



TIPS Featured in 2008 Publication “Designing the Reclaimed Landscape”

by Jennifer Shawe, Writer/Editor, OSM

“Mining is an integral part of the modern American landscape. The western United States alone has more than five hundred thousand abandoned and active mines, covering millions of acres and tens of thousands of square miles. At current production rates, most of the mineral and energy resources will be mined out of Federal land in the American West during the twenty-third century. Although the total acreage is difficult to predict, a vast new post mined landscape, approaching the scale of a hundred thousand square miles, will be created in the wake of US mining alone. This landscape will need to be redesigned, reclaimed, and reprogrammed for post mine land uses.”

So begins *Designing the Reclaimed Landscape*, a 2008 book edited by Alan Berger that brings together representatives of the mining industry, academia, and the Federal coal-mine regulatory community, along with among others, poets, philosophers, historians, and landscape architects, the purpose of this convergence being to investigate in what ways the sciences of “reclamation, design, and the environment” might mutually benefit one another. In Mr. Berger’s words, he offers the book in the spirit of optimizing the value of a wide-ranging, cross-disciplinary approach, with a goal of “engaging reclamation at its origins, by embracing and valuing alteration as much as we feel compelled to resist and deny that change is happening.”

Representing the Office of Surface Mining Reclamation and Enforcement (OSMRE) in this comprehensive collection were T. Allan Comp, a program analyst in the bureau’s Headquarters office, and Billie E. Clark, Jr., who heads up OSMRE’s Technical Innovation and Professional Services (TIPS) program, which is based out of the bureau’s Western Region office.

Mr. Clark's chapter, entitled "Real-time coal mining and reclamation: the Office of Surface Mining's Technical Innovation and Professional Services program," sets out in a fairly straightforward manner to describe the TIPS program, as well as the emerging technologies that it both supports and makes available to its 700 or so customers across the Nation.

TIPS provides four primary services: computer and other specialized, state-of-the-art hardware; the software—amounting to some 26 scientific and/or engineering applications; training as to how to use both hardware and software; and specific technical assistance to users. Likewise, the TIPS program embraces four emerging technologies: geographic information systems (GIS), mobile computing (that is, computer use in the field), remote sensing, and three-dimensional modeling.

Recognizing the importance of geospatial technology the Secretary of the Interior established, by Secretarial order (No. 3277, issued August 1, 2008), a new office within the department to oversee GIS activity underway among all departmental bureaus. Mr. Clark's "Real-time coal mining and reclamation" stresses the significance of GIS within his bureau's TIPS program.

Using examples related to the McKinley mine in New Mexico and the Black Mesa mine in northeastern Arizona (covering 100 square miles, Black Mesa is one of the largest coal mines in the world), Mr. Clark looks at how regulatory inspectors, on the ground at both these mine sites, were able to employ GIS software both to ensure compliance with the terms of the permits authorizing mining activities on the sites and to determine precisely which regulatory requirements pertained to what parcels of land within the sites' permit-area boundaries.

Beyond GIS, however, Mr. Clark maintains that the three other technologies now supported by the TIPS program are of equal importance to TIPS's customers, who are largely involved in reviewing coal-mine permit applications and/or in assessing field compliance with such applications once they have been approved. An example he gives in support of this conviction comes from a coal mine in the State of Arizona.

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) requires reclaimed mine sites to maintain "adequate drainage," except in the case of approved impoundments. In one reclaimed pit area at the Arizona mine, a substantial amount of water was "trapped" and unable to properly flow out of the reclaimed area. OSM used remote-sensing technology to produce a three-dimensional image that demonstrated this problem to OSMRE management and the operator. The problem was then rectified.

Looked at in the context of the assumptions and goals that informed the development and publication of *Designing the Reclaimed Landscape*, TIPS's adoption of GIS and related methodologies as core technologies seems undeniably foresightful. Altogether, these technologies help TIPS and its

customers excel in the arena of enforcement of SMCRA and its State-law equivalents. Thirty-one years ago, the creators of SMCRA, which among many other things gave rise to OSM, were careful to specify in the actual name of that bureau that “enforcement” and “reclamation” are two sides of the same coin. These framers understood the interconnection of things and their understanding, memorialized in the name of the bureau they founded, continues to spread and grow. As Mr. Berger would have it, “the primary objective of any new cross-disciplinary approach is the formation of knowledge that can redirect our current ways of thinking about reclamation, to allow the mining world to begin a new discourse with the design world, and vice versa.”