Comments on Volume 3, Section B2, "Facility Operating Plan"

1. Page 0-8. Septic systems. Contained septic systems that can be sampled, pumped, and hauled are acceptable. However, leach fields are not recommended, particularly with respect to the one for the mill buildings as they can be a source of soluble uranium to the environment.

2. Page 0-11. 1st paragraph. It states here that there will be overflow alarms on closed tanks. It would seem that open tanks would benefit from overflow alarms (as has been a problem at Cotter in the past). Please clarify.

3. Page 0-11. 0.4.3 Piping. It is stated here that some pipes may be buried. Please describe how buried pipes will be monitored for chronic leaks.

4. Page 0-15. The text states that leaks in the tailings lines would be captured in the trench and flow downhill to the tailings piles or evaporation ponds. Don't they have berms around them that would preclude the fluids from going into the ponds? Wouldn't the fluids build up in the containment at the foot of the berms? Please clarify.

5. Page 1-4. Section 1.1.2. System Controls. Raffinate water shall not be used for dust control outside of the impoundments.

6. Page 3-2. CCD tank area. This area, which has a large potential for leaks, spills, etc. should have a subsurface monitoring system to ensure that chronic leaks are not leading to a soil contamination issue. Since the area has to be excavated prior to construction anyway, consider a resistivity mat or some other detection system.

7. Page 3-8. 1st paragraph. Tailings cells. This report describes a practice where fines and coarse material will be intertwined. Recent correspondence relative to the cap design now indicates that slimes will be directed toward the center such that coarse material can be used to cover the fines for radon control at closure. Please clarify.

8. Page 3-9. Wildlife Protection. All bird mortalities are to be reported to the Department and DOW.

9. Page 3-9. Wildlife Protection. Consider close-woven fence near ground level (and perhaps below) to keep smaller animals out of the area, particularly burrowing animals.

10. Page 4-3. Radiation Monitoring. While airborne may not be a hazard in the SX building, contaminated surfaces from dried spills, etc can become problematic here (and in the other production buildings, too) and as such, routine contamination monitoring and mitigation should be also listed (e.g. reference SOPs).

11. Page 4-5. Fire Alarm System and Controls. Please confirm that water sprays are appropriate for a potential fire of this magnitude and type. Other facilities use CO_2 – based mitigation systems.

12. Page 5-3. 1st full paragraph. Please verify that this sump is double lined and has a riser for monitoring any leaks.

13. Page 5-5. Radiation Monitoring. While the hazards are lower due to moisture, the cake does present an ingestion hazard if the workers are not vigilant in their work practices. Contamination monitoring should be performed routinely in this area.

14. Page 5-6. Packaging system. It states that the lid will be placed on the drum after packaging and on the next page that the drums are cracked to equilibrate. This is not adequate, in that there may not be enough time, particularly towards the end of a shift for the contents to equilibrate. A very powerful exothermic reaction can occur if the drums are not adequately allowed to reach equilibrium with the outside air pressure. See NRC Information Notice 99-03.

15. Page 10-2. 1st full paragraph. It states here that people will be frisked with a gamma meter before leaving the area. This is not acceptable. The surveys need to be for particulates, so a beta or alpha survey is more appropriate. One can just do a beta survey and calculate the associated alphas or use detectors that can read both alpha and beta particles. The SOPs describe this activity.

16. Page 10-3. 2nd paragraph. All material that is scanned for release from the site shall be documented and the records available for inspection.

Comments on Volume 11, Section J2, "Estimates On Radiation Doses To Members Of The Public From The Pinon Ridge Mill (MILDOSE-Area Report)"

1. There is no quantitative data supporting an average ore value of 0.23%. Please provide supporting data. We note that Cotter has used values for western slope ore ranging from 0.25% up to 0.43%. Ore concentrations will vary from mine to mine, and will even vary at the same mine. An increase of a few percent in the ore average can result in significantly higher radium values in the tailings, which can affect public and

occupational dose. EF must provide supporting data for the 0.23% used in the application. Short of adequate documentation of the 0.23% value, the Department may use a higher value in its license review.

2. Guidance for MILDOSE provides suggested ratios for particle size. Up to three particle size distribution sets are available. Set number one is assigned to the yellowcake dryer packaging or equivalent source type. Set number 2 is assigned for the crushers, grinders, rod mills, conveyers, fine ore blending, and other mill-process source types. Set number 3 is assigned to tailings and ore-storage piles source types. Both the default Particle Size and the Fractional Size Distribution may be modified if a source releases particles with different sizes or distributions. Particle Size (PTSZ): defines up to four AMADs (um) per distribution set. Default particle size values are 1.5, 3.0, 7.7, and 54 um. Provide a technical basis for using the default values in MILDOSE to model particle size from the SAG mill, the dryer vent, and tailings/ore.

3. The final report that was submitted with the application does not discuss calculated doses at the administration building (which is out of the restricted area). We note that the administration building was modeled, but not discussed in the report. While no dose limits are exceeded based on the modeling, some of the organ doses come very close to the limit, it would appear that the location of the administration building is not ALARA. NRC guidance (NUREG-0859) for evaluating compliance with 40 CFR 190 notes the limit applies "…to any member of the public". While EF may plan on classifying all workers in the administration building as radiation workers, this may not hold true over time if policy changes. Many administrative staff has no need to access the restricted area. CDPHE has had considerable experience with a similar situation at Cotter. Consider placing the administration building to the north of the impoundments rather than the north-east. If not, please provide an ALARA analysis for leaving the administration building where proposed.

4. The report did not address the loading/unloading areas, which are outside the restricted area. A receptor point for the loading dock area should be added to the model.

5. The MILDOS-AREA model uses Gaussian-plume algorithms, assumes flat terrain, and uses wind rose patterns that do not accurately represent low-duration, high wind events, such as the dust storms being experienced in the West in recent years. It is adequate for modeling potential dose under normal operations and conditions. Please provide an analysis of the regional impact of Energy Fuels with respect to particulate deposition from these type events. Since ore piles and tailings piles will be subject to dust

suppression and mitigation during operations, the review should focus on times when the tailings ponds will be dewatered and dried prior to placement of the final cap.

Comments on Volume 11, Section J3, "Radiological Exposures Pathways Report"

1. Neither this report nor the Risk Assessment adequately addresses heavy metals that are also associated with uranium recovery. EF must provide an analysis of the non-radiological health hazards, and should include at the least, vanadium, arsenic, lead, molybdenum, and cadmium. This is considered to be a major deficiency in the application.

2. What about organics used in the SX process? What are the hazards of the reagents used at the site? UMTRA is a law that regulates the radiological and non-radiological components of byproduct material. The report is inadequate.

3. A conceptual site model is normally presented in an analysis of this type. While Figure 3 is beneficial, it is not complete or adequate. For example, there is no groundwater or surface water pathway from spills or leaks, nor is there a direct gamma exposure pathway presented in the figure (e.g., from windblown). Reference to NUREG-0706 is not recommended here due to its being outdated with respect to environmental pathway analysis' standard of care. One can reference the RESRAD manual, or numerous other citations that are more current or germane.

4. Page 1. Sources of radiation. The first paragraph generally describes the source to receptor relationship: source pass through an exposure medium and produce a radiation dose. This statement would be better if it included the step of a release of a portion of the source material and step of an intake or an uptake rather than just an exposure. Just because there is an exposure, that does not mean necessarily that there is an uptake or an intake (for internal) to cause a dose. This is often overlooked when discussing pathway analysis.

5. While it doesn't have a very long half life, there should also be some discussion of Po-210. While normally discussed in conjunction with Pb-210, they are often not in equilibrium in the environment after industrial processing. Po-210 is a significant ingestion hazard.

6. Page 2, 1st bullet. Default particle size distributions in MILDOSE-AREA need to be compared to expected particle sizes from use of the newer SAG mills vs. older crusher

technology. In addition to the smallest particles being exhaled, the smallest particles may also be able to cross the blood barrier, which is of more concern. Dosimetry has progressed significantly since the time of the writing of the guidance, the ICRP 60 et al series incorporates a 5-compartment lung model that is more sophisticated than the 3-compartment model used in ICRP 26/30.

7. Page 4. 3rd paragraph. How will dust suppression be applied in the winter? There seems to be the potential for a safety hazard if the ore pad is repeatedly sprayed with water during the winter. It should also be noted that only end dumps will be able to use the wall, all side dumps and bottom dumps will have to access the pad to dump their load and then be released from the site.

8. Page 5. Tailings Disposal. An important step has been omitted here, i.e., drying out of the tailings impoundments prior to the construction of the cap. It is at this point in time when the possibility of dusting is most acute.

9. Page 6. Equipment released from the mill. Please state that the vehicle will be surveyed after it leaves the truck wash station.

10. Page 6. Sources of Waterborne Radioactivity to Humans. This section is not complete. What about benthic organisms? What about other biota? Just saying that the dose to a human receptor is low is in no way sufficient; biota other than humans should at least be given a discussion. There should at least be a reference to the Risk Assessment, section 3, which has some discussion on this topic.

11. Page 6. De Minimus Pathways. What value is used to make the determination that a pathway is de minimus? 1 mrem/y? 5 mrem/y? This needs to be further quantified. While these pathways are considered de minimus by the author, many stakeholders have concerns that need to be better addressed in the application by providing some quantification of the range of likely exposures (which are partially addressed in the risk assessment).

12. This report and the Risk Assessment focus on current land use, population, etc. Yet, the MILDOSE-AREA report data shows that in out years, members of the public may approach the 25 mrem/y organ dose limits at some fence line locations (the MILDOSE report did not discount for time, and so we realize is conservative). Nonetheless, it is difficult for the Department to reconcile the two; a projected dose that approaches a regulatory limit cannot be considered trivial or de minimus. If properties around the mill

were to be developed, members of the public will need to meet all dose limits. Please reconcile.

13. Page 8. Ore Trucks. It is stated that accidents are possible but unlikely. Reference should be made to Appendix A5 of the Risk Assessment.

14. Page 8. Toxicological Assessment. See comment 1.

Comments on Volume 11, Section J4, "Risk Assessment Report"

1. Page 9. While we agree that currently there is little agriculture in the area, the mill is proposed to last 40 years. As discussed above, the MILDOSE report data shows fence line receptors in out years to approach the 25 mrem/y organ dose limits in some locations. This report should also include a bounding scenario of residential development at adjoining downwind properties.

2. Page 9. Table 3.2 We note that the supporting MILDOSE reports show organ dose limits at or near the limit for out years. This is reflective of a scenario where tailings cell two is full and half the tailings exposed (drying out while waiting for the cap to be placed) with the third cell tailings half exposed (by this time, cell 1 is closed and capped). See Figure 6, Scenario 2. This is what in fact does happen when a cell is at capacity; it may take more than a year before fill can be placed over the drying tailings. The risk assessment report should evaluate the scenario presented in the MILDOSE report.

3. Page 10. 1st full paragraph. This paragraph well-describes the behavior of uranium and radium. It should also discuss thorium-230, lead-210 and Po-210, as these too will be present in significant amounts and can be a hazard.

4. Page 10. last paragraph. It is understood that bird balls will be used on the saturated portions of the cells, but what about the exposed beaches? What are the risks to wildlife from exposed tailings beaches?

5. Page 12 Section 3.2.1. 2nd paragraph. The statement is made here and elsewhere that the site is designed to mitigate emissions, which is very apparent. The correspondence between Energy Fuels and the Air Pollution Control Division relative to the RACT analysis since the submittal of the application shows that the design of the plant is very robust with respect to reduction of volatile organics (e.g., covered tanks, additional filters), and should be recognized. Even with the RACT technology, about 36 tons per

year of volatiles will be emitted (e.g., in Raffinate) and fugitive emissions will be down to 162 tons per year. Some analysis of the impacts from volatiles should be presented for perspective for normal operations and for accident scenarios in later sections.

6. Page 14. Section 4. We note that the office worker at the administration building was modeled in the MILDOSE report. While not discussed in the text, the admin building was included in the modeling. It is noted that members of the public at the admin building can receive a measureable dose from tailings; therefore, we do not agree with the exposure routes for the office worker at the mill. For example, in scenario 2, the office worker is projected to receive 21.2 mrem/y to the bone. Similar results were given for other scenarios. The total doses did not change much, which indicate particulate rather than radon may be the source. Include ore or tailings dust in the evaluation of the office worker at the mill.

7. Page 15. Last bullet. Please note that the Department considers the MSHA standards to not be protective of workers in that it does not provide for summing of internal and external doses, could allow for up to 10 rem/y TEDE and uses outdated dosimetry (MPCs) from ICRP 2, and does not adopt the ALARA principle.

8. Page 17. Rather than compare to exposures from 30 years ago, what are the comparative doses from White Mesa?

9. Page 17. Comparison to Cotter occupational doses. Cotter has specifically requested and was granted permission to use ICRP 68 dose conversion factors, which greatly reduce the calculated inhalation dose. Energy Fuels, based on our review of the application, made no such request. Dose conversion factors in form ICRP 26/30 (e.g. FGR 11) therefore must be used to calculate dose. It should be noted that for calendar year 1999, about a third of the Cotter workers received over 1 rem TEDE using ICRP 26/30 DCFs.

10. Page 18. Section 4.1.2 Transportation. The analysis described on Pages 80 and 81 was conducted assuming transport of yellowcake to Metropolis. It is just as likely that the yellowcake will go to Cameco, which is farther away in Port Hope, Ontario, Canada. What is the difference in the frequency of an accident and how many more waterways could be affected using Cameco vs. Honeywell?

11. Page 18. Transportation. These transportation reviews (including the work in the Environmental Report) usually include an analysis of rail crossings and the probability of a truck/train accident (this is germane to shipping of yellowcake). Update to include those data.

12. Page 19/appendix A3. Please provide a printout of the Microshield runs for the files.

13. Page 19. Table 4.5 Truck Driver. You report 48 mrem/y for a driver transporting ore based on Microshield calculations, and also cite the DOE EIS for uranium leasing at 14 mrem/y for an ore truck driver. Please note that DOE has been sued over that EIS document for numerous inadequacies, and the court has allowed the suit to move forward. Caveat Emptor (Unit staff has concerns about that report as well). However, DOE in a separate report estimated up to 220 mrem/y for a driver hauling mill tailings for 1,000 hours per year[1]. Since the primary pathway is gamma, please reconcile this large variance in calculated exposures. We note that the drivers are not under the EF license, and this comment is to put relative exposures into perspective.

14. Page 22. Section 5. 3rd paragraph. The Department has learned over the years that not exceeding a dose limit is not sufficient to protect the public or the environment. While releases may not be of particular health risk, the financial risks of cleanup of spills and accidents can be considerable when protecting the soil, air and water from degradation. This approach has been recognized by NRC as being weak, see SECY-03-069 and follow up documents relative to large cleanups required from chronic releases.

15. Page 23. Hazard Identification. A fourth category is of major importance: energy sources. You must evaluate the risks from unintended releases of energy.

16. Page 24. Table 5.1 Construction. Due to the nature of the collapsible soils at the site, the scenario should also include excavation accidents such as trench failure.

17. Page 24. Table 5.1 Ore Handling and Grinding. Acid burns are a problem in this area. A loss of time accident happened at Cotter in the recent past in this area.

18. Page 26. Identified bounding scenarios. The Department is concerned that these scenarios are evaluated in isolation; that is, there could be cumulative or multiple events that can lead to compounded effects. Uncontrolled wildfire is a real concern in the area; if there is not sufficient time to put the plant in standby, a wildfire could overwhelm the facility. In addition to the environmental damage of the fire, it is possible that explosions and fire from hazardous substances could occur, including the propane tanks, ammonia

[1] *Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah Draft Environmental Impact Statement. http://nepa.energy.gov/nepa_documents/docs/deis/eis0355d/Vol_1/chap4-4.pdf*

tanks, reagents, etc. Wildfires on the west end can break out quickly, with little warning; they are not adequately addressed in this report.

19. Page 29. Section 5.4.1. What are the probabilities of those risks and how are they managed? Just because they are no different than in other plants doesn't mean they don't need to be evaluated and addressed. How does MSHA relate to this topic?

20. Page 39. 1st full paragraph. It is our understanding that solvent fires should not be fought with water. Either a foam or CO_2 system is recommended by NFPA. Provide documentation showing that a conventional sprinkler system is adequate for the SX circuit or re-design that system to current standards of care. Cotter uses a CO_2 system for its solvent extraction circuit.

21. Page 40. Tornado and High Wind. While the applicant has made a reasonable attempt at showing tornados are not likely at the site, it did not address high wind events. This is of import not as much due to the accident scenario, but for dust loading into the atmosphere during dust storms. "Red dust" storms are becoming common on the western slope, and as commented earlier, need to be addressed better in the application. See comment #6 for the MILDOSE-AREA report.

22. Page 41. Building Fire. As mentioned elsewhere, water is not the proper remedy for a solvent fire. These would be considered Class B fires by NFPA. See comment 20 above.