Non-Metallic Mining Reclamation Plan

DS Mine

Town of Cooks Valley, Chippewa County, Wisconsin

SEH No. EOGRE 113677

August 22, 2011

SEHDesign|Build, Inc.
An alternative delivery company.

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RE: DS Mine
Non-Metallic Mining Reclamation Plan
Town of Cooks Valley, Chippewa County, Wisconsin
SEH No. EOGRE 113677

Mr. Dan Masterpole
Department of Land Conservation & Forest Management
711 N Bridge Street
Chippewa Falls, WI 54729

Dear Mr. Masterpole:

On behalf of Dennis Schindler and EOG Resources, Inc., SEH Design|Build, Inc. is resubmitting the application for Non-Metallic Mining Permit supported by the enclosed document entitled "Non-Metallic Mining Reclamation Plan" – EOG Resources, Inc., Town of Cooks Valley, Chippewa County, Wisconsin dated August 12, 2011. This reclamation plan applies to an approximate 234-acre proposed non-metallic mine project. The parcel is located in Sections 29, 30, and 31; Township 30 North; Range 10 West; Town of Cooks Valley, approximately seven (7) miles southwest of Bloomer, Wisconsin.

Enclosed is a memorandum in response to Chippewa County's "Reclamation Review Comments" dated July 22, 2011.

This Site Reclamation Plan has been prepared in accordance Wisconsin Statute Chapter 295, Wisconsin Administrative Code Chapter NR135, and Chippewa County Ordinance Chapter 30, Article II. EOG Resources, Inc. requests that Chippewa County conduct a preliminary review for completeness within 15 calendar days and issue a public notice in accordance with NR 135.20.

If you have any questions pertaining to the contents of the attached Reclamation Plan, please contact me at 715.720.6212.

Sincerely,

Mike Swoboda, PE
Project Manager

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Non-Metallic Mining Reclamation Plan

DS Mine
Town of Cooks Valley, Chippewa County, Wisconsin

Prepared for:
EOG Resources Inc.
Chippewa Falls, Wisconsin

Prepared by:
Short Elliott Hendrickson Inc.
421 Frenette Drive
Chippewa Falls, WI 54729-3374
715.720.6200

Certification Page

I hereby certify that this reclamation plan was prepared by me, or under my direct supervision, in accordance with Wisconsin Statute Chapter 295, Wisconsin Administrative Code Chapter NR135, and Chippewa County Ordinance Chapter 30, Article II.

Shanna Skallet, MNCWD — Date
Scientist

Mike Swoboda, PE — 29350 PE Number — Date
Project Manager

Certification of Reclamation Plan

I, as the operator and lessee of the property described herein, do hereby certify that I have reviewed the reclamation plan, concur with its provisions, agree to permit its implementation, and certify that reclamation will be carried out in accordance with this reclamation plan.

Tim Stauffer — Date
EOG Resources, Inc.
Regional Operations Manager

I, as the owner of the property described herein, do hereby certify that I have reviewed the reclamation plan, concur with its provisions and will allow its implementation.

Dennis Schindler — Date
Property Owner

Distribution List

No. of Copies	Sent to
2	Mr. Dan Masterpole Department of Land Conservation & Forest Management 711 N Bridge Street Chippewa Falls, WI 54729 dmasterpole@co.chippewa.wi.us
4	Mr. Tim Stauffer EOG Resources Inc. 619 Bridge Street, Suite 101 Chippewa Falls, WI 54729
1	Mr. Dennis Schindler 3182 County Highway A Bloomer, WI 54724

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Non-Metallic Mining Reclamation Plan

DS Mine

Prepared for EOG Resources Inc.

1.0 Introduction

This Non-Metallic Mining Reclamation Plan has been prepared for the proposed DS Mine located in the Town of Cooks Valley, Wisconsin. This reclamation plan has been prepared by SEH Design|Build, Inc. for EOG Resources, Inc. in accordance with Wisconsin Statute Chapter 295, Wisconsin Administrative Code Chapter NR135, and Chippewa County Ordinance Chapter 30, Article II.

2.0 Site Information

2.1 Project Description

The Operator proposes to extract sandstones from the Cambrian-age Wonewoc Formation at the proposed DS Mine site for use as a proppant in petroleum frac wells. The loose sandstone will be mined to the extent practical using earthmoving equipment, which may include but not limited to excavators, dozers, front end loaders, conveyors, and trucks. Processing activities at the site will include excavation, crushing, screening, and stockpiling. The excavated material will be stockpiled onsite then transported to an off-site plant. The Nonmetallic Mining Reclamation Permit Application for Chippewa County is included in Appendix A, "Nonmetallic Mining Reclamation Permit Application New and Reopened Mines".

The proposed project site is located in the SW ¼ of Section 29; the NE ¼ of the SE ¼ and the SE ¼ of the SE ¼ of Section 30; and the NE ¼ of the NE ¼ of Section 31, T30N, R10W, in the Town of Cooks Valley, Chippewa County, Wisconsin (Appendix B-1, "Site Location Map"). The site consists of approximately 234 acres of agricultural and forested land. The proposed project location does not include any previously mine areas.

2.2 Site Description

The Parcel ID numbers for the project area are listed below. Figure 1, "Initial Site Plan" shows the overall property boundaries.

- 23010-2931-00000000
  - 40 acres zoned agriculture located in the NE ¼ of the SW ¼, Section 29
- 23010-2932-00000000
  - 40 acres zone agriculture located in the NW ¼ of the SW ¼, Section 29
- 23010-2933-00020000
  - 36 acres zoned agriculture located in the SW ¼ of the SW ¼, Section 29

- 23010-2934-00000000
  - 40 acres zoned agriculture located in the SE ¼ of the SW ¼, Section 29
- 23010-3041-00210000
  - 20 acres zone agriculture located in the NE ¼ of the SE ¼, Section 30
- 23010-3044-00210000
  - 7 acres zoned agricultural forest and 13 acres zoned agriculture located in the SE ¼ of the SE ¼, Section 30
- 23010-3111-00000000
  - 28 acres zoned agricultural forest and 10 acres zoned agriculture located in the NE ¼ of the NE ¼, Section 31

2.2.1 Operator

The property for the proposed DS Mine is owned by Dennis Schindler. The proposed DS Mine will be operated by EOG Resources, Inc. A copy of the lease is found in Appendix C, "EOG Resources, Inc. Lease of the Dennis Schindler Property".

Operator Contact:
Tim Stauffer
Regional Operations Manager
EOG Resources, Inc.
619 Bridge Street, Suite 101
Chippewa Falls, WI 54729

Landowner Contact:
Dennis Schindler
3182 County Highway A
Bloomer, WI 54724-3951

The operator will certify that a lease is in effect for the upcoming year in the Annual Reclamation Report & Activities Plan.

2.2.2 Surrounding Property Information

The properties surrounding the project location include residential, agricultural, and forested land. Figure 1, "Initial Site Plan" shows the parcel boundaries. Names and addresses of property owners within 660 feet of project site are as follows (according to Chippewa County tax records):

Allen J. Swartz
14261 County Highway A
Colfax, WI 54730

Nancy J. Schindler
1711 150th Avenue
Colfax WI, 54730

Joseph A. & Beth M. Stange
2929 Wellington Drive East
Eau Claire, WI 54703

Loran B. Zwiefelhofer
14411 County Highway DD
Bloomer, WI 54724

Louis W. Jr. & Jane M. Sonnentag
13522 County Highway DD
Bloomer, WI 54724

LA Property Acquisitions, LLC
14411 County Highway DD
Bloomer, WI 54724

Thomas J. & Karen M. Schindler
2473 148th Avenue
Bloomer, WI 54724

Gloria Hable
7670 160th Avenue
Bloomer, WI 54724

William J. Schindler, III
15204 County Highway DD
Bloomer, WI 54724

David Wogernese
PO Box 165
Eau Claire, WI 54702

Kim & Mandy Knutson
14627 20th Street
Colfax, WI 54730

Scott J. & Donna Johnson
1892 135th Avenue
Colfax, WI 54730

2.2.3 Location of Manmade Features

The Schindler residence and the Cooks Valley Processing facility are located on the proposed project property; see Figure 1, "Initial Site Plan". Several nonresidential buildings associated with Cooks Valley Processing facility and agricultural use are located near the center of the site in the southwest quadrant. The Dennis Schindler residence is located southwest corner of the proposed project property. Site utilities include private wells for water supply, private on-site waste water treatment systems and overhead power lines and buried communication utilities supplied to the site along 20th Street and the private drive. The general locations of utilities present at the site are shown on Figure 1, "Initial Site Plan".

A private unpaved road extends northwest from the termination of 20th Street at the southern most boundary of the Denny Schindler property. Driveways to the Denny Schindler and Knutson residences branch off of this road.

3.0 Geologic Composition and Depth of Mineral Deposit

The geology of the proposed project location consists of Cambrian-age sedimentary rocks that overlie Paleoproterozoic volcanic and intrusive rocks. The geology encountered in soil borings advanced throughout the project site includes the Tunnel City Group, the Wonewoc Formation, and the Eau Claire Formation.

The mineral deposit of interest at the proposed DS Mine site is the Wonewoc Formation, a fine to coarse-grained sandstone (Mossler 2008). The Wonewoc Formation is the host of the frac sand deposits of interest, which consist of fine to coarse-grained, moderately to well sorted, quartzose sandstone. Boring information shows that the approximate elevation of the top of the Wonewoc Formation is 1167 feet MSL. The floor of the deposit is estimated to be at approximately 1105 feet MSL. An illustrative cross section of the proposed DS Mine site geology is shown in Appendix E-2, "Geologic Site Cross Section".

The Wonewoc Formation is overlain by the Tunnel City Group which is mainly comprised of the Lone Rock Formation, a very fine to medium-grained, non-glauconitic to slightly glauconitic and dolomitic sandstone (Mossler 2008). The Wonewoc Formation is underlain by the Eau Claire Formation, a fine-grained, thin-bedded siliciclastic unit, composed mainly of very fine to fine-grained sandstone, siltstone, and shale. The Tunnel City Group will make up the majority of the overburden. There is little or no subsoil between the Tunnel City and B-Horizon.

3.1 Distribution, Thickness, and Type of Topsoil

The USDA Natural Resources Conservation Service (NRCS) soil survey data for Chippewa County shows the proposed project boundary to include nine (9) soil series with varying slopes. See Appendix D-1, "Chippewa County Soil Survey Map" and Appendix D-2. "Chippewa County Soil Survey Data Table" for topsoil and B-horizon locations and

thicknesses. The topsoil thickness ranges from two (2) to nine (9) inches with an average of seven (7) inches and the B-horizon thickness ranges from zero (0) to 35 inches with an average of 20 inches.

3.2 Groundwater Information

The local groundwater elevations are shown on Appendix E-1, "Groundwater Contours Map" and the corresponding cross section, Appendix E-2, "Geologic Site Cross Section". Groundwater contours were developed for the site and surrounding area using information from the following resources:

- Wisconsin Department of Natural Resources (WDNR) Bureau of Drinking Water and Groundwater records
- Wisconsin Geological and Natural History records
- Water table information from the Tetra Tech Log of Exploratory Borings for borings within the project area
- Water level measurements of the supply wells at the Schindler and Knutson residences.

The local well log information and the Tetra Tech soil boring logs used to create the groundwater contours are included in Appendix E-3, "Local Well Logs" and Appendix E-4, "On-site Soil Boring Logs", respectively.

According to the Wisconsin Geological and Natural History Survey, the proposed project site is located in major hydrologic groundwater unit No. 7, the West Central Drift-Paleozoic, which includes sandstone aquifers overlain by Pleistocene deposits, which contain water-bearing sand and gravel primarily in bedrock valleys (Zaporozec and Cotter, 1985).

Based on the available data, the elevation of the groundwater on the project property follows topography moving from upland to lowland areas across the site between elevations of 1100 and 1075 feet mean sea level (MSL) in the north portion of the property and between 1085 and 1015 feet MSL in the south portion of the property.

4.0 Surface Waters and Site Drainage

4.1 Location of Surface Waters

The proposed project area is located within the Pine Creek and Red Cedar River Watershed. There are no surface waters in the area of the proposed mining operation. There are six (6) creeks surrounding the project area, five (5) unnamed and a section of Running Valley Creek. The creeks are shown on Appendix F-1, "Site and Surrounding Features Map". All six (6) creeks are classified as intermittent and drain either south or west to the Running Valley Creek or east to the South Fork Trout Creek, respectively. South Fork Trout Creek drains north to Trout Creek. Both Running Valley Creek and Trout Creek are classified by the WDNR as Class II Trout Streams and ultimately discharge to the Red Cedar River.

4.2 Existing Topography and Drainage Patterns

Existing site topography is shown on Figure 1, "Initial Site Plan". The local surface waters drainage basin are shown in Appendix F-1, "Site and Surrounding Features Map". None of the creeks receiving drainage from the property are classified as impaired or special waters.

5.0 Biological Information

The proposed project area is located on the northern edge of the Western Coulee and Ridges Ecological Landscape which is characterized by a relatively extensive forested landscape (WDNR, 2006). This ecological landscape is currently a mix of forest, agriculture, and

grassland with some wetlands in the river valleys. The forests are primarily dominated by oak species, shagbark hickory, sugar maple, basswood, and red maple. Some bottomland hardwoods exist in the valley bottoms of major rivers and are dominated by silver maple, ashes, elms, cottonwood, and red maple.

The proposed project area includes open grassland areas and cattle pastures surrounded by wooded habitat (SEH, 2010). The wooded habitat is primarily a mixture of mostly mature deciduous species. There was no evidence of logging or recent use of the wooded areas for grazing cattle except for a small portion in the north-central portion of the site. Appendix G-1, "Observed Plant Species at Proposed Site" includes a list of plant species noted at the site during the field review on October 12, 2010.

The WDNR has listed several animal species according to their probability of occurring in the Western Coulee and Ridges Ecological Landscape. See Appendix G-2, "Species Occurring in the Western Coulee and Ridges Ecological Landscape" for a list of these species. Mr. Jim Devlin of WDNR has screened the area for endangered and threatened species and potential sites of archaeological significance. None were found.

5.1 Wetlands

A field review to determine the presence of wetlands was completed on October 12, 2010. No wetlands were found within the project area. A copy of the SEH Technical Memorandum – Wetland Delineation Report is included as Appendix G-3, "SEH Technical Memorandum Wetland Delineation Report, October 27, 2010". Wetlands located in the surrounding properties were not delineated, but are shown on the Wisconsin Wetland Inventory map included as Appendix C of the attached SEH Technical Memorandum.

6.0 Areal Extent and Site Operations Plan

The Areal Extent of the project is shown in Figure 2, "Site Operations Plan". Operation of the proposed mine site will include the removal of topsoil and B-horizon and the blasting and removal of overburden and sand resource. The overburden, topsoil, and B-horizon will be stockpiled on-site for later use during reclamation. Appendix H, "Sand Resource Quantity Estimation", shows the estimated quantity of material that will be removed from the proposed DS Mine site for processing. The Areas A-0 through A-8, showed on Figure 2, "Site Operations Plan", represent conceptual boundaries that subdivide the proposed mine. Actual boundary lines may vary. The proposed foreseeable order of work is found in the Initial Sequence Table of Appendix I, "Water Quality Plan".

On-site Processing

The sand resource will be conveyed, sorted, selectively crushed to a manageable size, temporarily stockpiled, and then loaded on over-the-road trucks for transport for subsequent processing.

Vision Screening Methods

The project is not located within direct view of a navigable water or public roadway. The area surrounding the site is forested. No screening berms or vegetation will be installed as no berms along the nearby public roads are necessary to screen the site due to the surrounding topography of the proposed project site.

Overburden Stockpile Construction Methods

Overburden is primarily composed of the highly consolidated Tunnel City Group. Generally speaking, the Tunnel City Group is the stratigraphic interval lying above the Wonewoc

Formation in Chippewa County, and is estimated at approximately 100 to 150 feet in maximum thickness. The Lone Rock Formation of the Tunnel City Group is recognized in outcrop at Colfax, Wisconsin. Well cemented, iron rich, fine-grained sandstones, shale and glauconitic sandstones are the primary Tunnel City rock types encountered. The well-cemented Tunnel City bedrock is frequently termed "ledge-rock" locally and has been quarried at some localities in the past.

- It is expected that the relatively durable rock will be blasted into large fragments falling in the general category of common rip rap size. The material is not friable. Loading, handling, and final positioning will have minimal affect on size. The material will tend to be angular which will provide interlocking friction in the point to point contacts of individual pieces of rock and contribute to greater overall stability.
- Stockpiles will be constructed from the blasted Tunnel City ledge rock and the processing plant byproduct fine material further described in Section 6.5. The fines haulback materials will be mixed into the overburden at roughly a 1:6 ratio. Material will be spread in horizontal lifts as it is delivered. It is expected that the nature of the fines from the plant will be create a matrix of nonhomogeneous material. The fines will be incorporated into the voids of the Tunnel City rock in random patterns across the lift. It will not be placed as a segregated lift or deposit.

Stockpile S-1 may reach an elevation of approximately 1200, which is approximately 80-100 feet above the nearby valley floor, while matching and blending into the existing elevations part way up the west ridge. S-1 may contain approximately 450,000 cubic yards of overburden material. The majority of S-1 will remain in place as part of final reclamation.

Stockpile S-2 may reach an elevation of 1300-1340. The footprint of S-2 will be divided into separate areas for stockpiling of topsoil, B-Horizon, and other overburden soils. Based on differences in existing topography, this means a fill varying anywhere from 30 to 150 feet above existing ground. Volume of S-2 will vary during the life of the mine, and may contain up to approximately 2.5 million cubic yards of overburden material. Material from S-2 will be placed back in the excavated mine as part of final reclamation fill when mining operations begin to encroach on areas A-7 and A-8.

Stockpile S-3 will originate from the mined-out floor and reach an elevation of approximately 1330, where the height will be roughly 220+ feet above the mine floor, or 70 to 120 feet above the adjacent remaining existing ground at the mining limits. Volume of S-3 will vary during the life of the mine, and may contain up to approximately 10 million cubic yards of overburden material, much of which will remain in place as reclamation fill in the mine pit. Size, shape, volume, exact location, and staging of overburden stockpiles will vary during mining depending on methods and rate of sand product extraction.

6.1 Groundwater Monitoring

In alignment with Department of Land Conservation & Forest Management Guidance to supplement the current groundwater elevation information, EOG proposes to install three (3) groundwater elevation monitoring wells prior to the commencement of mining at the site. The wells will be installed in permanent areas outside the area to be actively mined to allow for continued monitoring of the groundwater table throughout the life of the mine. Groundwater elevations will be recorded monthly for the first year of operation and quarterly thereafter per County request. The groundwater contours shown on Appendix E-1, "Groundwater Contours Map", will be updated with the data gathered from the groundwater monitoring wells and will be included in the Annual Reclamation Report and Activities Plan.

It is intended to not dewater the regional water table. The floor of the mine is expected to be above the regional water table. Fluctuations of the regional water table are expected and during seasonal increases in precipitation the water table may approach the mine floor. If this occurs some ground water may be routed (via surface drainage) around working areas to keep the quarry floor dry. Water will be routed to existing sediment basins or the process water pond where the water will infiltrate to groundwater and/or be discharged from the site. If any water from the dewatering operation is routed to a sediment basin the size of the sediment basin will be adjusted to account for the increase in flow. Channel stability will be addressed to prevent potential erosion associated with increased soil wetness. Because of water management issues, efforts to stay above the water table will be made.

Best management practices contained in the site's Storm Water Pollution Prevention Plan (SWPPP) and Spill Prevention Control and Countermeasure Plan (SPCC) will be utilized to protect the groundwater.

6.2 Areas A-0 through A-2: Mine Development and Opening

Mine development, including initial site infrastructure and storm water management BMP construction, is proposed to commence in the fall of 2011 or as soon as all applicable permits are obtained. Mine development will begin with the installation of storm water Basin B-1.0, located in Area A-0 (See Figure 2, "Site Operations Plan") and Appendix I, "Water Quality Plan" Figure I - 1.4. Diversions will direct clean water downstream of Basin 1.0. Storm water structure BMP's are discussed in further detail in Appendix I, "Water Quality Plan". A site access road will be installed to provide paved site access from 20th Street. The access road will be designed to accommodate over-the-road trucks while continuing to provide existing access.

Area A-1 will be graded to create a transfer/processing pad. Material will be handled and stockpiled. This area will provide a location for temporary stockpiling of sand resource that will be shipped off-site, and for the fines material that will be returned after off-site processing. The overburden material excavated from Area A-1 will be placed in permanent Stockpile S-1 located in Area A-0.

Area A-2 will be developed concurrently with Area A-1. Mining will transition to the bottom of the sand resource. Overburden removed from Area A-2 will be placed in Stockpile S-1 or S-2. Topsoil and B-horizon material will be placed in segregated areas of Stockpile S-2. Some quality sand resource may be encountered during the mine development; this material may be processed and hauled off-site.

6.3 Areas A-3 through A-8

Areas A-3 through A-8 will be mined in their approximate corresponding sequential order. Figure 2, "Site Operations Plan" shows the proposed mining areas. Topsoil, B-horizon, and overburden will be placed in segregated areas of Stockpile S-2 until the available area is exhausted. Once Stockpile S-2 can no longer accept additional material, the overburden material will be stockpiled at Stockpiled S-3 on the floor of the mine. Internal Stockpile S-3 is shown on Figure 2, "Site Operations Plan". As mining progresses into Areas A-7 and A-8, the material stockpiles in Stockpile S-2 will be moved to the internal Stockpile S-3 topsoil and B-horizon will remain segregated. Storm water basins, diversions, and other BMP's will be installed in a watershed-based progression in advance of the disturbance for new mining. As the active mine footprint increases, an infiltration basin will be installed in the northeast corner of the mine property to manage the process water pumped from the active mine areas.

Storm water and process water basins are described in more detail in Appendix I, "Water Quality Plan".

6.4 Storm Water Management and Erosion Control

Storm water management, temporary erosion control, and process water due to pumping are part of the Water Quality Plan found in Appendix I, "Water Quality Plan". Generally the site is managed by the existing drainage basin areas as found on Appendix I, "Water Quality Plan" Figure I-1.1. All areas requiring tree removal will be logged prior to advancement of mining operations in a separate operation under the control of the property owner. Before mining takes place within the watershed, the receiving area offsite is protected by the construction of a sediment basin at the property boundary. Diversions are installed to route contaminated runoff to the sediment basin. Other diversions will divert clean water around the sediment basins.

Water accumulating in the mine depression may require pumping. This process water will be stored in Basin 8.0 for infiltration to groundwater and will be protected from direct run-off accumulation by a diversion. The capacity of the basin will exceed back to back 10-year runoff events for the largest expected combination of open mine and in-mine stockpiles.

Temporary erosion control measures employed at the proposed project site include:

- Mine roads within the site for BMP construction and material handling will employ water bars, silt fence, and lined channels as necessary.
- Temporary erosion control measures will follow the standards of the WDNR may include:
  - Silt fence at road perimeters and sediment basin berms, when it can be placed on the contour.
  - Seed and mulch on sediment basin berms, diversions, channels, and mine perimeter strip faces.
  - Erosion mat in concentrated flow channels and extended-length soil covered slopes.
  - Rock armoring on stockpiles, ditch checks, and channel liners.
  - Stone Tracking Pads at the site access point.
  - Dewatering of in-mine water accumulations due to perched water and precipitation run-off.
  - Other methods as necessary.

Appendix I, "Water Quality Plan" provides maps, plan sheets, calculations, and a detailed discussion regarding storm water and erosion control management. An engineering analysis was conducted to determine the feasibility of the storm water BMP's used in the opening and early stages of mining and stockpile development. Future stages will include the design of BMP's that may follow the general strategy used in this initial phase.

6.5 Temporary Erosion Control Vegetation Plan

Where disturbed areas require vegetation and are not at final reclamation grade, a temporary stabilization seed mix will be used to provide erosion control. Seeding with the temporary stabilization seed mix will occur during the growing season. A nurse crop may be necessary where seeding must be performed outside of the normal growing season. Annual Ryegrass or Winter Wheat will be used where fall or winter planting is necessary. The following table summarizes the proposed temporary stabilization seed mix, which is Wisconsin Department

of Transportation Seed Mix No. 20. Adjustments to the proposed seed mix may be necessary based on availability and site suitability.

Table 1
Temporary Stabilization Seed Mix (WisDOT Mix No.20)

Common Name	Scientific Name	Seed Composition
Kentucky Bluegrass	*Poa pratensis*	6%
Hard Fescue	*Festuca brevipila*	24%
Tall Fescue	*Schedonorus phoenix*	40%
Perennial Ryegrass	*Lolium perenne*	30%

Seeding will be performed using the best available methods for each disturbed area and will follow procedures described in Section 630 of the Wisconsin Department of Transportation Standard Specification for Highway and Structure Construction (2011 Edition) (WisDOT Standard Specifications). The seed will be spread at a rate of approximately 40 pounds per acre. After seeding, areas will be mulched using the best available methods and will follow procedures described in Section 627 of the WisDOT Standard Specifications. Applicable seeding and mulching standards are included in Appendix J, "WisDOT Standard Specifications for Highway and Structure Construction (2011 Edition)".

6.6 Fine Material Handling

Processing of mined materials will occur at an off-site plant facility. Material that does not meet particle size after processing at the off-site processing facility will be returned to the mine site for stockpiling and use in final reclamation.

Material being returned to the mine site is regulated under Ch. NR 500.08(2)(b), Wisconsin Administrative Code, which exempts facilities for the exclusive disposal of spoils from sand, gravel, or stone and crushed stone quarry operation and similar nonmetallic earth materials from all solid waste management requirements of Chs. 500 to 538, provided the waste fines are used in mine reclamation according an approved Non-Metallic Mining Reclamation Plan. The Wisconsin Department of Natural Resources concurrence letter is included as Appendix K, "Exemption for EOG Resources Sand Wash Fines, Chippewa Falls, WI, March 9, 2011".

Reject material from the Chippewa Falls Sand Plant is generated from four distinct processes: from the scalping screens (oversize), attrition scrubbers (clay fines), density separators (very fine sand), and mineral separators (dry sand dust via the dust collectors).

The wet materials are pumped to the water clarifier, where they settle with the aid of flocculants, and are discharged to belt presses for dewatering. The dewatered filter "cake" is then processed in a pug mill to be mixed with the dry fines from the dust collector.

The pug mill mixes the filter cake with screened coarse and fines reject as well as the dry fines to create a homogenous blend of reject materials which is then conveyed to bins for loading into trucks.

The blended reject material consists mainly of fine sands in the particle size range from 100 to 140 mesh, with small amounts of oversize up to 10 mesh, and small amounts passing the #200 mesh. The material contains a moisture content of approximately 18%, and demonstrates a very low degree of plasticity.

EOG intends to utilize the reject materials for reclamation by mixing the reject material with native overburden materials to form a stable fill material, and using the blended fill to backfill

mined-out areas and slopes. This process will be performed with conventional earthmoving equipment.

7.0 Post-Mining Land Use

The post-mining land use will be passive recreation used by the property owner.

8.0 Reclamation Measures

8.1 Final Grading and Slopes

Final reclamation will commence once mining is considered complete in a specific area by the operator. Final grading will be performed according to Figure 3, "Final Site Plan" and Figure 4, "Site Cross Sections". Stockpiled overburden, B-horizon, and topsoil will be used to meet final reclamation plan grades. All reclaimed slopes will be graded to 3:1 or flatter. The reclaimed landform will be a slight depression with an extension of the existing valley south of the proposed DS Mine site. Stumps from the site will be buried in the fill areas with a minimum of 10 feet clear between each. Once grading is complete topsoil will be installed according to methods described in Section 8.2.3. Seeding and mulching will be performed according to methods described in Section 8.4.

8.1.1 Safety

No highwalls will exist after the proposed project site is graded to the final reclamation grade shown in Figure 3, "Final Site Plan" and Figure 4, "Site Cross Sections". Once graded to final reclamation grade, the site will not pose any safety concerns associated with the mining process that took place at the proposed project site.

8.2 Topsoil & Storage

8.2.1 Topsoil Removal

Topsoil and B-horizon material will be removed, segregated, and stockpiled. Management of topsoil will follow methods described in Section 625 of the WisDOT Standard Specifications, included in Appendix J, "WisDOT Standard Specifications for Highway and Structure Construction (2011 Edition)".

All topsoil and B-horizon material will be stockpiled onsite. See Figure 2, "Site Operations Plan" for proposed stockpile locations. All stockpiles will be seeded and mulched according to Section 6.4.

8.2.2 Contemporaneous Use of Topsoil

Where practicable, the topsoil removed to prepare an area for the next phase of mining will be immediately redistributed to complete reclamation.

8.2.3 Topsoil Redistribution and Site Preparation

Topsoil redistribution and site preparation will follow methods described in Section 625 of the WisDOT Standard Specifications including as Appendix J-1. Seeding of all exposed areas will occur as described in Section 8.4. Soil compaction will be minimized to the extent practicable by limiting unnecessary traffic or tracked vehicles during and after the placement of the subsoil and topsoil layers.

As noted in section 3.1 topsoil and B-Horizon soil thicknesses have an average thickness across the site of 7 and 20 inches respectively. Every effort will be made to salvage and reuse the existing soils for reclamation. However, as this topsoil thickness is less than the 8 inches required under Part B of Appendix I. a waiver is requested. Some loss of material is unavoidable during handling and compaction is a potential during placement. Seed bed

preparation including the use of disc and/or harrow will loosen the soil and increase thickness. It may not be possible for the volume of salvaged topsoil to be placed such that it exceeds a thickness of 5 inches. All salvageable B-Horizon material will be placed in the reclaimed areas and a similar reduction in thickness is likely, with an expected thickness of 15-18 inches.

8.3 Structures

There will be no permanent mine facility buildings at the mine site. All mine roads, storm water BMP's, and safety berms will be graded as shown on Figure 3, "Final Site Plan" and Figure 4, "Site Cross Sections". The primary access road will remain after site closure to allow access to the site during future use and access to the surrounding residential properties.

8.4 Final Reclamation Vegetation Plan

After subsoil and topsoil reapplication, the seedbed will be prepared by discs, harrows or other equipment to obtain an even and loose seedbed. Seeding will occur during the growing season when soil conditions are suitable. Based on a passive recreational post-mining land use and the presence of sandy soils, a dry mesic prairie seed mix will be used for the final reclamation areas. The following table summarizes the proposed seed mix. Adjustments to the proposed seed mix may be necessary based on availability and may include additional native grass and wildflower species.

Table 2
Reclamation Seed Mix

Common Name	Scientific Name	Seed Composition
Grasses		90% to 95%
Big Bluestem	*Andropogon gerardii*	
Sideoats Grama	*Bouteloua curtipendula*	
Switchgrass	*Panicum virgatum*	
Little Bluestem	*Schizachyium scoparium*	
Indiangrass	*Sorghastrum nutans*	
Wildflowers & Legumes		5% to 10%
Purple Prairie Clover*	*Dalea purpurea*	
White Prairie Clover*	*Dalea candidum*	
Wild Bergamot	*Monarda fistulosa*	
Yellow Coneflower	*Ratibida pinnata*	
Note: *Legumes must be inoculated according to the seed provider's instructions prior to seeding.		

Disturbed areas will be seeded as soon as practicable. A nurse crop may be used to assist the establishment of the final reclamation seed mix. Annual Oats may be used when spring planting is possible and Annual Ryegrass or Winter Wheat may be used when fall or winter planting is necessary.

Seeding will be performed using the best available methods and will follow procedures described in Section 630 of the WisDOT Standard Specification. After spreading the seed at a rate of approximately seven (7) to eight (8) pounds per acre, the area will be lightly raked or dragged to cover the seed with approximately ¼ inch of soil. After seeding, areas will be mulched using the best available methods and will follow procedures described in Section 627 of the WisDOT Standard Specifications. Applicable seeding and mulching standards are included in Appendix J, "WisDOT Standard Specifications for Highway and Structure Construction (2011 Edition)".

8.5 Revegetation Standards

In order to determine successful revegetation for both temporary and final vegetation cover, reclaimed areas will be assessed for density of the perennial vegetative cover. Reclamation will be considered complete when "final stabilization" has been achieved, as defined in Wisconsin Code NR 216. This standard states that final stabilization is achieved when a "uniform perennial vegetative cover has been established with a density of at least 70% of the cover for unpaved areas and areas not covered by permanent structures."

8.6 Final Reclamation Erosion Control

Final reclamation grading will proceed according to methods described in Section 8.1. Perimeter storm water diversions and basins will remain in place during initial reclamation grading to allow for diversion of runoff from grading activities, but will be removed and graded according to Figure 3, "Final Site Plan" and Figure 4, "Site Cross Sections". Grading to final reclamation plan grades will begin at the toe of the slope at the mine floor. The horizontal lifts will be filled using overburden that will be broken down to ensure all voids are filled. A layer of fine sand material returned from the processing plant will be placed 12 to 18 inches thick as subsoil. B-horizon, topsoil seed and mulch will be placed as each 20 foot vertical stage reaches final grade. The maximum slope length of each stage will be 60 feet on the 3:1 slope between benches in accordance with Figure 4. Seeding and mulching will occur according to methods described in Section 8.4 and topsoil installation will be performed according to methods described in Section 8.2.3. Silt fence will be placed at each completed contour to prevent runoff from remaining disturbed areas causing deposition of sediment on the reclaimed areas. In the event of slope failures, failed seeding, or persistent erosion problems on reclaimed acreage, engineered BMP's will be assessed and applied where practicable. Engineered BMP's may include hydroseeding, silt fence, erosion control mats, turf reinforcement mats, water diversions, rock lined chutes, slope breaks, soils stabilizers, and inlet protection.

8.7 Interim Reclamation

The working face will remain open and unreclaimed until mining activities are complete. Stockpile S-1 will be a permanent feature that will be reclaimed contemporaneously during placement of overburden.

In-mine stockpiles and Basins will prevent most interim reclamation. However opportunities at the perimeter of the mine that are not subject to further disturbance and are below the final reclamation grade of approximate elevation 1210 will be permanently reclaimed after mining is complete and as in-mine Stockpile S-3 is constructed. Areas that drain off-site present this opportunity. When in-mine overburden stockpiles are constructed, the storm water basin will be filled in as overburden and fine material is placed. Fill along the outer slope up to the approximate final reclamation plan grade of elevation 1210 will be reclaimed using A and B horizon soils. Reclamation methods outlined elsewhere in this section will be followed. When standards are met the areas will qualify for the reduction of fees under NR 135.41.

8.8 Follow-up Inspections and Necessary Site Maintenance

During mine operation, all erosion control and storm water control structures will be inspected and maintained in accordance with Wisconsin Administrative Code NR 216. Inspections of the reclaimed areas will occur until each area meets the reclamation measures described in Section 8.0. A Reclamation and Construction Inspection Plan will be developed for the proposed DS Mine project. An example of the information to be included in this plan is included as Appendix L, "Reclamation and Construction Inspection Plan Example".

9.0 Criteria for Successful Reclamation

Compliance with reclamation measures described in Sections 8.1 through 8.8 shall be determined by on-site inspections by the regulatory authority, the LCFM, or its agent. Once reclaimed areas have achieved the reclamation measures described in Sections 8.1 through 8.8, the areas will be considered successfully reclaimed and no further reclamation activities shall be required. Reclamation of those areas will be considered complete after the LCFM inspects the area and signs the County Certification of Reclamation.

10.0 Final Site Actions

The safety berms, stockpiles, roads, and storage basins will be removed after mining is complete. The temporary sediment and infiltration pond will be removed per standard methods. All areas will be reclaimed using the procedures outlined in Section 8.0.

11.0 Financial Assurance

Financial assurance will be achieved through a bond by EOG prior to commencement of mining operations. A copy of an example bond form is included as Appendix M-1, "Financial Assurance Bond/Non-Metallic Mining Form for Chippewa County". The cost estimation for the proposed DS Mine project final reclamation is included as Appendix M-2, "Proposed Reclamation Cost Estimation Summary". The financial assurance is based on the acres disturbed and reclaimed at the proposed project site. The mine operator shall complete and submit an annual report in accordance with NR 135.36. The annual report information required by the LCFM is included in Appendix N, "Annual Reclamation Report and Activities Plan".

12.0 References

Mossler, J.H. 2008.Paleozoic Stratigraphic Nomenclature for Minnesota: Minnesota Geological Survey Report of Investigations. 79 pp. plus appendices.

Wisconsin Department of Natural Resources. Ecological Landscapes: North Central Forest Landscape. WDNR website. 8 Feb 2006. <http://dnr.wi.gov/landscapes/index.asp?mode=detail&Landscape=11>.

Zaporozec, A. and Cotter, R.D. 1985. Major Ground-water Units of Wisconsin: University of Wisconsin-Extension of Geological & Natural History Survey. 20 pp.

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