

Colorado Department of Public Health and Environment  
Hazardous Materials and Waste Management Division

INTEROFFICE COMMUNICATION

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Through: Howard Roitman, Gary Baughman

From: Joe Schieffelin, Jeff Deckler

Date: July 12, 2005

Subject: Recommendation on Disposal of Radioactive materials from the CSMRI  
Creekside Site

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The Colorado School of Mines Research Institute (CSMRI) Creekside facility in Golden, Colorado, is currently storing radioactively contaminated soils in transport sacks on-site and has additional unexcavated soils on-site that will require additional characterization, removal and disposal. The Department has required a radioactive materials license for the CSMRI facility for many years, based on the fact that it is contaminated with radionuclides. The site is adjacent to Clear Creek, impacts surface and groundwater, and presents potential exposure to students and other members of the public. The Colorado School of Mines (CSM) is managing this project on behalf of CSMRI.

After beginning the excavation of the more highly-contaminated material, it became apparent that the material quantities were much larger than originally anticipated. Because of the cost implications of these increased volumes, CSM ceased excavation. Seventeen sacks of contaminated soil were shipped to Idaho, 455 sacks of additional soils were stockpiled (~2000 cubic yards), but no more material has been shipped off site. Since excavation ceased, CSM has been attempting to work with HMWMD to find alternative disposal options.

For HMWMD, this has been a difficult issue. Here is the dilemma:

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- Higher level contamination in the soils was mixed with lower concentrations during the excavation process.
- A risk assessment performed by CSM's contractor shows that this resulting mixture can be safely disposed at the BFI Foothills municipal solid waste landfill north of Golden on Highway 93.
- The cost of sending the 455 bags to the Foothills landfill has been quoted to CSM by BFI and the CSM contractor to be about \$35,000 – this is cheaper than any other alternative.
- However, the radiation control regulations require in many places that licensed materials be disposed in licensed facilities, which Foothills is not.
- In addition, in association with the Water Utilities Council, the Department (WQCD and HMWMD) have begun a stakeholder process to discuss appropriate

disposition of NORM and TENORM wastes (the CSMRI waste are TENORM). This process will run through the spring of 2006 and will result in a management and disposal policy for NORM and TENORM waste materials.

Therefore, because the stakeholder process and policy development is underway, but will not be final for ~9 months, **HMWMD recommends that, in this interim, the excavated soils from CSMRI be sent to the CSI industrial waste landfill in Bennett, Colorado.** This will cost CSM about \$150,000, or about \$115,000 more than sending the material to Foothills. However, the CSI landfill is a better option for several reasons:

- A) CSI is not a licensed facility either. However, the CSI landfill only accepts industrial wastes. All wastes are solidified before disposal, minimizing future contaminated leakage. In addition, CSI is a more robust location from a geological perspective.
- B) CSI is the only commercial landfill so far in Colorado that has taken NORM/TENORM wastes under specific approval from the Radiation Control Program. Most recently, Englewood was allowed by the Program to send their TENORM drinking water residuals to CSI.
- C) CSI has taken TENORM waste materials from CSMRI in the past as part of an EPA removal action in 1997. By sending today's stockpiled soils from CSMRI to CSI, we avoid proliferating disposal sites during a time of policy development and stakeholder input.

A lot of supporting information and further detail for this recommendation follows. The Department, and HMWMD specifically, will take some legitimate criticism from CSM from a cost and risk perspective if CSI is the required disposal location. Nevertheless, we believe that in this interim period, sending the excavated CSMRI soils to CSI is the right thing to do. There may be some smaller amount of equally contaminated soils remaining in-place at CSMRI that should also go to CSI. However, the vast majority of the contaminated soils that CSM wants to remove from the site will probably be able to go to the Foothills landfill because of its expected very low levels of contamination.

The Governor's Office has been involved as recently as last August to resolve disputes between the Department and CSM. This recommendation, should it become the final decision, may cause CSM to involve the Governor's Office again. If you would like a briefing on this issue, please do not hesitate to let us know.

Supporting Information to the CSI disposal recommendation:

1. CSM has a cleanup plan (following CERCLA requirements to facilitate cost recovery) that was vetted through a public process and approved by HMWMD. This plan requires that “Soils excavated from the Class 1 areas will be disposed of at the Subtitle C, American Ecology disposal site in Grand View, Idaho, or the Subtitle D, Waste Management – CSI disposal site in Henderson, Colorado.” Class 1 areas were areas with radionuclide contamination exceeding 3 picocuries/gram. Materials below this level, which were called Class 2 areas, were considered to be of little or no risk, could go to the local landfill (BFI Foothills landfill north of Golden). Therefore, because all the bagged materials exceed 3 picocuries/gram, and because the existing approved plan for this facility calls for disposal at CSI, we think CSM should implement that plan.
  
2. CSM’s argument is based on cost and risk. They have performed a risk assessment on the bagged materials that shows that no unacceptable risks will be presented by disposing of the bagged materials at the Foothills Landfill. We have evaluated the risk assessment and concur that disposal of the bagged materials at Foothills Landfill would not pose unacceptable risks. Because of this, and the fact that Foothills is the cheapest disposal option, CSM believes they should be able to nullify the existing approved remediation plan and send this material to Foothills. However, CSMRI is a licensed facility. The radiation control regulations require in numerous locations that licensed materials only go to licensed facilities. Our willingness to send this, or any other material from CSMRI, to the CSI landfill (which does not have a license) is a significant compromise from the regulatory requirements.
  
3. The following table presents the relative costs for transportation and disposal at Idaho, CSI, and Foothills.

	Idaho		CSI		Foothills	
<b>Transportation</b>		\$680/yd3	\$60,000		\$15,000	
<b>Disposal</b>			\$90,000	\$45/yd3	\$20,000	\$10/yd3
<b>Total cost</b>	<b>\$1,360,000</b>		<b>\$150,000</b>		<b>\$35,000</b>	

The cost to send the CSMRI material to CSI is \$45/cubic yard for disposal, plus additional costs for transportation. For the 455 bags of contaminated soil in question (~2000 cubic yards), this results in a total disposal cost at CSI of about \$150,000. This is slightly more than 10% of the cost of \$680/cubic yd, or \$1,360,000, to send and dispose of the material in Idaho. CDPHE believes that it is reasonable to request disposal at CSI from a cost perspective, since it represents a savings of 89% percent over Idaho, which we had approved and CSM had agreed to. From a policy standpoint, even though the CSI costs are higher than what it would cost to send the material to the Foothills landfill, we feel that the cost is reasonable because it buys added protectiveness in landfill design and operation, as explained below, and does not create the public policy and precedence problems that disposal at Foothills would create.

4. The Legislature has allocated millions of dollars for this cleanup, and CSM has pursued cost recovery from other responsible parties. Although the recent Aviall court decision severely hampers future cost recovery, we feel that CSM has, and should commit, sufficient funding to complete this project in a manner that is cost effective, protective of human health and the environment, and does not cause operational and policy problems for another state agency. CSM has told us that they have a total budget for cleanup and restoration of the CSMRI site of \$3,800,000. They have chosen to allocate \$2,000,000 of that for site cleanup and reserve \$1,800,000 for site restoration and ball field construction. Even using their allocation for cleanup, after the bagged material is sent to CSI, the School will still have about \$1,850,000 to complete cleanup, a sum that should be more than adequate.
5. The CSMRI facility operated for almost 75 years, and conducted numerous experiments and projects using a variety of radioactive ores and materials generating wastes that span numerous programmatic definitions. Based on that site history, the CDPHE could have classified the material as 11e(2) byproduct material or low-level waste. Such a designation would have severely restricted disposal options and significantly increased cleanup costs. As part of the remedial action approach, the Department made a decision to designate the material as Technically Enhanced Naturally Occurring Radioactive Material (TENORM) on the condition that the more contaminated materials would be shipped to a facility in Idaho. Although the CDPHE would like to preserve the flexibility to send certain kinds of un-licensed NORM and TENORM to municipal solid waste landfills (drinking water treatment residuals, etc.), disposal of licensed material of this kind in a municipal landfill sets a precedent that neither we, nor the communities across Colorado, would wish to set. As mentioned above, the radiation control regulations require in numerous locations that licensed materials only go to licensed facilities. Our willingness to send this, or any other material from CSMRI, to the CSI landfill is a significant compromise.
6. Recently, through the Water Utility Council and others, CDPHE has begun an extensive stakeholder process on generation, management, and disposal of NORM and TENORM wastes. This stakeholder process will likely run into early 2006, and will result in a CDPHE policy for management and disposal of NORM and TENORM with various levels of radioactivity. We believe that the policy will specify that material from a licensed facility must go to a licensed disposal facility, or to a properly permitted facility with Department approval, as well as the approval of the local permitting authority. Because CSMRI is licensed, sending the bagged materials at CSMRI to CSI will likely be consistent with that policy, but sending the material to Foothills will be inconsistent.
7. The CSI facility is an industrial solid waste landfill that, as a matter of process, solidifies all materials that are disposed of in the landfill. As a result, the

possibility of creating contaminated leachate that can impact groundwater is minimized. In addition, the CSI site is located within an area of bedrock shale with little or no groundwater. The Foothills landfill accepts all municipal solid waste, does not solidify wastes, and is located directly over a ground water recharge area for ground water used for drinking water supplies in the Metro-area. New studies on municipal solid waste landfills in Pennsylvania and California show that radionuclides are showing up in landfill leachate. Although we do not question the design of the Foothills Landfill for municipal waste, or that a risk assessment can prove that site to be safe for this material, we feel that the extra protectiveness in the operation of CSI is desirable when considering the current state of public concern regarding radioactive materials. In addition, CDPHE is currently developing a policy (consistent with our past practice and ANSI guidelines), as explained above. Utilizing our regulatory discretion and best professional judgment, our developing policy identifies industrial landfills as preferential to municipal landfills for such materials.

8. The CSI site has already been utilized for the disposal of radioactive materials from the CSMRI Creekside site, as part of an EPA required removal action conducted at the facility in 1997. Continued use of the CSI site for disposal of Creekside materials would avoid multiple sites containing CSMRI materials and thereby reduce future state liability. In addition, the Radiation Control regulations contain a requirement that, while not directly applicable in this case, would require non-proliferation of radiation disposal sites.
9. While we have confirmed that the Jefferson County commissioners are supportive of the CSMRI waste stream being disposed of in the Foothills Landfill, we are concerned that other important stakeholders have not been appraised. Specifically, the cities of Westminster and Thornton have historically observed every groundwater sampling event at the Foothills facility because the landfill is directly up-gradient from their water supplies. It is certain that these cities would have concerns about the CSMRI waste stream going to this landfill.
10. We are concerned that the cost of disposal quoted to CSM by Foothills Landfill (~\$10/cubic yard plus transportation = ~\$35,000) is optimistically low. If Foothills accepts this material, their groundwater sampling and analysis will be required to be augmented to include a suite of specific radionuclides that are present in the CSMRI waste. This will have significant cost implications for Foothills as this additional analysis will be required for as long as ground water monitoring is required at the site. Normally, this type of future costs is recouped by adding present value to the disposal costs of the wastes.