ACID MINE DRAINAGE AND POLITICAL CONFLICTS IN THE THIRD-PARTY EIS

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ABSTRACT

The 1980s and 90s have seen greatly increased emphasis on enforcement of state and federal regulations for mining projects on federally-managed lands. With the passage of CERCLA and SARA ("Superfund"), the BLM and Forest Service have become much more concerned about their liability resulting from water quality degradation at mining sites. These agencies have actually been named as Potentially Responsible Parties (PRPs) at some sites. As such, these agencies now routinely require consultants to predict volumes of water to be encountered and discharged, along with future water quality, as part of the permitting process. Most such predictions are unreliable at best, especially for estimates of specific constituent concentrations. Despite the limitations of the predictions, it appears the agencies are compelled to use them, or they cannot issue the permits. Bonding calculations used to cover potential impact remediation costs are, in part, based on these predictions. Thus, there is considerable pressure from various parties to shape these predictions.

Water quality impacts due to mining may not become obvious for many years, often after mine closure, both because of slow initial reaction rates and active mitigation measures during operations. Frequently, evaluation of water quality and geochemical issues in this third-party EIS process must be performed before the legally-enforceable water quality standards for the site have been determined, usually by the state.

During the EIS process, the third-party contractor usually promotes technical compromise among the parties regarding water quality and acid drainage issues. However, the three parties to the process are often "compromised" politically. The notion of EIS defensibility and predictions of water quality are being explored in many ways at mining sites throughout the U.S., as this new era of mining impact regulation evolves.
DISCUSSION

Most hard-rock mining in the western United States has been undertaken on federally-managed lands. Such federal lands comprise about 50 percent of the eleven western states and 90 percent of Alaska. Because most mining involves disturbing huge volumes of rock, it results in huge volumes of waste -- especially when compared to most other industrial processes. Historic and operating mine sites have received considerable public attention because of the associated environmental impacts. Most geoscientists are well aware of the tendency of sulfide-rich rocks, when weathered, to form metalliferous, acid rock drainage (ARD). Such processes have been mentioned in non-technical terms from old mining sites in Sweden starting hundreds of years ago and within mines of the former Greek and Roman empires much earlier.

In the modern U.S. federal lands empire, a complex and convoluted maze of processes has evolved in an attempt to inform the public, manage the mining activities, and control environmental degradation. The maze (Figure 1) begins when a mining company desires to permit, construct, operate and reclaim a gold mine, for example, on federal land. The mining company approaches a federal management agency such as the U.S. Bureau of Land Management (BLM) or the U.S. Forest Service, on whose land the company has mining claims, to begin the environmental permitting process. Dozens of permits -- air quality, water discharge, highway access, explosives, mining and reclamation plans -- may be required in addition to the preparation of an Environmental Impact Statement (EIS).

The National Environmental Policy Act (NEPA), passed under the Nixon Administration, became effective in 1970. NEPA provides that all federal agencies must prepare a "detailed statement" for all "major Federal actions significantly affecting the quality of the human environment." Thus the need for EISs, or similar reports, when large-scale mining is proposed on federal lands.

However, the land management agency may not have the staff, budget, or technical expertise to prepare the EIS, especially on the schedule the mining company desires. Therefore, a third-party arrangement is proposed (Figure 2). The company deposits money in an account, technical and cost proposals are selected from various EIS consultants, and a consultant is chosen as a third-party to the process - to compile data, assess impacts, and prepare a rough draft of the EIS. Environmental baseline (existing conditions) and impact predictions are often needed in such mining EISs regarding potential acid rock drainage, which may be caused by the company's proposed action, or alternatives to it.

Well enough: but here is where the situation gets a bit strange. The consultant, it seems, is serving two or three masters: the lead agency (or two if it is a joint federal-state EIS), and the mining company which is providing funding. Both "masters" may review and approve estimated costs, cost modifications, and schedules. The company also supplies critical environmental baseline data, project design information, and results of their alternatives analysis. The lead agency is supposed to direct the technical effort of the consultant and decide upon the final language of the EIS. It doesn't always work that way.
These third-party arrangements have come under increased pressure and scrutiny with the evolution of environmental awareness and resulting legislation, and with the expansion of gold mining in the west. Gold prices increased drastically during the 1970s to an historical maximum of more than $800 per ounce in early 1980. These prices caused a boom in gold mining in general and made it economic to open-pit mine low-grade ores. Also in 1980, by coincidence, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund) became effective. This legislation increased the federal role, via the U.S. Environmental Protection Agency (EPA), in pressuring for clean-up actions on both public and private lands. At least 50 mining sites on public lands have been placed on the Superfund list -- the National Priorities List (NPL). But the real political heat has come because the federal management agencies have been named as Potentially Responsible Parties (PRPs) at several NPL mining sites. That is, it has been alleged that the federal agencies were materially responsible, in part, for the environmental damage done at these sites. As such, the taxpayer becomes directly liable for part of the clean-up costs.

The fear of being dragged into environmental litigation, either through Superfund or other related legislation such as the National Resource Damage Assessment Program (NRDA), has made the federal management agencies very cautious about site permitting, and further complicated the role of third-party consultants.

Agencies like the BLM and Forest Service now feel more pressure for the agency and their consultants, to predict the future -- as in whether the waste rock will generate acid, and "what will be the dissolved zinc concentration at the permit boundary ten years after mine closure?" If such accurate and precise predictions cannot be given, the agencies are increasingly reluctant to permit the activities. At the same time, they are divided as to whether the 1872 Mining Law, and associated legislation (the Federal Land Policy and Management Act, FLPMA, and the various "organic acts") actually give them the power to deny mining permits for environmental reasons. Thus, the consultants receive varying degrees of pressure to make these predictions, so that the EIS can confidently describe the water quantity and quality 10, 20, or 50 years in the future. The various flow, transport, and chemical equilibrium models together with static and kinetic geochemical tests are quite useful for improving our conceptual understanding of the hydrogeochemical system and processes, and for making rough estimations of future constituent concentrations. However, one need only compare the predicted chemistry from half a dozen mining EISs or EAs with the observed chemical data where at least 5 to 10 years has elapsed to note the poor correspondence.

Focusing on such precise and unrealistic predictions aggravates several problems:

- It slows up and greatly increases the costs of the permitting process;
- Often boring and impenetrable documents are produced, frequently 100s or more pages long, which were originally intended for a non-technical audience;
- Once published, these predictions take on an importance much greater than the authors intended. This relative sense of certainty allows bureaucratic and development decisions to move forward, and that's useful. But, it has also been used
to justify minimal actual oversight of the water quality and geochemistry during mining. Masses of data are collected, but little interpretation is done;

- There may be considerable pressure on the third-party consultants to come up with "optimistic" predictions for which there are probable "theoretical" mitigations -- otherwise the site cannot be permitted; and
- Bonding calculations used to cover potential impact remediation costs are often based, in part, on such predictions.

Hence, it is not often that a consultant will report, for example, that operation of a water treatment plant may be needed in perpetuity post-closure (to remediate ARD).

Other complications may arise. One or more of the agencies also may have legal requirements to complete the EIS on a specific schedule, or forfeit approval of a publicly-controversial mining project. The actual legal enforcement of surface and ground water standards/regulations often falls to a State agency. It is common that the State will not determine what standards are enforceable until after the EIS and federal Record of Decision (ROD) have been published.

One of the main roles of the consultant in the third-party EIS process is as a mediator of compromise. For example, the agencies may want more wells to better characterize ground water flow direction or water quality. They often request additional static and kinetic geochemical tests. From the mining company's point of view, it looks like a research project. The agencies want to appear responsible regarding the decisions they are about to make. The consultant can help to promote reasonableness, but they also may be "compromised" by the many masters previously mentioned. Who does one listen to if conflicts arise? The agency has the final say, but the mining company is funding the study and may contract directly with the consultant. (The agency, too, has a responsibility as a public entity to serve the mining "client.")

In closing, this paper was intended to provoke discussion, not provide answers. There is a new era of mining waste regulation in which the federal land management agencies are receiving greatly increased scrutiny. The new Republican Congress will undoubtedly be looking at possible cuts in these budgets and staffs which, if enacted, would further aggravate the problems "in the maze." At the same time, much of the new mining activity is moving overseas to countries with less stringent environmental climates and, thus, lower operating costs.

SUGGESTED READINGS

The authors of this piece have a combined 40+ years of experience in mining projects impact analysis from various perspectives. As such, the observations are drawn from many projects and experiences, some of which are confidential, others merely sensitive. Some of the more recent influences on our perspectives are presented below for the interested reader.


FIGURE 2 The Third Party EIS Process

- Project Proponent
- Agency (ies)
- Consultant

"Third Party"
Water Resources At Risk

A selection of the papers presented at the conference held in Denver, Colorado, May 14-18, 1995

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