

STATE OF COLORADO

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Dedicated to protecting and improving the health and environment of the people of Colorado

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Colorado Department
of Public Health
and Environment

MAY 13 2011

Mr. John Hamrick
Vice President of Milling Operations
Cotter Cañon City Milling Facility
PO Box 1750
Cañon City, CO 81215-1750

Subject: Review of Update of the Tailings Reclamation Plan for the Primary and Secondary Impoundments, and Soil Remediation Plan for Site Decommissioning and Radioactive Materials License Termination, Radioactive Materials License CO-369-01, Canon City Milling Facility, March 30, 2011

Dockets #9760 and 9761

Dear Mr. Hamrick,

Radiation Management Unit staff have completed their initial review of the subject documents and provide the attached General and Specific comments for review and inclusion in revised submittals.

CDPHE requires more detailed information in numerous areas. These include, but are not limited to, insufficient characterization of site conditions and geotechnical parameters.

More importantly, Cotter has failed to update the overall site decommissioning plan for the site as requested, and rather has only submitted a reclamation plan update for the impoundments that is materially deficient and a soil remediation plan that is lacking in several areas.

Cotter stated in its letter of June 30, 2010 that "...plans are being developed to demolish the remainder of the CCMF, dispose of the contaminated materials and associated soils in the tailings impoundments, and close both the Primary and Secondary Impoundments as soon as reasonably achievable. Cotter remains committed to complete the reclamation as described in plans approved by the State for this facility."

CDPHE listed the status of the 2005 Reclamation Plan¹ as an Item of Concern in its 2010 inspection NOV letter. It states: "The 2005 Reclamation Plan does not reflect current status of the *site* (e.g.,

¹ 2005 Update of the Mill Decommissioning and Tailings Reclamation Plan for the Cotter Corporation Canon City Milling Facility. MFG, August 2005.

volume of material in the impoundments) and potential long-term groundwater management options. The Reclamation Plan is to undergo review to reflect current and anticipated *site conditions* (emphasis added).” During the inspection closeout meeting, CDPHE and EPA emphasized that plans that do not reflect current site conditions are grounds for enforcement. Cotter responded in their reply letter of August 10, 2010 that they “...were in the process of selecting an engineering contractor to revise and update the Reclamation Plan.” Cotter committed to providing a revised plan by March 31, 2011. Significant portions of the required information were not provided, rather Cotter has submitted a schedule for delivery of certain items, and has already missed that date for 2 items (revised checklist and tailings dewatering plan).

Previous plans did not anticipate near-term site closure and therefore were not comprehensive; all aspects of site closure need to be current in order to adequately plan, schedule, bond, remediate and reclaim the site in a timely manner. The 2005 Plan is a site-wide plan, with only one chapter entitled “Tailings Reclamation Plan.” The decommissioning and restoration of the remainder of the site is not adequately addressed. The 2005 Decommissioning Plan (Appendix I) shall be updated to reflect current plans for site closure not captured by the current Buildings Demolition Master Plan. For example, there is no discussion of the SCS dam, pump-back system or final site plan showing reclaimed contours and revegetation for the entire site, necessary for pursuing license termination.

Cotter has repeatedly failed to deliver a project schedule. Cotter was given to March 15, 2011 to provide the schedule and did not meet it². A final extension was set in the Department’s letter of April 27, 2011 that requires Cotter to provide a comprehensive decommissioning and reclamation schedule to the Department within 45 days of receipt of that letter. There are no changes in delivery date to that requirement as a result of this letter. Failure to provide a comprehensive decommissioning and reclamation schedule by June 13, 2011 will be considered a violation and subject to compliance enforcement per Part 3.16.4.3.

For brevity and to not further hold up this letter, we will submit technical comments on the Criteria 6(6) and Final Status Survey reviews later under separate cover.

The Soil Reclamation Plan only addresses soil cleanup criteria relative to license termination (as reflected in the title of the plan), but does not address additional requirements that may be necessary relative to the RAP and Consent Decree, as well as EPA requirements with the goal of removal of the site from the NPL. In particular, there is no discussion of surface and groundwater management now that the Primary Impoundment will be closed.

We note that the next revision to the site surety is due June 30, 2011. If not corrected, it will be necessary for the Department to establish conservative estimates for surety for the omitted or incomplete actions.

Please be advised that revisions to Parts 1, 3, 12, 13, and 18 became effective on May 1, 2011.

² See letter from Steve Tarlton to John Hamrick, December 1, 2010.

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We anticipate a series of meetings with respect to these efforts. If you have immediate questions relative to the Reclamation Plan revision, please contact Larry Bruskin at (303) 692-3384 or electronically at larry.bruskin@state.co.us and questions relative to the Soils Remediation plan to Phil Egidi at (970) 248-7162 or electronically at phil.egidi@state.co.us.

Sincerely,

A handwritten signature in blue ink that reads "Steve Carlton". The signature is written in a cursive style with a large, sweeping initial "S".

Steve Carlton, Manager
Radiation Program

SFT:pve/lb

CC:
Edgar Ethington
Phil Egidi
Larry Bruskin
Jim Cain (Cotter)
Randy Whicker (Cotter)
File 369-01 File 3.

Update of the Tailings Reclamation Plan for the Primary and Secondary Impoundments

General Comments

1. The cover letter from Cotter transmitting the “*Update of the Tailings Reclamation Plan for the Primary and Secondary Impoundments*” states that the plan was prepared by MWH Americas, the same firm that prepared the 2005 plan. This is not correct. The 2005 plan, titled “*2005 Update of the Mill Decommissioning and Tailings Reclamation Plan for the Cotter Corporation Canon City Milling Facility*”, dated August 2005, was prepared by MFG, Inc. and not MWH Americas. This is also confirmed in Section 1.1 and Section 5.0 of the subject plan. Please clarify, as it is our understanding that the principal investigator working on the project is the same person, but now working for a different firm.
2. The concepts, design criteria, calculations, numerical modeling, and material sampling and testing for closure of the impoundments are all taken from Cotter’s previous consultants, with no new information provided other than a general site update since 2005. The material sampling and analysis for borrow characterization was apparently performed in 1989 – about 22 years ago. It is unknown whether the materials that were evaluated 22 years ago even exist today. A complete borrow investigation for each required material type must be performed, with appropriate material sampling and testing, using acceptable minimum frequency guidance for borrow investigations, such as Table 2.3 in EPA (1993)³. This includes characterizing “random fill”, or any other final cover component, so that appropriate modeling inputs can be developed. The results of the borrow investigation must be clearly presented in detail. Summary tables may be used, but drawings showing sample locations and laboratory data sheets must also be included. See Comment 3 for further details.
3. Complete information on the borrow materials planned for use for the proposed cover was not found in the 2005 MFG Plan. Appendix G, Sections 2.1.7 of the NUREG-1620 checklist indicates that borrow information is located in Appendix A or B of the 2005 MFG Plan. Appendix A is the 1999 Tailings Investigation, and does not contain information on borrow materials, but rather the tailings properties. Appendix B contains some information, but only in a summary fashion. All sampling and testing needs to be presented in the document. Items such as the location of all samples, testing results, and frequencies for all of the different types of materials should be clearly presented.
4. There is no discussion of surface and groundwater management for the site as the Primary Impoundment will no longer be available to capture surface water, or for management of recovered groundwater (e.g., pumpback system and planned active treatment for the mill site and 006 area). Cotter is a zero-discharge facility. There may be years to decades of active groundwater treatment necessary prior to termination of the license after the Primary Impoundment is closed. The new Pond 3 is only good for limited use based on financial

³ U.S. Environmental Protection Agency, 1993, *Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities*, EPA/600/R-93/182: http://www.kdheks.gov/waste/techguide/EPA_QA-QCforWasteContainmentFacilities.pdf

decisions Cotter made during the OPA project. How will Cotter manage water after closure of the Primary impoundment? What is the projected water balance? Is there an evaporation cell location and design. As this cell(s) will be accepting byproduct material from ground water treatment, it must meet the full design and operational requirements of CDPHE and EPA (with respect to NESHAPS).

Specific Comments:

1. Section 3.3 states that the planned cover system is the “uniform cover system”, as discussed in the 2005 Reclamation Plan prepared by MFG, Inc. The 2005 MFG Plan was the result of earlier submittals by Cotter that were refined through general discussions between the Division, Cotter, and their technical consultants. However, after the 2005 MFG Plan was submitted, while some further meetings and discussions between Cotter and the Division were held, they were not concluded, and the 2005 cover designs were not finalized and approved by the Division. Significant design issues were identified by the Division at that time, and have remained unresolved through the present. In addition, since 2005, the “state of the practice” for design and construction of “water balance covers” in the semi-arid west has also evolved, but the current submittal has not changed one aspect since 2005.
2. Figure 5.6 of the 2005 MFG Plan shows the “topsoil” and “subsoil zone” together act as the radon barrier. According to NRC (2003)⁴, the radon barrier must be designed against possible freeze/thaw impacts. It is unclear how freeze/thaw of the radon barrier can be addressed when the radon barrier is at the surface.
3. Appendix F. The Division had several concerns with the numerical modeling performed for the 2005 MFG Plan (Appendix F, Cover Infiltration Analysis). They are the following:
 - a. The random fill layer should be excluded from the modeled cross-section such that any migration of water at the base of the cover system would be downward only.
 - b. There is no material specification associated with the random fill; therefore, the hydraulic properties may vary significantly.
 - c. The random fill was modeled using a saturated hydraulic conductivity (K_{sat}) of 1.0×10^{-2} cm/sec. This likely creates a capillary barrier effect at the interface, resulting in an unconservative estimate of percolation (infiltration).
4. Appendix F. Assuming all of the parameters used for modeling inputs are valid (this is not the case, as the Division has concerns with many of the modeling inputs), the infiltration results shown in Table 4.1 of the Cover Infiltration Analysis (Appendix F) are not satisfactory. The average flux rate for the wet year analysis for the “Alternative Cover” is 0.14 in/yr (3.5 mm/yr). The “percolation standard” used for design in Colorado for “alternative covers” at two hazardous waste sites are 1.3 mm/yr for covers at the Rocky Mountain Arsenal, and 1.0 mm/yr for the Landfill 5 cover at Ft. Carson. In addition, the current “Draft” stakeholder guidance for water

⁴ U.S. Nuclear Regulatory Commission, 2003, *Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978*, NUREG-1620, Rev. 1.

balance alternative covers for solid waste sites in Colorado is proposed at 2.0 mm/yr. The Division has never agreed on an acceptable percolation standard to be used for covers at the Cotter facility, but 3.5 mm/yr percolation is too great and not acceptable for the given climate and final cover planned.

5. The biota barrier to prevent animal intrusion should be specifically evaluated, not dismissed, stating that "*The minimum 6-ft depth exceeds the burrowing depth of most vertebrates in the region.*" Even if an animal does not dig into the tailings, disturbance of the final cover from animal intrusion is still problematic and must be addressed in the design.
6. The proposed cover slope of 0.5% is too flat and must be increased. This is necessary to promote runoff, minimize ponding, and minimize erosion. EPA (1989)⁵ guidance recommends slopes between 3% to 5% for hazardous waste landfills, while Colorado Solid Waste Regulations (6 CCR 1007-2, Part 1)⁶ requires slopes between 5% to 25%.
7. Part 18, Appendix A, Criteria 5(5) states in part "Near surface cover materials, i.e., within the top three meters (10 feet), may not include waste or rock that contains elevated levels of radium; soils used for near surface cover must be essentially the same, as far as radioactivity is concerned, as that of surrounding surface soils." Cotter must demonstrate how this requirement is to be met.
8. The Appendix to the Reclamation Plan provides a schedule for missing data. Two of the deliverables (NRC checklist and dewatering plan) have already not been met and shall be submitted no later than May 20, 2011. The remainder of the dates listed in the Appendix are considered final by the Department and will not be extended. Failure to provide the reports will be considered a violation and subject to enforcement per Parts 3.14.2 and 3.8.2.

Soil Remediation Plan for Site Decommissioning and Radioactive Materials License Termination

General Comments:

1. Part 18.8.3.1 requires decommissioning plans to have a "Description of planned decommissioning activities." Cotter states in the Introduction that "Engineering and construction issues related to soil removal, disposal, re-grading, and re-vegetation are issues covered elsewhere in the overall site reclamation plan." We see no updates or schedules for updating soil remediation plans or schedules. The Master Demolition Plan (and Appendices for individual buildings) recently submitted only addresses demolition of buildings and does not address remediation of soils. Surety calculation reports provided a glimpse of what equipment would be anticipated, but are not presented or referenced here. As mentioned in the cover letter, Appendix I to the 2005 plan needs to be updated and resubmitted. NUREG-1620, Chapter 5 describes the basis requirements for a decommissioning plan. NUREG-1757, Vol. 1 provides more recent

⁵ U.S. Environmental Protection Agency, 1989, *Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments*, EPA/530-SW-89-047.

⁶ <http://www.cdphs.state.co.us/regulations/solidwaste/100702part1SWRegs.pdf>

guidance on contents of an acceptable decommissioning plan (we note that portions may not be applicable at Cotter, as it is geared for 10 CFR 20 Subpart E).

2. In our letter of January 20, 2011, CDPHE stated: "Cotter shall provide a characterization report addressing the various areas of the facility for volumetric estimation of contamination, excavation, and reclamation. It shall be based on a combination of gamma surveys, borings, and surface and subsurface soil samples. The characterization shall include a historical site assessment and be consistent with the MARSSIM manual, including a robust data quality objectives process." It went on to say "Cotter must show how the UMTRA cleanup criteria are met (i.e., 100 m² area) if using large survey units under MARSSIM. The content of all reports should also meet CERCLA requirements with an eye towards delisting the site. Section 21 of the RAP also has requirements that need to be addressed."

This plan does not meet those directives. There is no discussion of requirements necessary to meet the RAP or CERCLA (which must be accomplished prior to license termination), and as such is deficient. Please note there is a MOU between EPA and CDPHE that calls for consistency with the CERCLA process.

- a. The report follows The Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) process, to which the Department concurs. The MARSSIM process was developed to provide necessary rigor for not only the surveys, but the documentation of site cleanup to support a decision; in this case, removal of portions of the site from the National Priorities List (NPL), closeout of the RAP/CD, and eventually license termination and transfer of portions of the site to DOE, the Legacy Management Program. The introduction to the report only focuses on the license requirements, and does not consider the RAP or Superfund. CDPHE and EPA have stated to Cotter that addressing requirements of those programs now may reduce duplication of effort and shorten the closeout period. We agree that a revised background study should be performed that is consistent with MARSSIM.

Certain sections of the report are missing or lacking, in particular:

- b. Historical Site Assessment. In order to properly identify contaminants of concern, a full review of site activities shall be assembled, tabulated and presented as a Historical Site Assessment (HAS). The CCMF has a long history of milling and disposal of ores and concentrates with a variety of constituents (e.g., spent catalyst recovery, PCB project, zirconium project). The recent discovery of organic contaminants on the site is a good example of the need to adequately determine potential radiologic and chemical constituents of concern and areas of the site to focus resources. The HAS shall be used along with the Data Quality Objectives process to drive characterization of the site, in particular the milling facility. As part of the HAS, proof of off-site disposal where appropriate shall be documented (e.g., TCE). See additional comments relative to characterization. Additional information on the HAS process can be found in Chapter 3 of MARSSIM.

c. Characterization. The subject report summarizes earlier survey efforts, some of which are very informative, others that may no longer be representative. We appreciate the level of effort in summarizing and presenting graphics relative to the earlier reports. In 2008, Cotter conducted a limited characterization for surety purposes⁷. Cotter made clear in that report that the 2008 characterization was not to be used for remedial planning, but rather only surety calculation. CDPHE noted in its review letter that the mill area was not adequately characterized in that report, and its volumetric estimates of mill facility contamination would only be used as a lower bound.

i. Cotter shall adequately characterize the milling facility for radiological (and where applicable, chemical) constituents. Part 18, Appendix A, Criteria 6(7) states:

“The licensee shall also address the nonradiological hazards associated with the wastes in planning and implementing closure. The licensee shall ensure that disposal areas are closed in a manner that minimizes the need for further maintenance. To the extent necessary to prevent threats to human health and the environment, the licensee shall control minimize, or eliminate post-closure escape of nonradiological hazardous constituents, leachate, contaminated rainwater, or waste decomposition products to the ground or surface waters or to the atmosphere.”

It is difficult to meet these requirements without an understanding of the radiological and non-radiological conditions at the site, particularly in the sub-surface. Additional guidance is found in NUREG-1620, Chapter 5.2.2 that states “Based on the operational history (including radiation surveys) of the facility, the reviewer determines that the plan describes the likely source and locations of residual byproduct material such as spills, releases, waste burial, haul roads, diversion ditches, process and yellowcake storage areas, ore stockpile areas, areas likely to be affected by windblown tailings, and tailings solution evaporation ponds. Determine that the extent of contamination (area and depth for soil) has been or will be established from adequate representative sampling and surveying.” Current characterization efforts have not been focused on areas described above, and sampling and surveying has not been adequate in the mill complex. Cotter states in the Soil Remediation plan that rather than conducting required characterization, Cotter will remediate soils based on surface gamma exposure rates and will chase the contamination until it meets standards. This is not sufficient as some areas may have considerable contamination not related to surface expressions, e.g., leaking pipes, sumps and areas covered by concrete. Cotter commits to some trenching near leach fields, which should have already been done. As noted below, all areas subject to subsurface contamination not readily identifiable from surface gamma shall be investigated.

⁷ Estimate of the Volume of Contaminated Soil at the Cotter Corporation Uranium Milling Facility, Canon City, Colorado. TetraTech, November 2008.

This shall be described in a characterization plan to be submitted to the Department for approval. Attention shall be given to sumps, tank areas, leach fields, the entire catchment system out to Pond 3, and the area above the OPA cleanup to the SCS dam. It shall utilize the DQOs process and HSA to focus the subsurface portion of the characterization. We agree additional characterization is required in the OPA area, and should have been already conducted and provided in this report, rather than as a commitment since Cotter had ample time to prepare these reports.

Areas that are outside the restricted area, addressed in the RAP as site-adjacent soils, are not specifically addressed in this report. TQEM identifies them as areas A, B, C and D (some of these areas are now within the restricted area). As shown by the gamma surveys, considerable contamination may be encountered outside the current restricted area boundary.

Areas Cotter proposes to not remediate (e.g., windblown, wetlands), shall be adequately characterized to support what is a Department decision that may require NRC Commission approval. Please note there are no Supplemental Standards for Title II sites unlike Title I sites under 40 CFR 192, Subpart C. For ore pads that have been approved for removal under surety reduction efforts, limited characterization in those areas should be conducted to the extent that soil volumes can be recalculated.

- ii. Historical data cited in the subject report needs to be subjected to a data quality assessment review. For example, the Old Ponds Area borings were conducted from 1992 - 1994. They were sampled largely on five foot lift increments, were on large grid spacings (compared to the UMTRA criteria) and did not include analysis for Ra-226 and Th-230 (rather, uranium and moly, which drove that investigation). How can a five foot lift be used to show compliance to a 6" lift standard? What size deposit can be discerned from the grid spacing used in those studies and how do they compare to the UMTRA standard? We note there was no mention of the soil removal for the footprint of the zirconium building (~20 feet). The limited volumetric evaluation in the 2008 survey is not consistent with what was encountered in this area as well as the ore pad areas.
 - iii. The revised characterization plan shall be submitted no later than 45 days from receipt of this letter.
 - iv. The characterization report shall be due no later than 120 days after approval of the plan.
- d. Part 18, Appendix A, Criteria 9C states in part "Title to the byproduct material licensed under this Part 18 and land, including any interests therein (other than land owned by the United States or by the State), which is used for the disposal of any such byproduct material, or is essential to ensure the long-term stability of such disposal site, must be

transferred to the United States or the State in which such land is located, at the option of such State.”

Experience at other UMTRA sites has shown that the land ownership requirements can be difficult to meet. Cotter shall provide an update in the revised Plans outlining current status of ownership of parcels affected by the closure of the site and plans to obtain rights to any lands that do not meet the requirements of Part 18.

3. Use of the field gamma soil sample counter described in the report shall be evaluated and incorporated into the QAPP if it is to be used for final surveys.