INDUSTRY APPLICATION OF THE FORESTRY RECLAMATION APPROACH

BEARWALLOW SURFACE MINE
Hurley, Va.
BEARWALLOW SURFACE MINE
1,055 ACRES
24 LANDOWNERS
PMLU’s-Unmanaged Forestry, Fish & Wildlife (Wetlands) & Industrial (Gas Wells/Pipelines)
Post-Mining Land Use(s)

- Numerous Landowners
- Lease Agreements
2005-2006 - Reclamation prior to gaining approval to implement Forestry Reclamation Approach
Planted 2006-Reclamation prior to gaining approval to implement Forestry Reclamation Approach
FRA Plan Submitted in 2006

9.4 REVEGETATION PLAN

- Narrative, 1 page.

Clintwood Elk horn agrees with, and hereby incorporates, the Appalachian Regional Reforestation Initiative (ARRI) goals. ARRI's goals are to communicate and encourage mine reforestation practices that:

1. Plant more high-value hardwood trees on reclaimed coal mine lands in Appalachia.
2. Increase the survival rate and growth rate of planted trees.
3. Expedite the establishment of forest habitat through natural succession.

These goals can be achieved when mines are reclaimed using the Forestry Reclamation Approach (FRA).

The FRA is a methodology for reclaiming coal mined land to forest under SMCRA. The FRA can be summarized in the following five (5) steps:

1. Create a suitable rooting medium for good tree growth that is no less than 4 feet deep and comprised of topsoil, weathered sandstone or the best available material.
2. Loosely grade the topsoil or topsoil substitute established in step one to create a non-compact ed growth medium.
3. Use ground covers that are compatible with growing trees.
4. Plant two types of trees - early successional species for wildlife and soil stability and commercially valuable crop trees.
5. Use proper tree planting techniques.

The FRA technique described above has been confirmed by forestry research.

References:

Disturbed areas will be seeded within 30 days after final grading during normal planting periods. Backfilled areas prepared for seeding during adverse climatic conditions will be seeded with an appropriate temporary cover until permanent cover can be established.

Seeding dates are from February 15th to May 15th, and after a good rain in August until October 15th. The optimum planting period for planting permanent grasses is from early March to mid-May. From early May to mid-September, forstal millet will be substituted for annual rye grass. The described seeding mixture will also be used to protect any stockpiled soil material.

**Unmanaged Forest Areas**

Permit areas intended for unmanaged forest post-mining land use are identified in Item 7.7 of this application. At least five (5) of the following timber species will be used within any given area, with the species used within each area and their placement determined by site characteristics: northern red oak, black oak, chestnut oak, white oak, post oak, scarlet oak, white ash, green ash, tulip poplar, sugar maple, pignut or mockernut hickory, white pine, black cherry, and sycamore. Species will be selected and mixed to accommodate soil and site characteristics and to achieve a silviculturally sound timber stand and wildlife habitat. About 550 timber trees and 50 nurse trees/shrubs will be planted per acre at a spacing of about 3 feet by 10 feet to allow for future management and harvesting. Nurse trees/shrubs will be interplanted with the timber species. Nurse trees/shrubs will be comprised of bicolor lodspera, bristly locust, black alder, and indigo brush. For wildlife habitat, sawtooth oak, gray or silky dogwood, and crab apple will be planted at a combined rate of 50 trees per acre on average for the permit area. Wildlife trees and shrubs will be planted in small scattered areas (about 0.4 acre) and along drains in narrow strips to create wildlife corridors and sources of food and
## Revegetation Plan 2006

<table>
<thead>
<tr>
<th>Type</th>
<th>Species</th>
<th>Rate/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Permanent Grass</strong></td>
<td>Orchardgrass (steep slopes only)</td>
<td>5 lbs.</td>
</tr>
<tr>
<td></td>
<td>Ryegrass</td>
<td>5 lbs.</td>
</tr>
<tr>
<td></td>
<td>Kentucky Bluegrass</td>
<td>2 lbs.</td>
</tr>
<tr>
<td></td>
<td>Creeping Bentgrass</td>
<td>2 lbs.</td>
</tr>
<tr>
<td><strong>Legumes</strong></td>
<td>Kentucky Leauepea</td>
<td>5 lbs.</td>
</tr>
<tr>
<td></td>
<td>Birdsfoot Trefoil</td>
<td>5 – 10 lbs.</td>
</tr>
<tr>
<td><strong>Annuals</strong></td>
<td>Annual Ryegrass (full or late winter seeding only)</td>
<td>20 lbs.</td>
</tr>
<tr>
<td></td>
<td>Foxtail millet (summer seeding only)</td>
<td>5 lbs.</td>
</tr>
<tr>
<td><strong>Timber Trees</strong></td>
<td>Red Oak, White Oak, Post Oak, Black Oak, Chester Oak, Scarlet Oak</td>
<td>Approximately 110** each of 5 species, or approximately equal numbers totaling 350 if more than 5 species are used within a given area.</td>
</tr>
<tr>
<td><strong>Wildlife trees</strong></td>
<td>Sawtooth Oak, Crab Apple, Silky Dogwood</td>
<td>50 total**</td>
</tr>
<tr>
<td><strong>Nurse trees/shrubs</strong></td>
<td>Bicolour Leauepea, <em>indigobush</em></td>
<td>50 total**</td>
</tr>
<tr>
<td><strong>Fiber, Mulch</strong></td>
<td>Cellulose or Wood Fiber</td>
<td>1,500 lbs.</td>
</tr>
</tbody>
</table>

### 9.4 Revegetation Plan - cont.

* Planted trees shall be selected from among these groupings. A minimum of five (5) tree species from this list should be chosen.

** These figures are cumulative averages for the entire permit area. Species composition of areas will vary throughout the site in response to factors such as soil properties, slope and aspect orientation. Thus, the specified planting rate for each tree type can vary from acre as long as these averages are attained. The combination of timber trees, wildlife trees, and nurse trees/shrub planted stems shall total 650 per acre, but per-acre species distributions shall vary across the job site.

### References:
2006—Revision to Incorporate the FRA
Minimal Grading Practices and Revegation Plan Approved
ARRI Forestry Reclamation Approach (FRA) Training

Changing Reclamation practices can be difficult for equipment operators

The Pride Factor
Single Pass/Loose Grading
Minimal run-off on Loose Graded Area
ARRI Forestry Reclamation Approach (FRA) Training

Best Available Material
Timing & Handling
Hydroseeding Application
<table>
<thead>
<tr>
<th>Date</th>
<th>Acres</th>
<th>Hardwoods</th>
<th>Wildlife/Shrubs</th>
<th>Pines</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>146</td>
<td>64,500</td>
<td>20,500</td>
<td>15,000</td>
<td>100,000</td>
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<tr>
<td>2007</td>
<td>144</td>
<td>63,360</td>
<td>20,016</td>
<td>14,688</td>
<td>98,064</td>
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<tr>
<td>2007</td>
<td>230</td>
<td>114,420</td>
<td>24,840</td>
<td>17,020</td>
<td>156,280</td>
</tr>
<tr>
<td>2009</td>
<td>197</td>
<td>98,050</td>
<td>23,750</td>
<td>19,000</td>
<td>140,800</td>
</tr>
<tr>
<td>2010</td>
<td>150</td>
<td>70,940</td>
<td>18,330</td>
<td>12,700</td>
<td>101,970</td>
</tr>
<tr>
<td>Total</td>
<td>867</td>
<td>411,270</td>
<td>107,436</td>
<td>78,408</td>
<td>597,114</td>
</tr>
</tbody>
</table>

Williams Forestry has Managed the Planting since 2007.
06/07-FRA Reclamation
“New Ridge Area”
06/07-FRA Reclamation
“New Ridge Area”
2010-FRA Reclamation
Promotion of Reforestation on Surface Mined Lands

Arbor Day April, 2009
Arbor Day April, 2009
Arbor Day April, 2009
Reclamation & Reforestation Awards

VMA, Individual and ARRI(State)

Arbor Day April, 2009
Reclamation & Reforestation Awards
Questions