Goals and Objectives

The goal of Technology Transfer of the RMRHSRC is to take the research results generated within our center, package them with related technologies created in other settings and develop these technologies for our customers through the demonstration phase and then to full-scale operations.

The objectives that have been set to reach this goal are:
1. Seek out appropriate personnel in the agencies that are our primary customers to determine their needs concerning environmental projects at mine sites, make certain that those needs appear in the Request for Proposals of RMRHSRC, and also give the customer a written assessment of how to meet these treatment needs.
2. Interview the principal investigators for each RMRHSRC research project. Determine from them what would be a reasonable demonstration situation that would use the technology that they are developing. Write a short description of the project and the demonstration situation to have available when contacting customers.
3. Identify other public and private agencies, with which we can combine results, generate packages that showcase the technologies, make our customers aware of these technology packages, and generate proposals that use technologies that are within the package.
4. If other agencies contact Technology Transfer about demonstration situations, advise them using either our research results or technologies that have been developed by other organizations, and assist them in generating proposals for those situations.

To further focus efforts, our primary customers are the EPA Region VIII, EPA Mine Waste Technology Program, The US Forest Service, the Bureau of Land Management, and the Office of Surface Mining. Our secondary customers are the US National Park Service and State Abandoned Mine Lands Programs in the western United States. All other agencies will fall into objective four where they will be assisted when contacted. Note that these objectives and the following measures of achievement are similar to how TOSC and TAB operate and measure success.
The approach for meeting these objectives requires informing individuals within agencies, committees, and societies of the activities of RMRHSRC. If the person falls in the customer category, find out what they consider to be the primary technical needs for remediating AML sites. If the person represents an organization with which we should cooperate, determine how that cooperation could be achieved. If the person represents an organization that is developing related technologies, then determine how we can help package our technical expertise with theirs so that it stands a better chance of being taken to the demonstration stage. It is clear that this approach involves making considerable contacts, preferably as personal visits. Fortunately, many of the individuals to be contacted are in the Denver area. However, the technology transfer budget does contain a considerable travel allotment for trips to customers not in the Denver area. As best as possible, the activities of this past year will be put into the context of these objectives.

With respect to the final goal of achieving demonstration projects, it is assumed that if enough good proposals are created, then the demonstration projects will be achieved. Concerning how a proposal is counted as being assisted by Technology Transfer, the “but for” criterion used by TOSC and TAB will be used. That is, “but for the involvement of Technology Transfer, this proposal would not have been written or would not have the links of technology with proposed solutions that are used”.

This Year’s Activities

Because the majority of our primary customers are federal agencies and the fiscal budget was not resolved until early 2004, many activities related to the tech transfer objectives have been held in suspension until just recently. Also, when federal agencies did receive their funding, it was found that money for demonstration activities had been curtailed. Most proposals and project suggestions are in the middle of preparation or negotiation. The activities relative to the objectives are summarized below.

A. Related to new objective 1 on contacting agencies that are primary customers, the following activities were conducted:

- I maintain continuous contact with personnel from Region 8 of the EPA throughout the year. In addition, I have been developing contacts with the people at the Office of Research and Development in Cincinnati. Also, meetings with superfund coordinators on priority site activities have been conducted. As a result of these activities the following activities have occurred. The assessment activities on North Clear Creek conducted by the Jim Ranville group have been extended to performing total toxicity assessment tests done in conjunction with the EPA Region VIII and to finding a low cost enzyme test in conjunction with the USGS. Because of these efforts, North Clear Creek is becoming a prime mine waste assessment demonstration site.

- With the aid of Diana Bless and David Reisman of EPA in Cincinnati, a contract was negotiated that calls for the use of Colorado School of Mines students to assist on demonstration projects in the operation, sampling and analysis activities in Region VIII. Currently, the students are assisting in the operation of the Pulsed Limestone Bed demonstration at the Argo Tunnel in Idaho Springs and in the analysis of samples from EPA demonstration projects in Montana.
B. Relating to objective 2 on interviewing the principal investigators for each RMRHSRC research project, a draft of a technical applications summary for each project has been prepared for each project and the principal investigator for each project is editing this summary. A brochure that we can disseminate on demonstration projects will be available by September 30.

C. Related to objective 3 on combining our results with those of other organizations, the following activities were conducted:

- The alkalinity generator of Barnaby Watten and Phil Sibrell of the USGS, Kearneysville, WV is still a fascinating technology. As stated above, a contract to help with operation and analytical activities at the Argo Tunnel is currently being carried out. In addition the technology was included in a proposal for the treatment of French Gulch water in Breckenridge that is currently under review. Laboratory tests on water from the French Gulch water were conducted to determine the efficiency of zinc removal. About half the zinc and 90% of the iron were removed. The plan is to find a mine water in which zinc is the main contaminant to show how the pulsed limestone process can be used for this type of treatment. A proposal on this technology is being prepared for submission to the Mine Waste Technology Program (MWTP). In this proposal, a faculty member from the RMRHSRC would be added to the proposal to investigate the geochemical principles behind the removal process. This is an important example of how tech transfer is using RMRHSRC capabilities to fill in scientific holes and make a promising technology more viable.

- At the ICARD 2003 Meeting and again at the Tailings and Mine Waste Conference this October, Greg Olsen of Little Bear Laboratories reported on a new method for controlling the bacteria that catalyze the oxidation of pyrite that uses thiocyanate. I have been working with him to find a waste rock pile that can be used to try a demonstration. In addition, because there is a bit of uncertainty on the chemistry involved in the suppression of the bacteria, and I have been working to find a faculty member who could investigate this aspect of the process. We have found a successful team of developer, scientist, and technology customer. In this case the customer is a private company and we are in negotiations with that company for funding.

D. Related to objective 4 on finding situations for going to the demonstration phase, the following activities were conducted:

- Recently, inquiries have been started to see how technologies that are being developed at MSE Technology Applications in Montana can be combined with the research that is being conducted at RMRHSRC. The objective this activity is to find proper combinations of projects that can be combined for proposals to the MWTP. It appears that the Project 3 on the metal removal capabilities of passive bioreactor systems is in the best position to combine on a proposal with MSE. Linda Figueroa has been doing a good job of maintaining contacts with MSE and is planning to prepare a proposal for MWTP with MSE.

- The consulting firm Envirocon is just starting reclamation of the sediment in the Milltown Dam site in Montana. In conjunction with Jim Ranville the principal investigator on the project developing improved methods for establishing water quality
criteria for mining impacted streams, we are in negotiations to see if we can assist in the
assessment work that will have to be done on the sediments that are removed from the
reservoir.
• In conjunction with Jim Herron of the Colorado Division of Minerals and Geology, a
proposal was submitted to the Colorado Abandoned Mine Lands Program for assessment
work in Gilson Gulch in the Idaho Springs/Central City Superfund Site. No money for
assessment work was available this year, so the proposal will be resubmitted next year.

E. Although the objective on contacting and interacting with related societies and
committees, has been eliminated, activities in this area have not ceased. The short course titled
Assessing the Toxicity Potential of Mine Waste Piles was given to 20 people at Region VIII of
the EPA on November 20. This course is also scheduled to be given at the National Meeting of
Geological Society of America in Denver on November 6 and at the National Meeting of the
Society of Environmental Toxicology and Chemistry in Portland, Oregon on November 14.

Related to the activities of the treatment focus group, James Gusek and I are again
scheduled to give our revised Passive Treatment Workshop at the Tailings and Mine Waste
Conference on October 10 in Vail.

Besides these activities, I have given talks representing RMRHSRC at EPA Region VIII
in December, 2003, at the Annual SME Meeting in February, 2004, and at the National ASMR
meeting in Morgantown WV in April, 2004. The talks presented and papers published, since the
last annual meeting, are listed at the end of this summary.

Next Year’s (7-15-04 through 7-14-05) Activities

A. Related to objective 1 on contacting agencies that are primary customers, the following
activities plan to be conducted:
• Make contact with representatives of the US Forest Service and Region VIII of the EPA to
inform them of the activities of our center. The materials describing our activities will be the
CD-ROMs of the short courses and the Application Briefs that are generated in objective 2.
Determine if we can be of any immediate help. Solicit from them their primary technical
needs for dealing with AML sites, and then make certain that these needs are included in the
yearly request for proposals.
• Maintain the contacts with the EPA, OSM, BLM and MWTP, especially with respect to
determining their technical needs for inclusion in next year’s request for proposals.
B. Related to new objective 2 on interviewing the principal investigators for each
RMRHSRC research project:
• Alert the investigators within the RMRHSRC about the upcoming MWTP call for proposals.
• Develop a Application Brief form.
• Strongly encourage the investigators to fill out the form so that it can be used to find partners
who want to try a demonstration.
• Use these Briefs in meetings with our primary customers and the people at MSE in Montana.
For these Application Briefs to be most useful, the above activities should occur before
September 1, 2004.
C. Related to objective 3 on combining our results with those of other organizations, the following activities plan to be conducted:

- Establish a working relationship with MSE Technology Applications to see how we can bundle our research and development results and present them to organizations for possible demonstration projects.
- Continue working with the USGS on mine waste assessment and determine whether we can initiate some reconnaissance projects with the EPA, BLM, or US Forest Service.
- Look for opportunities to bundle the knowledge that the members of our center have on As and Se with some other organizations that are interested in the fate and transport of these two elements.

D. Related to objective 4 on finding situations for going to the demonstration phase, the following activities plan to be conducted:

- Continue to explore demonstration situations with the agencies that are the primary customers of the center. Include in this exploration MSE Technology Applications.
- Review the activities of the other HSRC centers to determine whether any of their activities would benefit from our expertise in treating metals contamination.

Publications (5-01-03 through 7-01-04)

A. Publications related to RMRHSRC activities


Presentations

A. Presentations related to RMRHSRC activities


• A.P. Pinto, T. R. Wildeman, L.L. Fregadolli, and N.R.G. Munhoz, 2003, nickel and manganese removal by zero valent iron at a Rio Tinto nickel mine operation in Brazil, Sixth International Conference on Acid Rock Drainage, Cairns, Australia, July, 2003


