A Combination of Bauxsol™ Acid B Extra™ Blend and Biochar to Reduce Metal Concentrations in Eveline Acid Mine Drainage

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AMD Active Treatment
AMD Sulfate Reducing Bioreactor
**Eveline Mine Drainage**

- BLM and ARSG identified the Eveline for remediation
- 2007 – BLM National Operations Center performs pilot tests

<table>
<thead>
<tr>
<th></th>
<th>Q (gpm)</th>
<th>pH</th>
<th>Al*</th>
<th>Cd*</th>
<th>Cu*</th>
<th>Fe*</th>
<th>Mn*</th>
<th>Zn*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ford, Flemming, Odell 2009</td>
<td>7.6</td>
<td>3.2</td>
<td>9.4</td>
<td>0.014</td>
<td>0.08</td>
<td>25.2</td>
<td>1.1</td>
<td></td>
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<tr>
<td>Eveline inflow August 2012</td>
<td>3.6</td>
<td>3.4</td>
<td>13.5</td>
<td>0.02</td>
<td>0.10</td>
<td>29.4</td>
<td>1.06</td>
<td>1.5</td>
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<tr>
<td>Eveline inflow August 2011</td>
<td>5.5</td>
<td>3.3</td>
<td>12.9</td>
<td>0.021</td>
<td>0.07</td>
<td>29.5</td>
<td>0.95</td>
<td>1.3</td>
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<tr>
<td>Average</td>
<td>5.6</td>
<td>3.3</td>
<td>11.9</td>
<td>0.012</td>
<td>0.1</td>
<td>28.0</td>
<td>1.0</td>
<td>1.3</td>
</tr>
</tbody>
</table>

*mg/L
Eveline Treatment Vault

- Designed to treat 8 gpm
- ARRA Funded
- Constructed in 2010
Bauxsol™ Acid B Extra™

• Altered by-product of the Alumina Refining Industry
• Purchased from Virotec
• Basic
• Fine grained powder
• Iron rich and silica rich minerals
• Has been used to treat tailings ponds and waste piles
2012 Eveline Bauxsol™ Pilot Tests

- Biochar
- Porous Concrete (Aerix)
- Pea Gravel
Adit Distribution bucket

50% ABE & Biochar

40% ABE & Biochar

30% ABE & Biochar

30% ABE & Pea Gravel

30% ABE & Porous Concrete
Conclusions

• Porous Concrete and Pea Gravel – may be suitable to PRB
• All Bauxsol™ Acid B Extra™ combinations performed similarly
• The 30% Bauxsol™ and 70% Biochar combination was installed in the Eveline Treatment Vault in September of 2012.
• Initial sampling indicates issues with plumbing, but some removal is occurring.
• Eveline sampled a month ago