

## **Stakeholder Management: the Key to Successful Metal Mine Discharge Remediation**

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**Abstract** In Great Britain, discharges from long abandoned metal mines are the most significant cause of metal pollution in surface waters. The majority of these mines, in contrast to coal mines, are orphan sites. In the last three years, the UK Government has funded a programme (in England), overseen by the Environment Agency and delivered by the Coal Authority, in response to European legislation. The Authority has successfully delivered two mine water treatment schemes working with a multitude of stakeholders including the Environment Agency, the National Trust, English Heritage, Natural England, National Park Authority, local residents and local administrative authorities.

**Keywords** pollution, remediation, mine water, stakeholders, management

### **Introduction**

The Coal Authority (CA), established in 1994, is a Non-Departmental Public Body funded by the Department for Energy and Climate Change. Since 1998, the CA has gained significant experience in building and managing coal mine water treatment schemes (MWTS). With the transposition of the European Water Framework Directive (2000/60/EC) into National law in 2003, the UK government has taken measures to put in place a water remediation programme focusing on non-coal mines. A consortium led by the Environment Agency (EA) of England and Wales, and including the CA, undertook a programme of monitoring to identify and prioritise the principle non-coal mine water discharges (Jarvis and Mayes 2012 (NoCAM Report)). In response to this report, the Department for Environment, Food and Rural Affairs (Defra) allocated funding for a non-coal mine water remediation programme in England. Based on the experience of the CA in implementing mine water remediation schemes, this funding was awarded to the organisation, with the EA acting as both a partner and regulatory body. In order for the CA to undertake this programme of works, legal changes to the organisations vires were required; the original legislation limited the organisation to addressing issues associated with coal mining. The revised legislation now permits the CA to work with non-coal mine water and other non-coal mining related problems.

Many of the non-coal mine water discharges highlighted in the NoCAM report (Jarvis and Mayes 2012) are situated in sensitive areas including National Parks and Areas of Outstanding Natural Beauty. Many of these sites are also Scheduled Monuments as a consequence of the industrial archaeology still present, in addition to being designated for the specialised ecology that has established and colonised these areas. To successfully construct MWTSs at these sites, collaboration with a variety of stakeholders is of paramount importance. Examples of this stakeholder management from the first two non-coal schemes built and managed by the CA are presented here.

### **Saltburn Gill MWTS**

Saltburn-on-Sea in Redcar and Cleveland (North Yorkshire), is a small sea side resort (see fig. 1), popular with tourists and local surfers. During the 19<sup>th</sup> and 20<sup>th</sup> Centuries, this area was dominated by iron ore mining associated with the Cleveland Orefield. The Saltburn Gill, a small river which forms much of the Saltburn Gill Nature Reserve, flows through the town and over the beach prior to discharging to the Saltburn designated bathing water (Defra 2013).

Overnight in 1999 (EA 2009), the river turned bright orange as a direct result of a new mine water discharge originating from the iron ore workings. After it became evident to the neighbouring community that this orange discolouration to the river was a permanent feature; local residents formed the Saltburn Gill Action Group (SGAG), which was inaugurated in 2005.



*Fig. 1 Left: Saltburn-on-Sea bathing beach and Cliff Lift. Middle: SGAG have installed information boards along the Saltburn Gill. Right: Saltburn Gill treatment scheme during 2013 pumping test. (Photographs © The Coal Authority)*

The SGAG is a community group with members including local residents, the Tees Valley Wildlife Trust, EA, local and parish councils, and the University of Teesside. The group attracted funding from various sources (including a Landfill Tax fund and the local parish council) to investigate the impact on the river from the iron ore mines and possible treatment options. Close collaboration between the SGAG and the EA resulted in the CA being approached to provide advice in 2008, when the group was undertaking a feasibility study. Although the involvement of the CA was solely in an advisory capacity at this stage, it was during this period, that active discussions were on-going between the CA and Defra to establish a national non-coal remediation programme. In 2010, Defra granted funding for a five year non-coal remediation programme to the CA.

After five years of being the driving force behind the remediation of the Saltburn Gill, the SGAG, transferred control of the project to the CA in 2010. Consequently, the project became part of the national non-coal remediation programme, as supported by Defra. This allowed a full pumping test, with associated engineering and construction works, to commence in 2013.

An expeditious programme was conceived to construct a treatment scheme on land which was suitably positioned to drill an abstraction borehole into the mine workings. To achieve this programme, it was essential that the discussions, informal agreements and goodwill in the local area, accomplished by the SGAG, were continued by the CA. Therefore, the CA ensured that the SGAG were recognised in all publications relating to the scheme, had access to an online electronic data exchange website and continually informed the group with regular progress updates. This allowed the CA to maintain the local links with all the parties and individuals that were previously involved and interested in the project.

### **Force Crag MWTS**

Force Crag Mine was the last operational mine within the Lake District National Park in Cumbria (fig. 2). During its operational history, the mine has produced zinc, lead, barite and silver. Collapse of the mine workings in 1991 finally caused the mine to cease operations. Uncontrolled mine water discharges containing high concentrations of metals, notably zinc

(3.9 mg/L) (Atkins 2012), flow into the Coledale Beck. Additional diffuse contamination also enters the beck originating from the extensive spoil tips that surround the mine buildings and ore processing area. Furthermore, the collapse of the workings has produced a risk of a “blow out event”, due to a build-up of water behind the collapse. Pollution from the mine contributes to both the Coledale Beck and Derwent Water failing Water Environmental Quality Standards (EQS). Thus Force Crag was identified as a priority location for the non-coal mine water remediation programme (NoCAM Report 2012) and the CA started working on the project in 2011.



*Fig. 2 View looking northeast along the Coledale Beck Valley with Force Crag MWTS mid-construction in the valley bottom, 2014 (Photograph © John Malley, by permission).*

Due to the site’s location in the Lake District National Park and the former mine workings and infrastructure, which date back to 1838, the site has numerous designations. These designations include: heritage designations (Force Crag Mine and Barytes Mill and prehistoric cairnfield Scheduled Monument); environmental designations (Force Crag Mine Site of Special Scientific Interest (SSSI), Buttermere Fells SSSI, the Lake District High Fells Special Area of Conservation); and open access common land. The land in the upper Coledale valley, including the mine site, is owned by the National Trust (NT) (in England), a conservation charity that actively promotes the site to visitors; each year the NT opens the processing buildings on five occasions for small pre-booked public tours.

With each designation there are additional interested bodies (e.g. English Heritage (EH), Lake District National Park Authority and Natural England), some of which are required to grant consent for any site works to be undertaken. In addition, the NT also required a high level of input before allowing any construction on their land. Recognising the need for early engagement with stakeholders the CA and EA held a stakeholders meeting in September 2011. The aim of the meeting was to summarise the issues at the site and identify a way forward for the scheme; a scoping fact sheet for the site was prepared by the CA and EA and issued to the stakeholders prior to the meeting.

This early stakeholder event was undertaken while studies were still progressing to identify the principle discharge pathways and possible future treatment processes. The event allowed the CA and EA to place the scheme into a national context via the non-coal remediation programme, and enabled both parties to communicate the desire to install a sustainable method of passive treatment to the stakeholders. It was also accepted that whilst the ultimate aim for the scheme is to achieve EQS, as this scheme a pilot system for this methodology,

EQS at the point of discharge may not be achieved initially although there would be improvement in the water body. This event also provided an open forum for stakeholders to discuss their key drivers and agendas for the site. One of the fundamental issues identified at the event, was the placement of any treatment scheme within the historical mining infrastructure at the Force Crag site. It was agreed that the former tailings lagoon area was the preferred location for the treatment scheme, preserving and continuing the historical land use of the area. This agreement, between the CA, EA, NT and EH, recognised that treatment of the mine water was the next step in the mining evolution of the site. This concept was essential in obtaining scheduled monument consent and permission from the NT, an organisation defined by its works to preserve historical sites, to allow large earthworks on a scheduled monument.

Subsequently, the key stakeholders formed a working group to meet regularly and collaborate to progress the project. This partnership produced a communication plan, which stated the objectives of each party and the key principles of the project. Approval of this plan was given by personnel within each organisation whom had sufficient delegation to ensure that any non-standard issues that arose could be quickly accommodated, thus ensuring the project progressed swiftly. The communication plan also set out a timetable of wider stakeholder communications, which included two events to inform local interested groups and residents. These events, which attracted over 70 visitors, were held at a local community hall allowing people to attend and ask questions throughout the day. As the mine water pollution has little to no visual impact, these local events also provided an opportunity to educate and highlight the reasons for undertaking the works and raise the profile of the project.

Phase one of the works undertaken at the site to minimise diffuse contamination entering the Coledale Beck were completed on schedule in 2012; this phase included the installation of a diversion pipe, which was compatible and sympathetic with the local landscape, for the primary mine discharge in order to limit water ingress in to the spoil heaps. Due to changes within the national mine water treatment programme in April 2013, the start date for construction of the treatment scheme was moved forward by one year. All the stakeholder communications and discussions previously undertaken by the CA proved invaluable in meeting this revised challenging timetable. For example, regulatory bodies, which have internal procedures that can take six months to complete, provided the necessary consents within one month. By April 2014, the treatment scheme was constructed and became operational.

## **Conclusions**

Implementation of this stakeholder management approach, successfully facilitated the first two non-coal MWTs to become operational within 4 years of receiving funding; from this exercise the following conclusions are highlighted:

- A continually evolving stakeholder management process, allowing changes to the lead partner with differing expertise at key stages, helps to ensure effective management of a project.
- The experience and goodwill of previous interested parties should be nurtured and built upon; this will enable a scheme to be progressed more effectively.
- Educating and promoting the issues from non-coal mine pollution to various stakeholders should be undertaken; in contrast to iron-rich coal mine water, contamination from non-coal mines may not necessarily be easily visible or obvious. This facilitates the ‘buy-in’ to a project from all stakeholders.

- Ensure stakeholders have commitment from persons at the appropriate level within their organisation, such that they can effect change, and are engaged directly.
- Engaging with stakeholders at the onset of the venture allows the consideration of differing agendas and identifies any major issues of concern to be addressed.

Ensuring there was a common understanding of the goals and early engagement of stakeholders were found to be the key elements in achieving construction of these two schemes at non-coal abandoned mine sites.

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