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## WORKSHOP 6

### A Mine in a National Park – Environmental Issues

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| <b>The activity in brief</b>                                |             | This is a follow-up sheet for School use and outlines the things that students might look for while visiting Ecton or could be applied to well-known mine sites during follow-up work at school.                                |
| <b>Suitable for</b>   | <b>WJEC</b> | <b>AS</b> GL3 - problems of surface and groundwater pollution and waste tipping (p 24)<br><b>A2</b> GL5, Theme 2 - ...interference with surface and subsurface environment by mining:..., planning and legislation..... (pg 44) |
|   | <b>OCR</b>  | <b>A2</b> F794, Module 3 - ...the environmental consequences of underground metal mining operations.... (pg 36)   |
| <b>Suitable for teaching/assessing investigative skills</b> |             | Implementing (for mini-practical with jig & buddle)   |
| <b>Topic addressed</b>                                      |             | Environmental issues involving extractive industry in a national park.  |
| <b>Student practical or teacher demonstration?</b>          |             | Follow up activity for use at school.   |
| <b>Time needed to complete activity</b>                     |             |   |
| <b>Resource list</b>  |             | <a href="#">You may wish to download this topic for follow up discussions at the Ecton Centre, or back at your own institution.</a>   |
| <b>Ideas for following up the activity</b>                  |             |   |

**A former mine, such as Ecton, presents the following potential environmental problems:**

- 1. Shafts on the surface are a hazard, unless well-protected, and the fences used for protection may be considered unsightly.**



**Fig 6.1 The surface outcrop of the mined-out Ecton Pipe Vein**

## 2. Waste tips may be in danger of movement, or considered unsightly.



**Fig 6.2 The waste heap from Dutchman Mine**

At Ecton, the Peak Park authority planted trees around the perimeter of the Dutchman tip, presumably to try to hide it.

No special effort has been made to alter the tip by the roadside (The Hillocks), but, in time, trees have grown on it and not everyone would recognize that it is a tip.

Since a “road” has been provided through this tip, it must be regarded as reasonably stable (unlike waste tips from coal workings).

(Scope for engineering geology investigations)

3. **Mine effluent (water flow) from former workings may contaminate the river and consequently domestic water supplies.**



**Fig 6.3 Mine drainage flowing from Dutchman Mine  
(A dam within this mine supplies all the water for the houses below)**

Tests on the water flowing from the adits reveal scarcely a trace of metal ions. In fact, it contains fewer ions than that from the ion exchange apparatus. When the tap water, from the Dutchman adit, was tested for iron there was not a trace. When using the dithizone test for lead and zinc, water from the adits usually showed no lead or zinc, whereas the sediments over which the water stood, or flowed, showed very high lead and zinc values.

This is a complete contrast to coal workings. Once air is admitted, by starting the working of coal, the presence of oxygen, sulphides and bacteria, in an acidic environment, enables the bacteria to use a mechanism involving the oxidation of sulphides, as part of their respiratory process. Sulphates from the oxidation produce sulphuric acid, which flows into the river system. This is a major problem in abandoned coal workings.



**Fig 6.4 Ochreous deposits in acidified drainage in Sheffield**

The Ecton mine, in a non-acidic environment, does not suffer from this problem.

If the Ecton orebody had only been discovered in the 1940s, there wouldn't be a hill there now! The upper parts of it would have been worked by open pit methods, before the Peak District National Park was created, to try to limit detrimental effects on the landscape – discuss!

Note: There is a very full discussion of the factors involved in planning for mineral extraction within a National Park at [www.jesei.org](http://www.jesei.org). It is headed "The Limestone Enquiry", and provides enough data for a class to conduct a role play on the development of a new limestone quarry. It is based in turn on the Association for Science Education's "SATIS" pack, under the same title, and first published in 1986.

Although related to quarrying rather than underground mining, many of the principles are similar, and the topic could be used as follow up at school, after a visit to Ecton.