Study on Occurrence of Acid Mine Drainage Inner Part of Dumping Site at KPC Coal Mine, Indonesia

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Outline

Background
  Coal Production in Indonesia
  Acid Mine Drainage

Experiment
  Sample Analysis
  Field Investigation
  Leaching Test

Summary
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Summary
Change of Coal Production and Consumption in Indonesia
Acid Mine Drainage

\[ \text{FeS}_2 + \frac{15}{4}\text{O}_2 + \frac{7}{2}\text{H}_2\text{O} \rightarrow \text{Fe(OH)}_3 + 2\text{SO}_4^{2-} + 4\text{H}^+ \]

Bad Effect to

\begin{align*}
\text{As}^{3+} &\quad \text{Zn}^{2+} \\
\text{Cr}^{2+} &\quad \text{Ecosystem Human body}
\end{align*}
KPC Coal Mine

Operation: 1991~
Annual Production: 40 M ton / year (2010)
Truck and Shovel
Grade: 6500~7500 kcal/kg
Cover Layering System

Cover layer can cut off O₂ and H₂O supply to sulfide minerals.

Low permeability materials are used for cover layer.

Cover layering system in KPC coal mine

PAF: Potentially Acid Forming

NAF: Non Acid Forming
To study about acidic water generation inside of dumping site

It is not clear that the cover layering system works or not.

High Cost

Long-Term Treatment
Outline

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Sample Analysis

Sampling points

Grain Size Test
Chemical Analysis
Sample Analysis

Result of grain-size distribution analysis

<table>
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<th></th>
<th>unwashed</th>
<th>washed</th>
<th>USCS classification</th>
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<td>37.7</td>
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<td>3</td>
<td>32.8</td>
<td>89.1</td>
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<td>4</td>
<td>28.6</td>
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<td>68.3</td>
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<td>29.9</td>
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Result of paste pH, EC (mS/cm), and ABA test

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<th>Paste pH</th>
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<th>NAPP</th>
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<tbody>
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The layer can be easily compacted and the permeability decreases in the layer.

Acidic water may still be generated in some layers inside of the dumping site.
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Exposure face at the dumping site

These layers define the infiltration and water flow inside the dumping site.

The inclined layers have different characteristics and they are formed in alternate layers.
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# Leaching Test

To understand effects of the layers formed during construction of dumping site on the acidic water generation.

## Types of the leaching test

<table>
<thead>
<tr>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
<th>Type 4</th>
<th>Type 5</th>
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<tbody>
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<td>compacted NAF 50</td>
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<td>NAF 30</td>
</tr>
</tbody>
</table>

## Concept of the leaching test

Distilled water was poured into the column and quality of the leachate was measured.
Acidic water can be neutralized in the situation that NAF rocks are compacted or arranged alternately.
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Inclined and compacted layers were formed inside of dumping site during construction of the site.

Acidic water may still be generated inside of the site.

The layers have different characteristics, and acidic water may be prevented due to the layers inside of the site.

Acidic water may still be generated after constructing dumping site, however, it may be prevented when PAF/NAF rocks are formed alternately and NAF rocks are compacted.
It is not clear in this research that PAF/NAF layers are formed alternatively inside of the site.

Acidic water generation can be prevented inside of dumping site by considering the formation of the layers and the amount of PAF/NAF rocks before constructing the site.
Thank you for your kind attention.

At Mae Moh Coal Mine