurance requirements have been included within the administrative code. For instance, it is possible that, at the discretion of the RA, a combination of financial assurance methods, including a lien on the property on which the nonmetallic mining site occurs, may be selected. The RA may also accept a lesser initial amount of financial assurance, provided the permittee initiates a process that continuously increases the amount until it is adequate to reflect the costs of reclamation.

Brief Description of Financial Assurance Options

• Bond - collateral; also known as a performance or forfeiture bond; an instrument provided by a surety company; a 3-party agreement that serves as a guarantee that the provider will pay costs associated with fulfilling the permittee's obligations in the event of a default

• Cash - collateral; a deposit with the RA to guarantee performance of obligations under a reclamation permit

• Certificate of deposit - collateral; a deposit with the RA to guarantee performance of obligations under a reclamation permit

• Irrevocable letter of credit - similar to a bond with the bank or financial institution taking the place of a surety; established solely for the purpose of guaranteeing performance of obligations under a reclamation permit

• Irrevocable trust - trust created by the permittee solely for the purpose of guaranteeing performance of obligations under a reclamation permit

• Escrow account - account with a bank or financial institution established by the permittee to satisfy the financial assurance requirements (i.e. to guarantee the performance of the reclamation activities described in a reclamation permit)

• Net worth test - Method in which a permittee provides sufficient financial data to demonstrate compliance with minimum financial standards, which is accompanied with the opinion of an independent certified public accountant in order to establish proof of financial responsibility

• Government securities - a deposit with the RA to guarantee performance of obligations under reclamation permit

• Alternative methods for small operators - A blend of different options that could include a regular payment (based on production or gross sales) to an escrow account or other financial instrument designed to grow to the amount necessary to guarantee reclamation at the expected time of final reclamation. This probably would be set up along with a lien on the property that would serve as collateral to guarantee performance of reclamation obligations.

Some Items to Consider in Calculating Financial Assurance

Item	Cost per Unit	Number of Units	Amount ($)
Grading and Regrading Activities necessary to ensure soil and slope stabilization Erosion control materials Equipment and labor			
Topsoil Prep Scarification of subsoil or underlying materials prior to topsoil redistribution Equipment and labor			
Topsoil Creating or purchasing substitute topsoil (if necessary) Application of substitute topsoil Reapplying stockpiled topsoil Soil amendments, lime and/or fertilizer Equipment and labor			
Revegetation and Seeding Seeding/transplanting Seed costs and misc. materials Seeding and transplanting Costs Equipment and labor			
Vegetation Stabilization Mulching, netting or other stabilization materials Equipment and labor			
Short-term Site Maintenance Covers period until declaration of completion (DOC): Additional seed, vegetation, etc. Equipment and labor			
Long-term Site Maintenance Covers period between DOC and certificate of completion of reclamation (near time when financial assurance may be returned): Additional seed, vegetation, etc. Equipment and labor			
TOTAL			

APPENDIX G

CONCEPTUAL RECLAMATION PLAN

This appendix contains a conceptual plan, rather than an example plan or series of plans, because there is too much variability in the range of physical environments, potential post-mining land uses, mine operation layouts and other site specific variables to provide a meaningful example. Rather than provide one model example plan, which only a few mine operators may find beneficial, the Department has decided to present a conceptual plan that focuses on *one* of the many ways in which a reclamation plan may be structured and written. This conceptual reclamation plan specifically addresses the unique conditions of a proposed, hypothetical mining operation. The Department would like to emphasize the importance of utilizing the overall *structure* of this reclamation plan – not the specific language itself – as an avenue in which mine operators and regulators may benefit from. It is important to note that each reclamation plan will vary for each nonmetallic mining operation, predominantly because every single mine site is located within a fundamentally different geological, environmental and political context.

Please be advised that the conceptual reclamation plan provided in this appendix is presented strictly for guidance. The reader is further cautioned that any content provided in the attached reclamation plan is offered only in a conceptual context and does not necessarily address any specific requirements that may or may not apply in a jurisdiction regulating a nonmetallic mining site. It should be noted that the plan is strictly hypothetical and any possible references to maps, tables, logs, plan sheets or photographs referred to in the text of the conceptual reclamation plan are merely fictitious. Furthermore, the example language provided here be should **not** be interpreted in any way as a model.

Several examples of actual reclamation plans are, however, available from the WDNR for your reference upon request or you may benefit from contacting your RA for example(s). In addition, **operators should contact the county or local Regulatory Authority (RA) for guidance and to obtain any applicable forms** that they may require. Communication should be initiated at the very beginning of the process, prior to preparing or submitting an application for a nonmetallic mining reclamation permit.

Throughout this guidance it has been stressed repeatedly that the most important attribute driving the reclamation plan is the post-mining land use. This choice will dictate the structure and specifics of any given reclamation plan. The conceptual reclamation plan that follows addresses several potential or proposed post-mining land uses in order to show that a range of possibilities are indeed plausible. According to the reclamation plan the proposed post-mining land uses are as follows: a pond with a naturally contoured shoreline surrounded by habitat suitable for passive recreation/wildlife habitat and agricultural use (pasture). The edge of the pond shall contain a minor amount of wetland habitat.

Conceptual Reclamation Plan

Overview and General Summary of the Mining Operation

The proposed mine will contain a sand and gravel pit as well as a limestone quarry located on 37 acres in Bellows Country, Wisconsin. The operation will be located approximately five miles southwest of the Village of Crusherville. Sand and gravel material is derived from glacial outwash that abuts a limestone formation. The limestone outcrops as a bluff alongside the Big River. The mine is proposed to operate for 25 years allowing 1 to 3 years for reclamation.

Mining of the unconsolidated deposits (sand and gravel) will occur in 5 distinct 5 to 10 acre phases. Each separate phase of sand and gravel mining is expected to be about 5 years depending on market conditions. More specifically, contemporaneous reclamation of phase 2 of the sand and gravel operation will begin during or immediately preceding the initiation of phase 3.

Mining of the limestone will occur throughout the entire 25-year life of the mine.

Waste rock from all phases will be stockpiled to provide a source of backfill material during final reclamation activities.

Once an area is stabilized in accordance with the reclamation plan Endurorock will request that Bellows County will consider the phase temporarily reclaimed for the purpose of fee reduction under s. NR 135.41, or released as meeting the success standards for final reclamation.

List of Maps

List of Tables

1. Site Information

1. General Location

This proposed limestone and sand and gravel mine is near Crusherville, Bellows County, Wisconsin. Please see Map 1, which includes property location including boundaries, aerial extent of property and proposed mine footprint including all phases of mining and reclamation.

The proposed mine is on a portion of the USGS Bigtimbers, Wisconsin 7.5 minute quadrangle map (Map 1). The Endurorock Labyrinth Mine property boundaries are on page 22 of the 1990 Bellows County, Wisconsin Plat Book. S 1/2 of Section 22, T24, R16E.

Legal Description - "That part of Section 29, Township 2 North, Range 19 East of the Fourth Principal Meridian, described as follows: Commencing at the southwest corner of the Northwest Quarter of said Section 29, thence North 88 degrees 37 minutes, 33 second East along the south line of said Northwest Quarter, 221.76 feet to then point of beginning; thence North 20 degrees 47 minutes, 47 seconds East, 912.81 feet; thence South 41 degrees 56 minutes 47 seconds."

Parcel ID number is 440954 0078 C
Tax ID = O54 OO98-10034

Owners: Arthur and Jane Smooth
S. 608 Pebble Place
Stoneside, WI 53000
(715) 555-1999

Operator: Endurorock, Inc.
42 Miner Road
Aggregate, WI 53777
(920) 555-9999, contact person is Steve Crusher

2. Property Boundaries

Please see Map 1.

3. Areal Extent

Please see Map 2.

Map 2 illustrates how phasing will occur in the sand and gravel portion of the mining operation. Mining occurs in phases to minimize disturbance and erosion on the mining site. Each phase corresponds to a specific excavation period where topsoil is removed and the pit is expanded.

Phase 1: First mining phase of sand and gravel removal. Topsoil will be removed and relocated to topsoil storage area and scenic buffer berm (Map 1). Stockpiled topsoil will be revegetated immediately to minimize erosion.

Phase 2: Second mining phase of sand and gravel removal, topsoil removed and stockpiled.

A portion of this topsoil will be used to reclaim areas excavated during Phase 1 activities.

Phase 3: Topsoil removed during the third mining phase will be used during the reclamation of Phase 2 activities, *rather than being stockpiled*, thereby avoiding the negative impacts and unnecessary costs associated with double handling materials, in this case topsoil.

Phase 4: Topsoil from Phase 4, as described above, will be used in the reclamation of Phase 3 activities. Placement of waste rock, grubbed trees and stockpiled mulch onto land reclaimed will facilitate rapid contemporaneous reclamation.

Phase 5: Topsoil from Phase 5 will be stored in topsoil stockpiling area (indicated on Map 1). The material will subsequently be used in reclamation of Phase 5 activities.

4. Geologic Composition and Depth of Mineral Deposit

Please see Map 3a for the geologic composition and depth of mineral deposit. A cross section of the mining deposit has been provided and referenced in Map 3b.

This mining site has varying topography and thickness of mineable materials. The site features undulating, post-glacial topography. The surficial geology includes a mix of glacial outwash and moraine deposits as well as areas where impeded drainage has created wetlands, kettle lakes and areas where seasonally wet soils dominate.

The portion of the property containing mineable sand and gravel deposits ranges from 15 to 30 feet in thickness. The materials to be mined include a heterogeneous mixture of fine and coarse aggregate varying in size from 200 mesh fines to 12-inch cobbles. Please refer to Table 1 for soil borings data. Soil descriptions from these borings are included in Table 1 and Map 3c. Site specific information derived from drilling logs and test pits are available in Tables 2 to 4.

The portion of the property containing mineable limestone that occurs near the bluff is considerably thicker ranging from 50 to 100 feet in thickness. Endurorock anticipates that 8% of the total volume to be mined would consist of silt and clay. This would be washed from the gravel and recovered from the settling pond in accordance with the WPDES General Permit.

5. Distribution, Thickness and Type of Topsoil

A variety of soils occur in the area of the proposed mining site. A map delineating the soil types has been included in the reclamation plan (Map 3c). The approximate pre-mining topography is referenced in Map 3a. The primary soils encountered on the site are of a sandy loam nature and include Afton-Roul-Mertsing Complex AmB and AmD. On bluff tops, soils are in situ and are interpreted to be wind blown loess deposits. Woodland soils are typical in the site area. In more level areas, the soil formations are greatly influenced by glacial processes in association with glacial outwash, moraine and drumlin deposits. In these areas rich prairie soils developed, which currently support pasture with inclusions of prime farmland. Prime farmland soils are mapped as a Homestead silt loam HoA. These soils occur on the level to near-level (0 to 2% slopes) portions of the site. The deposit lies under 2 to 10 feet of topsoil and subsoil. The USDA has divided these surficial deposits into 5 separate soil series in the Bellows County Soil Survey. Such areas are designated in the reclamation plan to be returned to agriculture. Organic soils occur in low-lying areas and were

formed in association with areas containing impeded drainage typical of wetlands and glacial lake basins.

The remaining soil types are found in steeply incised (35 to 100% slopes) areas where the Big River cut limestone bluffs. This is in sharp contrast to areas that are level or nearly level (0 to 2% slopes) with poorly drained soils formed in kettles or glacial lake basins. Silt loams and glacial diamicton overlie the limestone bedrock and occur on the tops of the steep and rocky sites (35 to 100% slopes).

6. Information on Ground Water

Wisconsin Geologic and Natural History Survey (WGNHS) Report #XXX gives an overview of the regional groundwater regime. Depth to groundwater in the area proposed for sand and gravel mining is typically about 20 feet according to the WGNHS report. This conclusion is supported by data collected from private wells that Endurorock obtained from the WDNR's Bureau of Drinking Water and Groundwater in addition to the WGNHS. On-site drilling logs and test pits generated in delineating the mineable deposit also characterize depth to groundwater. Please refer to Map 4 for the approximate elevation of groundwater. Wells in the glacial deposits yield 100 to 150 gallons per minute.

Apart from the sand and gravel portion of the proposed mine, the depth to ground water varies from about 10 feet in areas where agriculture is now conducted, to groundwater depths exceeding 100 feet on bedrock bluffs. Groundwater may be found at or near the surface near wetlands or seasonally saturated soils.

The flow direction of groundwater is generally southwest in the vicinity of the Big River. Bedrock is generally poorly to moderately fractured and does not greatly effect groundwater flow.

The mining operation will be conducted above the groundwater table with a buffer of at least 5 feet except in the wet area (future pond area) where it will be intercepted and will require pumping during the mining operation.

7. Location of Surface Waters

Wetlands and Clear Creek as well as several ephemeral drainage courses (Map 1, Map 4) bound the Endurorock operation. The proposed mine is also within 1/4 mile of the Big River. All creeks and ephemeral streams drain into the Big River (Map 4).

Please refer to Map 4 for the location of surface waters.

8. Existing Drainage Patterns:

Please refer to Map 4 for the location of existing drainage patterns. Contour information has been set at a 2 foot contour interval as specified by Bellows County {the applicant should check the county or local ordinance for the specific interval}. Map 4 also details the pre-mining topography.

Please refer to Map 4 for location of water impoundments for sediment control purposes and other drainage management features.

9. Existing Topography

The existing topography has been graphically represented in Map 1, Map 3c and Map 4. This can easily be compared with Map 6, which portrays the mining site (including topography) after reclamation. The final land uses are also delineated.

10. Location of Manmade Features

Please refer to Map 1 for the location of existing and proposed manmade features. In essence, Map 1 provides a plan view of the current conditions. Map 5 is of the mining site property and details the location of the crusher, office building, maintenance shop, roads, scale house, stockpiles, loadout area and sediment ponds. Map 5 shows the proposed storage locations of reusable materials such as oversize stone and boulders, mulch from shredded woody material and whole trees that will be used in creating fish habitat in the future pond which will be located at the quarry location.

11. Previously Mined Areas

Map 1 and Map 2 delineate areas that were mined prior to August 1, 2001.

Biological Information
Vegetative data for the property was determined through visual observation and review of *The Soil Survey of Bellows County* (USDA, NRCS) and *The Vegetation of Wisconsin* (Curtis). Vegetation includes small areas of mixed lowland and mesic forest. Trees found on the site include: eastern cottonwood, river birch, red maple, green ash, black ash and basswood. Vegetation found in the understory include: willow, wild ginger, bedstraw, bottlebrush grass, New England Aster, honey suckle, trillium, wood violet, jack-in-the-pulpit and interrupted fern.

Old field: This previously farmed area consists mainly of brome grass, orchard grass, quack grass, ragweed, staghorn sumac, box elder, prickly ash, brambles, goldenrod, ragweed, St. John's wort and hawkweed.

Wetland areas: This area borders the site and consists mainly of cattails, wool grass, cord grass, red-osier dogwood, skunk cabbage, marsh marigold, sedge, arrowhead, swamp milkweed, boneset, Joe-pye weed and Ironweed.

Biological and wildlife data was mainly determined by visual inspections. Wildlife usage is heavy (forage, nesting and cover) in the wetlands and moderate in the mesic areas of the property. Main species present include coyote, badger, rabbit, woodchuck, squirrel, wood duck, raccoon, red fox, sparrows, grouse, white tail deer, great blue heron, Canada geese, red tail hawk, turkey vulture, wild turkey, great horned owl, cardinals, gold finch, chickadee and sandhill crane.

2. Post-mining Land Use

Endurorock will return the site to a combination of post-mining land uses including (1a) passive recreation/wildlife habitat (1b) and small pond/fish habitat (2) with some pasture. The proposed reclamation plan provides details the location and final land uses for the entire mining site. Map 6 portrays this information.

Plant materials will be selected for reclamation based on the post-mining land use and to be versatile enough to provide a matrix for any of the proposed post-mining land uses. Native species will be used to the extent practicable. {Please refer to the example Post-mining Land Use Success Criteria Table in Appendix D for Revegetation Standards.}

All portions of the reclaimed site (with the exception of the agricultural land uses) will be connected by trails beginning at a parking lot near the pond site before proceeding through the passive recreation and wildlife habitat areas and hence to adjacent (trail, park etc.).

3. Reclamation Measures

A. Earthwork: Final Grading and Slopes

Endurorock will perform selective blasting to minimize highwalls and maintain stability terraces. This should have the effect of reducing unnatural lines and blending the contours in an irregular pattern to avoid regular, unnatural edges. The technique will create a wavy, more variable and thus more natural appearance. The slopes will be sloped so they blend in with the surrounding landscape to create a more visually interesting landscape.

In all areas where the highwalls are retained and in any area where a potential risk to safety exists, warning signs will be posted. In addition, a safety berm, fencing or both will be installed to restrict access to potentially unsafe areas. Endurorock will use any excess rock and other clean materials as backfill against vertical slopes to minimize the vertical drop and create more diverse site conditions.

Excess materials will be stored close to the point of actual final use to reduce double handling and other transportation related expenses. Storage locations will be chosen to avoid environmental impacts.

When the slope occurs near the edge of a water body, the approved slope shall extend vertically 6 feet below the lowest seasonal water level.

All grading will be completed and resulting surfaces scarified prior to topsoil redistribution. Grading will be completed in a manner that prevents ponding of water on the reclaimed surface. The topsoil (and/or subsoil) will be placed and finished to the required lines, grades and slopes as shown on Map 6.

B. Topsoil

The establishment of sediment control measures will be the first activity initiated and will either precede clearing and grubbing and topsoil removal or will occur simultaneously in accordance with NR 135.07. Trees, brush and other woody materials removed from the site during grubbing will be run through a chipper or otherwise converted into mulch and stockpiled. These materials will be used in reclamation activities when possible or stockpiled for future use. Endurorock may also elect to stockpile non-shredded trees, brush or other woody material for use in the pond to provide habitat/structure for fish. Likewise, large (oversize) material or boulders will be separated and used to control access or strategically placed on the reclaimed surface (or stockpiled for future use) to provide wildlife habitat and improve the aesthetics of the reclaimed surface.

Topsoil Removal
After completing erosion and sediment control measures and clearing and grubbing on the site, but prior to initiating mining activities, the topsoil and surficial plant growth material will be removed. Topsoil (A horizon) and, when appropriate, subsoil (B horizon) will be removed to a depth ranging between 6 inches and 12 inches. In all cases soil removal will be to a minimum depth of 6 inches. Minor deviations may occur as directed in the field by the soil scientist or project manager.

Topsoil removal will be accomplished by scrapers or bulldozers and haul trucks with the goal of recovering as much of the existing topsoil in both the A and the B horizons as possible. When feasible, soil will be removed in a manner so as to minimize the surface area exposed to erosion at any one time.

Topsoil Storage and Protection
All topsoil and subsoil removed from the mining site will be transported to the locations shown on Map 1 and protected for subsequent use in reclamation.

Topsoil from the quarry location and Phase 1 of the sand and gravel operation will be used to construct the scenic buffer berm, also referenced as the long-term topsoil stockpile. This topsoil stockpile will be shaped into an elongated profile and placed in a manner to serve as a noise buffer and a scenic barrier between the mine and the recent Pleasant Properties Development.

The topsoil will be stockpiled where necessary and in as close proximity as possible to pasture and row crop post-mining land uses. Any topsoil stockpile(s) will be immediately protected from erosion. In general, protection will be accomplished through revegetation using the appropriate seed mix from Appendix C (depending on soil moisture, post-mining land use, etc.) and through the use of mulch or other protective measures that may be necessary. Utilizing the appropriate seed mix will serve to maximize the seedbank of native or other desired species. This will in turn minimize competition with undesirable, aggressive weedy species.

When topsoil or subsoil storage locations will be used as test plots, we will apply a variety of seed mixes to the test plots in order to determine which variety may succeed. Data from these test plots will be used to determine any revisions to the seed mix(s) for final reclamation that may be necessary.

Contemporaneous use of topsoil
Whenever possible -- as described in the mining and reclamation sequence portion of the plan -- the

soil removed to prepare an area for the next sequential phase of mining will be immediately redistributed to complete reclamation for that specific area. In these instances contemporaneous reclamation may proceed (such as from Phase 3 to Phase 2). This will be done to avoid any unnecessary potential loss of topsoil quality and quantity during storage.

When topsoil cannot be used in contemporaneous reclamation, topsoil and subsoil in prime farmland will be promptly relocated to separate stockpiles at the approved storage location as described above.

Topsoil Redistribution and Site Preparation
Endurorock will perform all necessary grading to achieve the final topography and drainage patterns as soon as practicable once mining has ceased in a portion or phase of the operation. This will be performed in order to prepare the site for final reclamation.

All grading will be completed and the resulting surfaces scarified prior to topsoil redistribution. This will promote good adherence/bonding between the subsoil and the topsoil and improve infiltration and drainage. Grading will be accomplished so to prevent ponding of water on the reclaimed surface. The topsoil (and/or subsoil) will be placed and finished to the required lines, grades and slopes as shown on Map 6. Topsoil will be placed to the depth required on the plans or as required in the permit.

When compaction of soil is found, or when underlying material is too compact or dense to allow for a suitable bond, the applicant shall take suitable measures to rectify the situation. This may include disking, chisel plowing, ripping and/or scarification. These measures will be employed to alleviate compaction, promote good bonding between the topsoil and the underlying materials, enhance drainage and ensure a suitable substrate for plant growth and the development of plant root systems.

All topsoil will be redistributed onto a prepared site. Topsoil redistribution will be performed only during dry conditions using appropriate equipment and in a manner so as to minimize compaction. Any clods and/or lumps present after topsoil redistribution will be broken down by the use of harrows, discs or other appropriate equipment in order to provide uniform textured soil. In addition, the surface will be dressed to present a uniform particle size to improve seed germination through good soil contact with the seed. In the case where an area not addressed in the plan is contemplated the topsoil will be replaced to a minimum depth of 6 inches.

C. Structures

Please refer to Map 5 for the location of the access road and gatehouse, which are the only structures that will remain once the site is reclaimed. The final removal of mining, drainage and sediment control structures will be accomplished once the vegetative cover is robust enough to provide equivalent protection. At such time, and in accordance with the approved reclamation plan, those structures will be removed and the soils in those areas will be reclaimed as described in the reclamation plan.

D. Revegetation Plan

The revegetation plan includes all activities in support of selecting, obtaining, handling and applying seed or otherwise installing plant materials to fulfill the reclamation plan. Seed and plant materials will be obtained from a licensed nursery that normally works with native prairie and/or wetland plant

materials. Seed shall be free of contamination by weedy species.

Seed Selection
Endurorock will use seed mixes to support each of specific land uses proposed in the reclamation plan (agriculture, wildlife habitat/passive recreation, pond margins) and a site stabilization mix:

Mix 1	Pasture
Mix 2	Basic Stabilization/Wildlife/Grazing
Mix 3	Basic Native Mix for Wildlife/Passive Reclamation
Mix 4	Wet soils/Pond edge/ Wetland area

Timing of Seed Application
Endurorock will apply seed to soils that are properly prepared as specified above at any time during the growing season when soil conditions are suitable except between July 1 and August 15, unless permitted by the county representative. Seeding activities will not be carried out immediately following rain, when the ground is too dry or during windy periods.

Seeds that require inoculation (legumes are indicated by an * in the sample seed table) will be inoculated prior to seeding. In the performance of seed inoculation, care will be taken to follow the instructions that are provided by the supplier.

General Seeding Methods
{Choose one or more of the following options listed below, depending on the situation.}
All plant materials will be handled with care during all phases of revegetation (transport, storage, preparation and seeding) or other plant installation activities. Plant materials that show any evidence of injury, mold, rot or excessive drying will not be used. Acceptance of plant materials shall be subject to approval of the reclamation project manager. If rejected, substitutes chosen from the list in the reclamation plan shall be provided as approved by the reclamation project manager.

The area will be seeded following the final grading and completion of all site preparation activities. All necessary physical seedbed preparation measures (such as scarification, tilling or harrowing) and chemical measures such as amendments (fertilizer, lime or other) will be done prior to seeding.

- **Broadcast Seeding Using Agricultural Equipment (agricultural land use and wildlife/passive recreation)**

Seeding activities will be carried out using specified equipment and in a manner to avoid soil compaction in accordance with seeding specifications and/or those given in the reclamation plan. The area seeded will not exceed the area that can be mulched on the same day. Seed will be uniformly sown by means of equipment adapted to the purpose. Then the site will be lightly raked or dragged to cover the seed with approximately one-fourth inch of soil. After seeding is complete, the areas will be lightly rolled or compacted by means of suitable equipment to improve seed to soil contact and germination.

- **Seeding by Hand (interim reclamation, topsoil and subsoil stockpiles, pond margins and other wet areas)**

The area will be seeded in accordance with the seeding specifications given in the reclamation plan. This method will be used only for areas less than 2 acres. Seed will be mixed with peat or other inert material prior to seeding. Seeding will be accomplished by uniformly scattering by hand followed by a light raking or equivalent method. Then the site will be dragged to cover the seed with approximately one-fourth inch of soil. Finally, the areas will be lightly rolled or compacted by means of suitable equipment, preferably a cultipacker.

- **Seeding With Drills (prairie plantings)**

After the seedbed has been prepared, uniform seed application using a no-till drill (such as Truax or comparable drill) will be used.

- **Hydroseeding (optional for steep slopes)**

Following preparation of the seedbed, the seed will be sown or spread by means of a hydroseeder. The selected seed mixture and water will be placed into a tank, provided within the machine, in sufficient quantities that when the contents of the tank are sprayed on a given area the seed will be spread at a uniform rate of application. At all times during the hydroseeding process the contents of the tank will be kept stirred or agitated to provide uniform distribution of the seed. The contents of the tank will be emptied within two hours after the seed is added to the mix. In no case will seed be allowed to remain in the tank for periods in excess of two hours.

Soil Amendments
This may include fertilizer, lime, organic matter and/or other materials determined to be beneficial to the seedbed consisting of topsoil or substitute soil.

In order to allow adequate time between sampling the soil and the initiation of reclamation activities, Endurorock will perform soil sampling and submit sample to an accredited laboratory for analysis at least 60 days prior to initiating of reseeding activities. Based on the results of the analysis, amendments will be obtained as necessary and applied to the soil prior to seeding. The general recommendations below will be used in lieu of data when necessary for contemporaneous reclamation of small areas and for the purpose of calculation of the financial assurance. Results from test plots and/or experience gained during phased reclamation may also be considered when making amendment recommendations.

Fertilizer Amendments
Conceptual fertilizer application rates for areas that will be reclaimed as pasture.

Nutrient Application Rate in Pounds per Acre

Nitrogen as ammonium nitrate	25
Phosphorus as P O	15
Potassium as potash	100

{NOTE: In areas to be reclaimed to native prairie it is usually not necessary to apply fertilizer. Indeed, fertilizer often favors competitive weedy species. However, each site should be evaluated based on soil analysis.}

Lime
Lime will be applied as necessary based on soil pH tests.

Other Organic Amendments
Manure and other sources of organic matter (compost, sludge -also known as biosolids, wood chips) may be used if available and if deemed appropriate based on the results of soil testing and/or test plots, and in accordance with local zoning and all applicable laws.

Mulching
Following seeding, mulch will be applied uniformly at a rate of between 1 and 1.5 tons per acre. Mulch will be wheat straw, marsh hay or equivalent weed-free mulch. Mulching operations will begin at the top of the slope and proceed downward. The mulch cover will be applied so as to be loose enough to allow some sunlight to penetrate yet thick enough to provide shade and protection from desiccation and raindrop impact and erosion. After spreading on reseeded surfaces mulch will be crimped into the soil by passing over the reclaimed surface with a dull, weighted disk or similar implement. On steep slopes straw or hay mulch will be securely pegged or stapled in place. In lieu of such anchorage, the mulch may be secured by means of heavy biodegradable twine fastened with pegs or staples to form a grid. Also, at the discretion of the project manager erosion blanket, jute netting or a tactifier may be used in addition to or in lieu of the crimping process.

E. Revegetation Standards

{As a means to minimize the length of this document, the reader is suggested to refer to Appendix D in order to learn more about post-mining land use specific success standards and criteria.}

F. Erosion Control

As required by law, a major strategic element of the reclamation plan is to conduct mining operations in a manner that minimizes the acreage being mined at any one time and thus serves to minimize the total area exposed to erosion in accordance with NR 135.06 (2). Thus mining will be conducted in phases with progressive or contemporaneous reclamation immediately following the cessation of mining in a given area or phase.

Erosion control measures will be established prior to any site development activities including soil

removal and stockpiling. Erosion control measures will be also be established prior to initiating reclamation such as contemporaneous reclamation, backfilling or grading. Typical erosion control measures are shown on Map 5. Surface water protection measures will be installed and maintained to support reclamation activities for each phase of the mine and will be in place before and during contemporaneous reclamation. Erosion and sediment control measures include diversion systems, sedimentation ponds and other means for controlling runoff. Map 5 depicts the runoff and erosion control system showing the location of diversions, sedimentation basins and related structures. In order to minimize the size of treatment structures, surface water will be diverted around the disturbed area except in areas near the wetland, the Big River and Clear Creek (the trout stream).

The operations area will be graded to direct all surface water runoff flow that encounters the disturbed area through protected ditches. Surface water from the operations area will be treated in sediment ponds before being routed to either an infiltration basin or a protected discharge channel. The goal is to encourage infiltration and percolation both by providing adequate detention time and minimizing the volume of water discharged to the protected channel. Discharge into well vegetated and stable buffer areas will also be used in some areas to allow for a steady and gentle release of waters and additional treatment or velocity reduction prior to their entrance into the adjacent trout stream. When possible the same approach will be used prior to release of liquid to Clear Creek, the Big River or the adjacent wetlands. This combination of treatment and controlled discharge will assure that the surface water from the disturbed area will not cause erosion, pollution or sedimentation.

G. Interim Reclamation

A main element of the reclamation plan is conducting mine operations in a manner that minimizes the acreage being mined at any one time. This approach, along with contemporaneous final and interim reclamation, will minimize the total area exposed to erosion in accordance with NR 135.06 (2). In the quarry location, sequential interim reclamation will be done so as to minimize the area impacted and to reduce the fees.

Once the area is stabilized, Endurorock will request that the Bellows County regulatory authority consider the increment temporarily reclaimed for the purposes of reduction of fees under NR 135.41. Likewise, we envision that the scenic berm will also be a candidate to petition Bellows County for a fee reduction.

H. Follow-up Inspections and Necessary Site Maintenance

Endurorock will inspect the sediment and erosion control systems on a regular basis and immediately after severe storms. Endurorock will conduct periodic follow-up inspections of all reclaimed or otherwise stabilized surfaces to ensure they are in a condition stable enough to control erosion and sedimentation. Endurorock will inspect and maintain all reclaimed areas.

When damage caused by traffic, wind, water or other cause is detected, Endurorock will promptly perform all necessary maintenance and repair work to the erosion control system. Likewise, other work necessary to ensure long-term success of the vegetation including follow-up fertilization, other necessary soil amendments as well as any weed or pest control that may be needed to restore and maintain adequate vegetative cover will be accomplished.

As part of maintenance of the reclaimed site, Endurorock will perform any necessary weed control or pest control and maintenance both to facilitate the establishment and survival of vegetation. Exotic species that occur on the site or are accidentally added though contaminants in the seed mixes or through the use of hay or other mulch products that are not weed free will be promptly controlled through fire, mechanical means or with herbicides. This is especially true when the species appears on the list of state noxious weeds. This will continue until the Bellows County RA issues the certificate of completion (COC).

4. Criteria for Successful Reclamation {refer to Appendix F}

Endurorock will demonstrate compliance with the revegetation success standards (performance standards) for each post-mining land use contained in the approved reclamation plan. The techniques employed are as follows**:** percent cover will be determined as total cover (expressed as a percentage) as measured by coverage of the canopy (vertical projection of plant parts) and will be recorded by species. Cover will be measured over the entire revegetated site at no less than 20 randomly placed square meter quadrats for each 10 acre area.

Success criteria will vary with the post-mining land use. In addition, both presence (a species list) and frequency (number of quadrats the species occurs in) will be included.

5. Certification of the Reclamation Plan

I hereby certify, as a duly authorized representative or agent, that _____ (name of operator) will comply with the provisions of this reclamation plan as well as the statewide nonmetallic mining reclamation standards established in ss. NR 135.05 through NR 135.15, Wis. Adm. Code.

Signature of Applicant or Duly Authorized Agent Date Signed

_____ _____

This section is required if the landowner or lessee of the property is different from the operator indicated above.

I/we, as the landowner(s) or lessee(s) of the property described herein, do hereby certify that I/we have reviewed the reclamation plan submitted by _____ (name of operator), concur with its provisions, and agree to permit its implementation.

Signature of Landowner(s) or Lessee(s) Date Signed

_____ _____

_____ _____

N. Final Site Actions

The final removal of mining-related structures, drainage structures and sediment control structures will be accomplished once the vegetative cover is robust enough to provide equivalent protection. At such time and in accordance with the approved reclamation plan those structures will be removed and the soils in such areas will be reclaimed as described in the reclamation plan (NR 135.11-135.19). At this time Endurorock will request the Regulatory Authority to perform the necessary inspection and evaluation work to certify the reclamation as complete (COC) and to release the financial assurance.

6. Financial Assurance

{For more information on reclamation costs and financial assurance, a table that may be used to aid in determining the dollar amount has been included in Appendix F.}

APPENDIX H

POTENTIAL POST-MINING LAND USES

Contrary to some past practices, non-metallic mining sites can no longer simply be abandoned and left to become eye sores, safety problems or good places for illegal dumping. Properly managed, mining sites can be transformed for a wide variety of useful and attractive purposes. Consider some of these post-mining land uses when preparing a reclamation plan:

- green space, passive recreation area (hiking, biking, skiing, or nature trails)
- low density residential development along reclaimed lake shoreline
- wildlife habitat including prairie, savanna or forest agricultural land or pasture
- public parks
- recreation fields (soccer, baseball, football, etc.)
- lake or pond for swimming and/or stocked for fishing
- commercial or residential development
- golf course
- combinations of the above

Still unsure about the best final land use for the mining site? Consult with the local authorities or neighbors to solicit input on what they might like to see on the site once mining ceases. Check out the references in Appendix B for other ideas. Or consider hiring a consultant or landscape architect to evaluate the site and suggest some creative options.

Also, stay alert for opportunities to connect with the Smart Growth planning process. A comprehensive plan including consideration of natural resource management in is now required by law in the State of Wisconsin. Long term considerations such as how the reclaimed property fits into the broader picture could yield connections to planned or existing trails, recreational areas, wildlife management areas or perhaps wildlife migration corridors. This is especially true if rivers, floodplains or wetland complexes are in or adjacent to the mining site. Check into possible incentives that may be available to assist in furthering such opportunities, such as tax breaks that might come with a conservation easement or perhaps a grant. In any case, participation with the broader community will promote good will and a more positive public image.

APPENDIX I

LIST OF ABBREVIATIONS AND PARTIAL GLOSSARY

ASCS - Agricultural Stabilization and Conservation Service
COC - Certificate of Completion of Reclamation
NMAC - Nonmetallic Mining Advisory Committee; a group of external advisors appointed by the Department Secretary to assist the WDNR in the long-term program implementation; required by NR.135.51.
NOC - Notice of Completion of Reclamation
NRCS - Natural Resource Conservation Service (formerly SCS)
OSM - U.S. Office of Surface Mining
RA - Regulatory authority; typically the county, sometimes a city, village or town and when necessary the WDNR
SCS - old term for Soil Conservation Service; now NRCS
USDA - United States Department of Agriculture
USGS - US Geological Survey
WDNR - Wisconsin Department of Natural Resources
WDOT - Wisconsin Department of Transportation
WGNHS - Wisconsin Geologic and Natural History Survey
WPDES - Wisconsin Point Source Discharge Elimination System

Contemporaneous reclamation - sequential or progressive reclamation performed as soon as possible following the cessation of mining activities in a portion of the mining site.

Financial Assurance - the commitment of funds or resources by an operator to a regulatory authority sufficient to guarantee that an approved reclamation plan will be carried out.

Jute netting - erosion control material.

Mesic - in soils - a soil temperature class; for vegetation it means a plant community intermediate between dry (xeric) and wet (hydric) environmental conditions.

Post-mining or "Target" Land Use - the post-mining land use required under NR 135.19 (3) will be key in determining the detail necessary in the reclamation plan. Grading necessary to achieve the final slopes, drainage patterns, site hydrology, topsoil redistribution, seed mixes and the degree of removal of mining-related structures, drainage structures, and sediment control structures will be dictated by the approved post-mining land use.

Prime farmland - land possessing soil qualities best suited to the high yield production of food and fiber.

Quadrat - a unit of area, typically a 1 meter square (about equal to a square yard) that is used as a way of delineating a small but representative portion of the entire reclaimed surface for the purpose of demonstrating success and reclamation.

Scarification - a process of loosening up a compacted or very hard soil or subsoil environment to

promote seed germination and drainage.

Tactifier - a glue-like substance used to retain mulch on a reclamation site by promoting the adhesion of the mulch to the soil.

APPENDIX J

FREQUENTLY ASKED QUESTIONS ABOUT RECLAMATION PLANS

I am considering opening, or reopening, a new nonmetallic mine. How do I get started?

The first, and most important, thing you need to do is determine what you envision as a final, post-mining land use for your site. We suggest following these simple steps:

Contact the Regulatory Authority (RA)

Visit the office of your county or local RA to pick up an application for a reclamation permit and any specific guidance or other instructions before starting out.

Talk to local officials

Many local governments already have a long-term land use planning framework. Talk to the representatives in your area.

Survey the site and the surrounding area

Surrounding land uses will give you clues to the potential future use(s) of a proposed or existing nonmetallic mining site.

Create a vision

Plans for extraction require a plan for reclamation. What do you see down the road 5, 10, 25 or 55 years?

Submit the Reclamation Plan

Submit the reclamation plan to the RA according to any applicable guidance that has been provided and any submittal deadlines agreed upon in the above discussions. For new or reopened sites, plan on submitting the reclamation plan at least 90 days before the date on which you would like to begin mining.

How can operators be assured that the county or local government regulatory authority will have a fair and reasonable interpretation of the uniform reclamation standards?

The reclamation permit is based on a reclamation plan submitted by the operator and approved by the regulatory authority. The reclamation plan will show how the reclamation standards are met and will provide known expectations. This provides assurance that arbitrary requirements are not imposed and thus may serve to protect the operator against future overly stringent interpretation of the reclamation standards.

What is a reclamation plan?

The reclamation plan and any associated map(s) describes and/or delineates all acreage that will be subject to reclamation following the completion of extraction and mining activities. It provides the post-mining land use within the mine plan area and the methods of reclamation necessary to achieve the target post-mining land use.

A reclamation plan needs to be "complete" in the sense that it addresses the plan requirements laid out in ss. NR 135.18 and NR 135.19.

An approved reclamation plan should be a flexible document. The best approach is to maximize flexibility by anticipating all areas likely to be mined as well as any minor changes to the operation and to write these into the reclamation plan. This may be preferable to developing a plan modification at a later date that could result in unnecessary delays associated with plan review and perhaps a public hearing.

What is the relationship between the total acreage in an approved reclamation plan and the acreage subject to an annual fee?

A reclamation plan delineates all acreage that will be subject to extraction and mining activities. It provides the land use or uses within the mine plan area and the methods of reclamation necessary to achieve the end land use. Fees are assessed on only those areas in the reclamation plan that have been, or are being, affected by mining activities and are not reclaimed.

When is a modification to an existing reclamation plan necessary and what does this imply?

Modifications to a reclamation plan may be required for many reasons including expansions, changes in mining methodology, changes in rate of extraction or simply from routine review of the existing reclamation plan. Even though the reclamation permit is a life-of-mine permit, modifications may require the permit to be reopened, possibly requiring a public hearing.

Will reclamation programs enacted under NR 135 affect the siting, and permitting of new mines?

No. This rule creates a **reclamation** program only. It is not a zoning rule and will have no effect on local zoning decisions. The decision on locating a nonmetallic mine will continue to be based on the physical presence of a deposit, the market demands and the restrictions placed on these activities through the zoning process. This rule deals only with final site reclamation and environmental protection and has no affect on siting decisions.

Will reclamation programs enacted under NR 135 address issues such as noise, blasting, and traffic?

No. Chapter NR 135 deals only with the reclamation of mines. Concerns related to siting and operations need to be addressed through zoning and other ordinances.

Will this rule cause the reclamation of already abandoned mining sites in Wisconsin?

No. There is no requirement or any funding to reclaim the previously abandoned sites. However, this does not mean that the rule will not have an effect in this area. Once the uniform reclamation standards are put into effect through a county ordinance, there should be no additional abandoned sites. Those sites that are operating in long-term locations or that reopen in the future may chose to reclaim past mined-out areas in order to fit in with the land use that is approved in the reclamation plan. Once people see the results, it may create incentive to voluntarily convert past abandoned sites into productive land uses.

What about "natural revegetation"? Is it true that these sites will simply "self-reclaim" if left alone?

No. Once mining has ceased the conditions for establishing vegetation are usually drastically different and more hostile than those found in the surrounding area. Only plants that can tolerate harsh conditions thrive in this environment. These conditions favor aggressive, generally undesirable, exotic plant species. Development of a mature plant community is delayed, thereby increasing the risk of site erosion and sedimentation impacts to surface waters. Plant diversity and overall site productivity suffer and the site's ability to support a productive and stable post-mining land use is compromised, often permanently.

Is there flexibility regarding the manner in which financial assurance is assigned by a nonmetallic mining reclamation program?

There is some flexibility in the method an operator may choose for guaranteeing financial assurance. Some flexibility may be lost in order to ensure that the regulatory authority has access to the funds necessary to perform site reclamation in the event of default on the part of the operator. It is important to understand the relationship between the approved reclamation plan and the financial assurance requirement. This is an area where the operator can, through good planning, minimize the costs of financial assurance.

The plan should keep the number of unreclaimed acres to a minimum, at any point in time. This can be accomplished by not mining areas until necessary and by promptly reclaiming areas no longer necessary for the operation. The less acreage affected by mining the less financial assurance is required.

What is the connection between post-mining land use and the reclamation plan?

A proposed post-mining land use is the key to determining the type and degree of reclamation needed to correspond with the proposed land use. The purpose of the reclamation plan is to achieve acceptable final site reclamation and a desired land use in compliance with the uniform reclamation standards. By working with local officials, and through good communications with all affected parties, a mutually satisfactory result may be obtained.

A complex reclamation plan might call for a post-mining land use combining a park with native prairie (passive recreation, education) along with a golf course community on a lake interfacing with

a park and wetlands. All these land uses could be connected by a trail system. On the other hand, a simple plan could be a lake or pond with some basic agricultural pasture grasses on the shore or could end up being similar to the reclamation typical of a DOT highway right-of-way project.

What hidden land use opportunities may exist?

Look for opportunities to connect with the Smart Growth planning process. A comprehensive plan including consideration of natural resource management is now required by law. Long term considerations such as how the reclaimed property fits into the broader picture could yield connections to planned or existing trails, recreational areas, wildlife management areas or perhaps wildlife migration corridors. This is especially true if rivers, floodplains or wetland complexes are in or adjacent to the mining site. Check into possible incentive that may be available to assist in furthering such opportunities such as tax breaks that might come with a conservation easement or perhaps a grant. In any case, participation with the broader community will promote good will and a more positive public image.

Why might the period of time necessary to show success of native prairie vegetation for wildlife habitat/passive recreation be longer than other uses, such as a pasture?

Because native prairie vegetation takes longer to become established it would be expected to take longer to demonstrate revegetation success. This is because native species often need a full growing season or two to establish their root systems, requiring more time before the appearance of obviously healthy plants.

However, natives provide other benefits that reward patient operators. The long-term nature of a prairie community, once established, is expected to provide a self-sustaining low maintenance condition. Prairie plantings of native species can result in an aesthetically pleasing array of colors and textures, which provide excellent erosion buffers and cover for native wildlife.

APPENDIX K

UNIFORM STATEWIDE RECLAMATION STANDARDS REQUIRED IN CH. NR 135

Refuse and Other Solid Wastes: Nonmetallic mining refuse shall be reused in accordance with a reclamation plan. Other solid wastes shall be disposed of in accordance with applicable state and local regulations

Area Disturbed and Contemporaneous Reclamation: Nonmetallic mining reclamation shall be conducted, to the extent practicable, to minimize the area disturbed by mining and to provide for reclamation of portions of the mining site while mining continues on other portions of the property.

Public Health, Safety and Welfare: All nonmetallic mining sites shall be reclaimed in a manner that will comply with federal, state and local regulations governing public health, safety and welfare.

Habitat Restoration: When the land use required by the reclamation plan approved pursuant to an applicable reclamation ordinance requires plant, fish or wildlife habitat, it shall be restored to the extent practicable, to a condition at least as suitable as that which existed before the lands were affected by mining operations.

Compliance With Environmental Regulations: Reclamation of mining sites shall comply with any other applicable federal, state and local laws including those related to environmental protection, zoning and land use control.

Surface Water and Wetlands Protection: Reclamation shall be conducted and completed in a manner that assures compliance with water quality standards for surface waters and wetlands contained in Chs. NR 102 through 105. Before disturbing the surface of a nonmetallic mining site and removing topsoil, all necessary measures for diversion and drainage of runoff from the site to prevent pollution of waters of the state shall be installed in accordance with the reclamation plans approved pursuant to an applicable reclamation ordinance. Diverted or channelized runoff resulting from reclamation may not adversely affect neighboring properties.

Groundwater Protection: (1) *Groundwater quantity* - a mining site shall be reclaimed in a manner that does not cause a permanent lowering of the water table that results in adverse effects on surface waters or a significant reduction in the quantity of groundwater reasonably available for future users of groundwater. (2) *Groundwater quality* - mining reclamation shall be conducted in a manner which does not cause groundwater quality standards in Ch. NR 140 to be exceeded at a point of standards application.

Topsoil Management: (1) *Removal* - topsoil and topsoil substitute material shall be removed, protected and redistributed to support reclamation and site stabilization. Topsoil shall be managed as specified in the reclamation plan in order to achieve reclamation to the approved post-mining land use. Topsoil and topsoil substitute material removal shall be performed, as required by the reclamation plan, prior to any mining activity associated with any specific stage of the mining operation. (2) *Volume* - the operator shall obtain the volume of soil required to

perform final reclamation by removal of on-site topsoil or topsoil substitute material or by obtaining topsoil or substitute material as needed to make up the volume of topsoil as specified in the reclamation plan. (3) *Storage* - Once removed, topsoil or topsoil substitute material shall, as required by the reclamation plan, either be used in contemporaneous reclamation or stored in an environmentally acceptable manner. The location of stockpiled topsoil or topsoil substitute material shall be chosen to protect the material from erosion or further disturbance or contamination. Runoff water shall be diverted around all locations in which topsoil or topsoil substitute material is stockpiled.

Final Grading and Slopes: (1) All areas affected by mining shall be graded in accordance with the approved reclamation plan to achieve a stable and safe condition consistent with the post-mining land use. The reclamation plan may designate areas such as stable slopes and rock faces that do not require final grading. (2) Final reclaimed slopes covered by topsoil or topsoil substitute material may not be steeper than a 3:1 horizontal to vertical incline, unless alternative requirements are approved under s. NR 135.26, and stable slopes can be demonstrated based on site-specific engineering analysis. The engineering analysis shall show that a minimum acceptable slope stability factor is attainable at a steeper slope and that the post-mining land use specified in the reclamation plan is not adversely affected. When the slope occurs at the edge of a body of water, this approved slope shall extend vertically 6 feet below the lowest seasonal water level. A slope no steeper than 3:1 shall be created at a designated location or locations, depending on the size of the water body to allow for a safe exit. 3) All areas in the nonmetallic mining site where topsoil or topsoil substitute material is to be reapplied shall be graded or otherwise prepared prior to topsoil or topsoil substitute material redistribution to provide the optimum adherence between the topsoil or topsoil substitute material and the underlying material.

Topsoil Redistribution for Reclamation: Topsoil or topsoil substitute material shall be redistributed in accordance with the approved reclamation plan in a manner which minimizes compaction and prevents erosion. Topsoil or topsoil substitute material shall be uniformly redistributed except where uniform redistribution is undesirable or impractical. Topsoil or topsoil substitute material redistribution may not be performed during or immediately after a precipitation event until the soils have sufficiently dried.

Revegetation and Site Stabilization: Except for permanent roads or similar surfaces identified in the reclamation plan, all surfaces affected by nonmetallic mining shall be reclaimed and stabilized by revegetation or other means. Revegetation and site stabilization shall be in accordance with the approved reclamation plan and shall be performed as soon as practicable after mining activity has permanently ceased in any part of the mining site.

Assessing Completion of Successful Reclamation: The criteria for assessing when reclamation is complete and, therefore, when the financial assurance may be released shall be specified in the reclamation plan. Criteria to evaluate reclamation success shall be quantifiable. See Ch. NR 135.13(2) through (5) for more specific criteria.

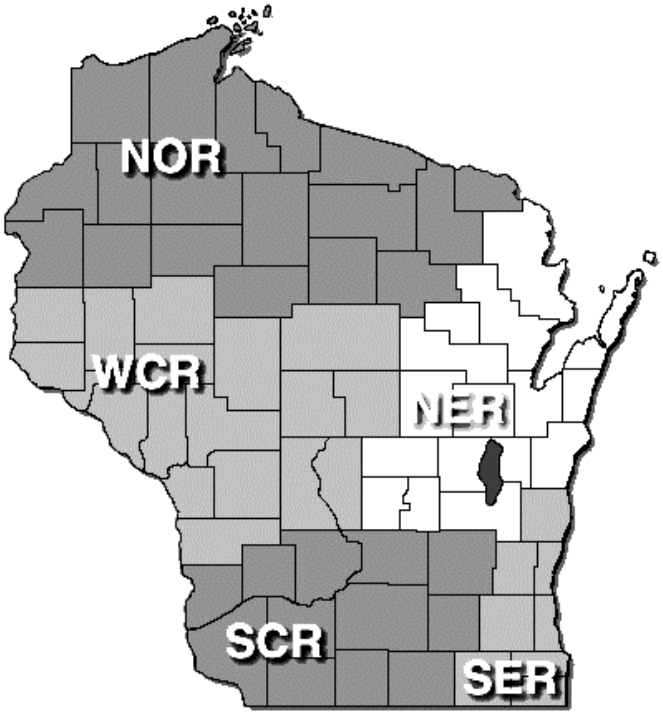
Intermittent Mining: Intermittent mining may be conducted provided that the possibility of intermittent cessation of operations is addressed in an operator's reclamation permit, no environmental pollution or erosion of sediments is occurring, and financial assurance for reclamation pursuant to s. NR 135.40 is maintained covering all remaining portions of the site

that have been affected by nonmetallic mining and that have not been reclaimed.

Maintenance: During site reclamation, after the operator has stated that reclamation is complete but prior to release of financial assurance, the operator shall perform any maintenance necessary. This includes measures to prevent erosion, sedimentation or environmental pollution, comply with the standards of this Subchapter, or to meet the goals specified in the reclamation plan.

APPENDIX L

LIST OF DNR CONTACTS



Central Office	Northeast Region
Tom Portle 101 S. Webster Street P.O. Box 7921 Madison, WI 53707 (608) 267-0877 PortlT@dnr.state.wi.us	**Dave Misterek** DNR - Oshkosh Service Center 625 E. County Road Y, Suite 700 Oshkosh, WI 54901 (920) 424-2104 MisteD@dnr.state.wi.us

Northern Region	Northern Region
Dave Kunelius DNR 107 Sutliff Avenue Rhinelander, WI 54501 (715) 365-8924 KunelD@dnr.state.wi.us	**Dave Kafura** DNR 810 W. Maple Street Spooner, WI 54801 (715) 635-4065 KafurD@dnr.state.wi.us

South Central Region Grant, Iowa, Sauk, Crawford, Richland, Lafayette **James Bakken** DNR 1500 N. Johns Street Dodgeville, WI 53533 (608) 935-1924 bakkej@dnr.state.wi.us	**South Central Region** Colombia, Dodge, Jefferson **David Edwards** DNR N. 7725 Hwy. 28 Horicon, WI 55032 (920) 387-7870 edward@dnr.state.wi.us

South Central Region Rock, Green **Cynde English** DNR 3911 Fish Hatchery Road Fitchburg, WI 53711 (608) 275-3240 EngliC@dnr.state.wi.us	**South Central Region** Dane **Jessica Maloney** DNR 3911 Fish Hatchery Road Fitchburg, WI 53711 (608) 275-3298 MalonJ@dnr.state.wi.us

Southeast Region **Phil Fauble** DNR 101 S. Webster Street Madison, WI 53707 (608) 267-3538 FaublP@dnr.state.wi.us	**West Central Region** **Deb Pingel** DNR-Wausau Area Office 5301 Rib Mountain Drive Wausau, WI 54401 (715) 359-4531 PingeD@dnr.state.wi.us