



State of Utah

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DRC-2014-003643

MEMORANDUM

TO: File C-2014-71

THROUGH: Phil Goble, Section Manager *PRG 5/29/14*

FROM: Russell J. Topham, P.E. *RJT*

DATE: May 29, 2014

SUBJECT: Engineering Module 70. Review of Comment Letter from Mark E. Smith dated April 18, 2014 ("revision 1.1 29 April"). Radioactive Materials License UT1900479 (License) - Energy Fuels Resources (USA) Inc. (EFR) White Mesa Mill, Blanding, Utah

I have reviewed the letter from Mr. Mark Smith contending the EFR surety is inadequate. The following narrative summarizes my findings. In the detail section, I present my findings in the order Mr. Smith treats the issues.

Executive Summary

Mark Smith, over his seal as a Utah Registered Professional Engineer, provided a detailed discussion of the Energy Fuels surety. Citing multiple versions of the surety and the underlying Reclamation Plan has introduced difficulty in retracing Mr. Smith's steps. However, I have made the following findings:

1. In some instances, e.g. the inclusion of labor burden (taxes, insurance, etc.) in the unit rates for labor without acknowledging how Energy Fuels has accounted for those costs elsewhere in the surety, Mr. Smith's methods result in double counting of costs.
2. A number of the comments involve attempts to invoke standards or comparisons that do not apply. For example, if federal funds were involved in the cleanup, the contract procurement requirements would drive the cost up substantially. Since the funding here involves private contribution from Energy Fuels to a surety account, the work can use private contracting practices at substantially lower cost, and reflect prevailing wage rather than federal wage standards or public works requirements.
3. Mr. Smith benchmarks the surety against feasibility study funding requirement estimates for numerous projects. No matter how comprehensive the data set, the project (White Mesa Mill reclamation) is significantly more refined, and much more is known, than at the feasibility stage of planning. These comparisons to earlier-stage planning estimates lead to inflated cost expectations.
4. In the cases where Mr. Smith cites actual closure data, some of the conditions in the chosen

benchmarking cases do not apply. For instance, Mr. Smith uses the Monticello site as a direct comparison. Some of the cover system has undergone multiple attempts to correct failure of the vegetative cover to take root and thrive (U.S. Department of Energy, 2007; Waugh et al., 2008; U.S. Department of Energy (2007) Study of Factors Affecting Shrub Establishment on the Monticello, Utah, Disposal Cell Cover, DOE-LM/1387-2007, January 2007). The costs for all of these attempts are included in the benchmark case. This artificially inflates the estimate.

5. Mr. Smith asks the DRC to use a set of construction specifications for the surety that do not appear in the approved Reclamation Plan. Since the surety estimate must reflect the currently-approved Reclamation Plan, doing as Mr. Smith suggests would require approving an alternate design which the DRC has not received for consideration. For example, Mr. Smith states that the surety should reflect a vegetative cover system incorporating evapotranspiration as an added barrier to moisture penetration instead of the approved rock-armored system. Other opportunities exist to address alternate designs, including the ongoing review of Reclamation Plan revisions 4 and 5.
6. Mr. Smith challenges techniques he perceives the licensee to have used to assemble its estimate, labeling these approaches as irresponsible. He then uses the same approach to buttress his own arguments. For example, Mr. Smith decries the use of telephone quotations for equipment rental rates, and then uses the same technique to support labor costs for surveying and environmental sampling.
7. The DRC should evaluate the feasibility of using the *Construction Cost Index* in accounting for inflation in the surety. Current practice is to use the Consumer Price Index, which considers a different sector of the economy and underestimates inflation in construction. However, the Construction Cost Index is not without weakness. In conjunction with refinements in the project schedule, the DRC should see that all costs are indexed using whichever index is determined to be most appropriate.
8. The DRC can benefit from expanding its requirements in the areas of remediation for as-yet undiscovered contamination; regulatory oversight, including quality assurance testing and inspection; front-end planning and administrative issues during the bankruptcy, engineering and bidding phases of the project; better definition of the project duration and financial requirements at each phase of the project, and indexing those costs the appropriate number of years for inflation; more thorough accounting for equipment maintenance and fuel costs; and better quantification of the post-closure and perpetual care phases of the project.

Detail

The following material appears in the same order as cited in Mr. Smith's letter. Mr. Smith's comments appear in *italics* for ease of differentiation. Page numbers from the letter appear within parentheses following the italicized excerpts. To provide additional organization, each comment received a number for use should occasion require future reference to this document.

1. *White Mesa Uranium Mill, Updated Closure Cost Analysis for Reclamation Plan Rev. 3.2 Cost Estimate Rev. 4.14 (p. 1; reference line)*

The letter reference line cites Reclamation Plan Revision 3.2, while Table 1 cites Reclamation Plan 4. It is unclear which version of the Reclamation Plan Mr. Smith used in his evaluation. However, this issue proves unimportant. The surety reflects the latest *approved* Reclamation Plan, Rev. 3.2. Denison Mines

(now EFR) submitted Reclamation Plan 4.0; then, before the DRC could finish review of Rev. 4.0, Denison Mines (now EFR) altered course to pursue a vegetative cover system, and submitted Reclamation Plan 5.0. The surety cannot reflect either as they are both unapproved plans. If Mr. Smith believes Rev. 3.2, Rev. 4.0, or Rev. 5.0 contains weaknesses in engineering, he should direct his comments to the engineering review team, not to the surety review. The surety does not provide an appropriate mechanism to address perceived engineering design weaknesses.

2. The focus herein is on the capping systems and how they compare to the Monticello cap. Monticello is an important reference project because it is nearby and in a similar climate, geologic and social-economic settings [sic]. Monticello was also closed by a government agency and thus presents the methods (and costs) that would most likely be applied to White Mesa in the event of an owner walk-away. Table 1 compares the components of the two projects' tailings cell caps. (p. 1)

Comparison with the Monticello site may have value if the author demonstrates the equivalency of the two sites, if the Monticello site meets appropriate current design standards, if alternate appropriate design standards do not apply or have not been approved, and if data exist to evaluate the performance of the Monticello site over time. Mr. Smith establishes the equivalency of the sites generally, but does not provide any detail of the geologic setting. Mr. Smith has not discussed the other aspects of the comparison. Therefore, any conclusions drawn must bear further examination before adjusting policy.

The federal government closed the Monticello site using federal tax money. That source of revenue requires following Davis-Bacon wage rates, and has other requirements to consider, such as minority- and woman-owned business enterprises, that escalate costs. The White Mesa surety does not draw on federal funds, so federal hourly wage rates and other similar provisions do not apply. Therefore the surety will be whatever the market will bear.

Ironically, the Davis-Bacon wage rates Mr. Smith cites constitute one of three wage rate sources consulted in establishing the White Mesa surety. Thus, the requirement the DRC has imposed is actually *more* conservative than Mr. Smith would have us pursue with relation to Davis-Bacon. The DRC required the licensee to use the highest of the three sources it consulted in each job category in lieu of using the more uniform (and costly) RSMMeans database for this work inasmuch as a local labor pool exists within a few minutes of the site from which the licensee routinely draws labor.

The Monticello site was closed by the federal government using the latest design theory. The vegetative cover has yet to flourish and perform as designed. The DRC has entered into review of a design change to a vegetative cover for the White Mesa Mill, requiring demonstration that the system will work before approving the design. Furthermore, the on-site experimentation at Monticello has resulted in multiple reseeding campaigns and seed mix redesigns, escalating costs. The DRC seeks to minimize these after-care expenses by requiring a workable design before installation.

Reclamation/cleanup of the Monticello site also consisted of excavating tailings, ore, and related byproduct material from vicinity properties. Because mill tailings from the Monticello site were used for local construction; cleanup included demolition of contaminated sidewalks, patios, sheds, and other improvements in the local community. Affected properties were backfilled, graded, and reconstructed. Approximately 150,000 cubic yards of contaminated materials were ultimately disposed of with contaminated mill site material in the on-site disposal embankment. A total of 424 properties were ultimately remediated as part of the Monticello site cleanup (Source Monticello Fact Sheet: <http://www.lm.doe.gov/monticello/Sites.aspx>). Although there may be some minor off-site cleanup required as part of the White Mesa Mill reclamation, in no way will it be anywhere near what was required

for the Monticello site. This is one of the examples why the Monticello site is not a good benchmark for the White Mesa Mill surety.

3. The White Mesa cap omits several important components used at Monticello, listed and discussed below. All of these missing components should be included in the White Mesa caps. (p. 1)

The current Reclamation Plan (3.2B) for the White Mesa Mill has received engineering review and Director approval. Mr. Smith should direct this comment to the reviewers of Reclamation Plan 5.0. The surety represents funding of the approved Reclamation Plan, not an opportunity unilaterally to amend the plan. Furthermore, the Monticello cover system has not been demonstrated to work.

4. Vegetative cover: Vegetation is the only truly sustainable cover, but rather than provide any vegetation White Mesa has proposed a 3-inch thick [sic] layer of gravel. Further and equally important, vegetation reduces the net infiltration of rainwater, and thereby the net discharge of leachate, through two important mechanisms: hold-up of water in the root zone, and evapo-transpiration (evaporation and loss through the leaves of the vegetation). Without a vegetative layer the leachate loss into the environment will increase; [sic] (p. 1-2)

Mr. Smith rules out all cover system designs other than the one he favors in the opening statement in this comment. Mr. Smith does not provide data to support this claim. Nor does he give evidence that the currently approved rock cover will not work. Without data, neither the Licensee nor the DRC should restrict the design in this manner. When one considers the evolutionary and as-yet unproven nature of the vegetative cover system at Monticello, the value of maintaining other options seems prudent.

The current Reclamation Plan does not include provisions for a vegetative cover. See comments 1 and 3 above. The surety is required to be based on the approved reclamation plan; therefore, the surety cannot require a vegetative cover at this time.

Additionally, Mr. Smith expands his treatment of cover systems on pages 4-6 of his letter, citing additional features not in the currently approved Reclamation Plan, then proceeding to extrapolate those costs into his discussion of White Mesa. This information requires incorporation into the Reclamation Plan, and design approval prior to incorporating these elements into surety.

5. Biotic intrusion layer: this is both standard practice on closure caps and needed to prevent deep burrowing animals from penetrating the cap; [sic] (p. 2)

Mr. Smith has not addressed the presence of prairie dogs and other burrowing species that the typical gravel intrusion barrier does not discourage. The vegetative cover would attract these animals, especially when the seeds are first placed. Therefore, more specifics on the intended biotic intrusion layer are required if a vegetative cover design is approved. Furthermore, as previously stated, the DRC cannot dictate design through the surety. The design follows a review cycle that precedes its inclusion in the surety. Until this issue is resolved and the vegetative cover system receives approval, those elements cannot appear in the surety.

6. Geotextile & capillary break: for a +200 year closure design, as required by law and industry practice, a water storage layer must be isolated from the balance of the system with a capillary break. Without said break, the water stored in the upper layer will be drawn into the radon barriers through the capillary action of the soils. Clayey soils can develop capillary suction approaching 1 atmosphere and 15-foot draws are commonly seen in the field;

See comments 1, 3, 4 and 5 above. This element does not appear in the approved Reclamation Plan. The surety is not the appropriate place to effect design changes. This comment will be forwarded to the design review team.

Mr. Smith states that the law requires inclusion of a geotextile, but does not provide the full legal citation. This information would prove useful to the design review team. In several places in the letter, Mr. Smith cites standards and regulations applicable to mining and to landfill closure, and applies these regulations to NRC-regulated work. Mr. Smith should provide the law's full citation so the review team can assess its applicability to this situation. Even under a determination that the law pertains to another line of work, and not to uranium milling, the DRC can still advance an effort to include the standard as a best practice. However, as previously stated, this issue should receive scrutiny under review of the Reclamation Plan, not the surety.

7. Contingency, which is reflective of the level of design and the risk of unknowns. [sic] The most common contingency used in the mining industry is 15 to 20% of the direct costs (and, as discussed below, this is almost always inadequate). Larger contingencies are appropriate when either the design is conceptual (as in the case of most, including the Whit [sic] Mesa, closure plans) or the site is subject to significant uncertainties (such as the extent of contamination in need of remediation). Contingencies are sometimes applied at different rates by either line item or work area subtotal. For example, the contingency for dismantling the mill could be lower than the contingency for remediating groundwater contamination. (p. 3)

Mr. Smith correctly points out that the contingency should reflect the level of planning, and that less well-developed plans should carry larger contingencies. NUREG-1757 requires, as a minimum, the 25% contingency in the current surety. Until additional information comes to light, I am satisfied with that level of contingency.

Consistent with language in NUREG-1757, Mr. Smith cites as-yet undiscovered environmental remediation needs as one basis for escalating the contingency. As I argued in the EnergySolutions Low Level License Amendment 16 Public Participation Summary, ASTM E2168 asserts that anything that can be foreseen and labeled should be analyzed and an appropriate budget *allowance* (not contingency) should be established. While right in concept, that environmental remediation should appear in the budget, Mr. Smith needs to differentiate between contingency and allowance. The DRC should begin to grapple with the environmental remediation issue, and determine a policy for reflecting the need to address as-yet undiscovered, but possible, remediation in surety.

8. Most cost estimates do not recognize inflation or cost escalation and as such should be cited in terms of the year the estimate was based (e.g., 2014 dollars). The estimate must then be escalated to the time period in which the work will be completed, using forward-looking inflation factors appropriate for the region. Common escalation factors are 3.0 to 5.0% per year (Zuzulokc, 2004). The failure to recognize inflation in cost estimates looking out 10 to 15 years in the future creates a strong built-in bias to underestimate costs; all other factors being correct, the actual cost will be 151% to 198% of the estimate. This is commonly included in the bonded amount because the cost will escalate regardless of the operator's ability to obtain larger bonds in the future. That is, the liability for the escalated future cost of closure is created in the year the impacts are created and the bond should reflect that. (p. 3-4)

The DRC requires licensees to base cost estimates on current dollars. The licensee applies the price deflator posted on the Department of Commerce website to all costs originating from bids in previous years. The post-closure and perpetual care budgets receive like treatment, using the Federal Reserve forward-looking

price deflator. The DRC can improve its processes by examining the time required for decommissioning, and applying the forward-looking deflator to costs expected to accrue beyond the first year of the project.

The price deflators Mr. Smith cites (3.0% to 5.0% versus the Federal Reserve deflator of between 1.5% and 2.5 percent depending on the year) appear in industry literature, and may provide a better estimate of future inflation, but the DRC will need to evaluate the risks and benefits of using this alternative information.

The Federal Reserve provides forward-looking estimates of inflation in the Consumer Price Index (CPI) for 10 years. The CPI considers a market basket of items that consumers routinely purchase, which is a poor representation of construction costs. The Engineering News-Record (ENR) has provided historical analyses of construction costs that document inflation in the construction sector. This information is represented in two indices, the Construction Cost Index (CCI) and the Building Cost index (BCI). Both of these indices consider the cost of steel, wood, concrete and construction labor. The differences between these indices are the higher proportion of labor used in calculating the CCI, and the specialization of labor included in the BCI. Of these, the Construction Cost Index more closely represents decommissioning activities. Historically, the CCI has run about double the CPI. However, ENR only provides a one-year estimate of future inflation, and the CCI is much more volatile than the CPI. I have asked Mr. Smith to direct me to his data sources on this issue.

Access to the CCI is available by subscription to the ENR. However, RSMeans provides that data with its online product. To determine the usefulness of the CCI data, the DRC will need to evaluate the risks and benefits of using a one-year forward-looking estimate to project inflationary effects during the post-closure period, and any correlation that may exist between the CPI and the CCI.

The only conclusion I am prepared to advance at this point is that the CPI appears to underestimate the effect of inflation on average.

Mr. Smith devotes most of p. 4 to a discussion of how inflation affects project costs. Those impacts are not in dispute. However, Mr. Smith's numbers derive from comparing dissimilar situations. Mr. Smith cites detail from a study Pincock, Allan and Holt published in 2000 that compares cost estimates at the *feasibility study* stage, which would have occurred well before mill construction, to *final construction* costs to make the point that inflationary pressures escalated costs beyond budget. While the concept provides no difficulty, taking the magnitude of the impact as applicable to the situation at White Mesa overstates the point. Feasibility planning occurred for White Mesa decades ago. A better approach would be to take the current surety budget, and demonstrate how inflation would affect it between project initiation today and project completion in three to seven years, then to consider the additional effect of inflation at the higher CCI rates. At 2.5% inflation (the highest level I have seen recently in the federal data) for seven years would have increased costs 9% (assuming a linear payout rate over that seven years) versus the 18% to 37% escalation Mr. Smith cited.

Recommendation: The DRC should evaluate the feasibility of using the CCI in accounting for inflation in the surety. In conjunction with refinements in the project schedule, the DRC should see that all costs are indexed using whichever index is determined to be most appropriate.

9. To summarize, the references reviewed considered a total of at least 110 sites and about 80% of global uranium production. These are summarized in Tables 3a and 3b. One conclusion that must be drawn is that a closure cost estimate significantly lower than \$356,000 per acre of tailings must be viewed with suspicion. EFRI's latest estimate is \$93,098 per acre of tailings, which is less than 15% of the average of all US UMT closures and 6% of the cost for Monticello (Table 2). (p. 6)

The preceding argument seems compelling on the surface. However, the analysis fails to account for decommissioning work already completed (temporary cover and partial dewatering of Cell 2, partial temporary cover on Cell 3) and for the differences in the sites (some sites required removal of tailings and debris to remote locations for disposal). The level of planning Mr. Smith has recommended would provide good data no later than the feasibility study phase. At the current evolution of the White Mesa mill, which is much more mature than the feasibility stage, a more useful approach would entail selecting from the 110 sites where Mr. Smith cites those few that have similar design and on-site disposal characteristics to White Mesa. As the project reaches new levels of refinement, so must the benchmarking data to which the project is compared change.

10. The regulatory purpose of a closure cost estimate is to ensure that sufficient funds exist to properly close [sic] and secure the site in the event that the owner defaults. In an industry-supported initiative to standardize closure guarantees, a model agreement has been prepared and includes this language: "(a) The mine closure guarantee shall be in an amount calculated to be necessary to implement the Closure Plan should the Company fail to implement the Closure Plan...." (MMDA, 2011). Given this, the method of preparing the cost estimate must assume that the project will be under government management, for which government-contracting rules apply. This means that:

- o The cost efficiencies available to the mining company cannot be recognized;*
- o An engineering, procurement and construction management (EPCM) firm with governmental experience and a high bonding capacity will be used;*
- o Prevailing wage (Davis-Bacon Act) rules will apply;*
- o All work will be contracted to public-works qualified construction companies with applicable overhead and other indirect cost factors;*
- o The cost estimate must have reasonable consideration for unforeseeable circumstances, including unexpected contamination;*
- o Agency required insurance, bonding, health and safety, independent inspection, and other rules will apply; and,*
- o Agency oversight costs must be recognized and reasonable.*

(p. 6-7)

Mr. Smith cites a mining industry document to support the claim that government procurement rules would apply, then proceeds to list several federal requirements. Firstly, the mining document does not substitute for NRC Regulation or Utah Rule. Under Utah Rule, government procurement procedures would apply. But those procedures do not go as far as Mr. Smith asserts. The mining document may prove valuable as an example of a best management practice, and I would welcome an opportunity to review the document in total.

The DRC has consistently endeavored to assure itself that company efficiencies, i.e., relationships with contracting agents and suppliers, do not influence the surety amount.

Nowhere in the Utah Rule will the DRC find a requirement to hire an engineering, procurement and construction management firm. That may be wise, but not required.

Prevailing wage (Davis-Bacon Act) rules will *not* apply inasmuch as the surety funds do not come from the federal treasury.

Public works-qualified construction crews will not be required. This is not piping and paving project in the public way, so anyone capable of doing landfill operations will qualify, with the added requirement to observe radiation safety to meet ALARA goals.

The project now has an appropriate *contingency*. It has budgetary *allowances* for known environmental remediation, but lacks funding for unknown remediation. This still needs to be addressed. (Emphasis was added to underscore the proper use of the terms *contingency* and *allowance*. Conflating these terms will lead to a licensee successfully reducing the surety by claiming that an allowance is a contingency and should be counted against the 25% requirement.)

I have not yet tried to assess the current surety completeness in the area of quality assurance. Typically, the contractor doing the work provides quality control testing to keep work within specification. The project owner, or owner's representative, provides quality assurance testing and inspection to check the work of the contractor. Quality assurance testing is often outsourced to an independent agent. I intend to perform this examination in concert with the evaluation of the DEQ oversight budget, discussed below.

Current agency oversight costs in the surety, at 4% of direct costs, may be inadequate, but I do not have good support for a better number. That was one of the reasons for starting to examine the project schedule through Gantt charts. The quantity of quality assurance testing required will vary, depending on work duration and intensity, both of which we can assess with a good project schedule.

11. Equivalent earthworks unit cost: The Rev. 4.14 estimate as provided by DEQ includes no back up information; no earthworks quantities, no equipment cycle times, etc. This makes it impossible to review or verify the accuracy of the ERFI estimate. (p. 7)

Mr. Smith may have worked from a summary. The annual submittals have much of the information he cites as missing.

12. Labor hourly rates: White Mesa apparently obtained 3 quotes for labor (those were not provided and thus not reviewed). However, according to federal law, the minimum wage and fringe benefits packages are set based on "prevailing wage" determinations. These come in the form of regional and project-specific "Wage Decisions." There are two Wage Decisions for the San Juan County, issued in 2011 and 2014 for specific labor categories. The labor rates used by White Mesa are much lower than these Wage Determinations. Further, White Mesa failed to include the employer's share of the taxes and insurance, as required by law.(p. 7)

One of the three labor quotes provided by EFR was the 2014 General Decision cited by Mr. Smith. The labor burden (benefits and taxes) were added in as a separate line item; thus the labor rates were not "fully loaded," and would appear low. By adding in the labor burden here, and accepting the overhead where EFR applied it elsewhere results in double-counting these costs, and artificially inflates the estimate. I can add a second check to see that the labor burden is sufficiently accounted for during review of the 2014 surety.

13. There is another important error in the labor estimate, the lack of a number of categories of workers that will be required to execute the project. Supervisor, foremen, engineer, laborers (provided in some but not all areas of work), assistants and similar personnel are missing from the estimate but required to compete [sic] the work. At a minimum, there would be one supervisor (other than the "Manager" included in the estimate) and two foreman, at a total loaded cost of about \$26,500 per month. (p. 7)

As we refine the project schedule, the supervisory needs will become clearer. Mr. Smith may be correct here.

14. Equipment hourly rates: No details for the Rev. 4.14 were provided, and thus this section discusses the Rev. 5 cost estimate. A local leasing company provided equipment rates. The rates include a nominal 50% discount for hours after 40 per week, and the assumption has been that a 50-hour workweek is average, producing an average rate less than the straight rental rate. However, the corresponding labor rates do not reflect any overtime multiplier as required by prevailing wage rules. This means that either (i) the equipment rates are too low or (ii) the labor rates need to be adjusted for overtime. Public works projects tend to limit overtime because of the high hourly rate penalty and thus the safe assumption is no overtime. This increases equipment rates by 11%. (p. 8)

Equipment rates comport well with RSMMeans. Therefore, I don't see a need to change. The rental quotes in the White Mesa surety are by the week or month, not by the hour. We may benefit from a more rigorous examination of the equipment maintenance and refueling requirements.

15. Quantities (labor and equipment hours): No details on quantities were provided for Rev. 4.14, and thus this section referees to Rev. 5. The benchmarked costs are vastly higher than the costs produced from Energy Fuel's quantity estimates, suggesting the quantities are unrealistically low. (p. 8)

Mr. Smith may have worked from a summary. The annual submittals have the information he cites as missing. As we refine the project schedule, the labor and equipment needs will become clearer. However, the benchmark studies take information from feasibility studies, which are highly unrefined estimates at the beginning of the project life cycle, and compare them against the universe of projects that have been completed, without regard for the diversity of conditions and options available. To extrapolate from a lack of data to a conclusion that the estimate must, therefore, be low, can lead to wildly erroneous results.

16. The quantity estimates were prepared by EFRI, by neither an independent party nor a registered engineer. The basis for the quantity estimates is provided in the hand-written notes following the cost tables; these suggest a traditional mining view on economies of scale, which are not available to a public works project. Without having a full peer review of the quantity estimates it is not possible to estimate an adjustment. (p. 8)

Neither NRC regulation nor Utah Rule requires surety estimates to be prepared by an independent third party. 10 CFR § 30.35 requires applicants for and holders of licenses to provide a decommissioning funding plan and to update that plan annually. Utah adopted this language in R313-22-35, with one significant modification: inclusion of a requirement that all surety documents submitted for review meet the requirements of NUREG-1757, Volume 3, published September, 2003. P. 4-9 of the cited NUREG states, "The purpose of the review of the cost estimate is to ensure that the licensee or responsible party has developed a cost estimate for decommissioning the facility...." (Emphasis is mine). Thus, the licensee may develop the estimate in-house, or hire a consultant to perform that service. The preparer of the estimate need not be a neutral third party. The peer review Mr. Smith desires must occur before the

responsible engineer stamps the document. Furthermore, the public's interest is protected by the regulatory review performed at the DRC offices.

For the record, the estimate is reviewed and signed by a Utah Registered Professional Engineer, and reviewed at the DRC by a Utah Registered Professional Engineer. Mr. Smith's assertion to the contrary is in error.

17. Specialized Professional Services: The cost estimate includes three highly specialized labor categories: Survey crew, environmental sample crew, and quality control contractor. The hourly rates used for these are: \$14.46, \$14.46 and \$62.00 per hour. These are all far below industry norms. (p. 8)

The DRC can discuss whether construction surveys need to be performed under the supervision of a licensed surveyor. The definition of a construction survey would influence that debate. I would recommend some level of quality assurance surveys be performed by a licensed surveyor, and that the DRC have in its budget funding to engage by contract a licensed surveyor. Quality control testing need not be contracted out, but the DRC can benefit from contracting out these services. Environmental sampling can be performed by low-skilled labor as long as the labeling, care, transport and documenting of samples occurs appropriately.

With the exception of the quality assurance issues (which are not a part of Mr. Smith's comment, but which require attention), the funding provided in the surety seems reasonable. Mr. Smith details a top-end approach to procuring these services from out-of-state sources in the first three paragraphs of p. 9, much higher in expense than I can recommend. The added expense suggested by Mr. Smith buys very little improvement in quality, and these services are available at lesser cost locally. The quality assurance issues belong in the DEQ management and oversight budget, which is a topic of refinement at the moment.

18. Management & Support. At the end of the cost estimate EFRI has included a category for "Management/Support." The rates range from \$8.96/hr for security to \$64.81/hr for health physics. No salary loading or employer's share of taxes have been included and thus these rates are understated. A similar approach as used for the prevailing wage analysis would be appropriate here, and would produce a similar adjustment, increasing the total labor costs by \$996,931, or 4.7% of the total cost. (p. 9)

As discussed earlier, EFR has used bare cost hourly rates, and added in the labor burden elsewhere. Doing as Mr. Smith suggests would double the labor burden, artificially inflating the surety.

19. Cell dewatering costs: A unit rate of \$0.48/hour (\$11.52/day) has been used with no basis. Given the electrical power rates in Utah, this equates to the electrical cost for one 4 hp motor, which might be a reasonable total power demand but excludes labor, supervision, reporting, purchase or rental of the pumps and motors, and costs for installation and maintenance. The same quantity of hours is used for each cell, though they vary in size, retained water and efficiency of the dewatering system. Dewatering has two stages for cost-estimating purposes: that performed during the active operating life of the mine and that performed afterwards. An approach based on a nominal cost per hour or cost per gallon may be logical during the operating life, since there is a core staff already on site along with the equipment, infrastructure and administration systems. However, once operations have ceased there will be no support and the dewatering program will be operated by a contractor and a significantly higher unit cost. If operator time required just 1 hour a day that would increase the total closure cost by 5.67%. (p. 9)

The cell dewatering system uses an automated system, purchased and installed. No rental or daily maintenance is required. The pumps operate intermittently, removing small amounts of "slimes" from the

consolidating tailings. The surety includes a budget for pump replacement. The use of mining as an analog has led to a vast overestimation of the dewatering needs of the project, and thus overstates the required cost.

20. Supporting quotes: The Rev. 5 estimate included supporting price information for some of the relatively minor costs (e.g., road haulage of rip rap from the borrow source 7 miles from the site, rental rates for a gravel screen, and so forth). None of these "quotes" (some are as informal as telephone notes) suggest that the vendor understands that he or she is quoting a public works project with the applicable contracting, insurance and prevailing wage criteria. (p. 10)

Mr. Smith criticizes the telephone quotes EFR used in the surety, but uses the same tactic on the preceding page to justify his cost figures for professional services. No out-of-the-expected techniques to obtain quotes appear in the EFR estimate.

Mr. Smith returns to his earlier argument that the quotations require public works rates for federally funded projects. The standards he cites do not apply.

21. Remediation costs: There is no provision for any currently unknown contamination. It is unlikely that the extent of surface or groundwater contamination is currently fully known and providing no such provision is irresponsible. (p. 10)

As stated earlier in this memorandum, this issue requires examination.

22. Indirect costs:

o Contingency: 20% is allowed and is too low for the level of design and the lack of supporting fixed price bids. Considering the findings of the prior section on industry experience with cost estimates versus actual costs, a contingency of 25% to 30% is recommended and the DRC has advised that they will require 25% for future cost estimates. For the purposes of this analysis, the contingency has been left at 20% of the direct costs and updated as the direct costs have been adjusted;

o License & bonding: 2.0% is reasonable for a private-works project but is much lower than seen on public works projects;

o UDEQ contract administration: 4.0% is allowed. This item is equivalent to "owner's costs" for conventional cost estimating, which run from 10% to 25%, with 12% to 15% being typical;

o Detailed engineering, procurement and construction management (EPCM) has been omitted and typically runs about 12%; and,

o Estimate provides 2.25% for "Engineering design review." This suggests that the design will be prepared by EFRI then reviewed and stamped by an external PE. Not only is this inappropriate for a project which has been taken over by the State, it is in violation of the Professional Engineers and Professional Land Surveyors Licensing Act.

Mr. Smith acknowledges the move to a 25% contingency, but makes his argument on the 20% contingency nonetheless.

Licensing and bonding, as Mr. Smith notes, is reasonable at 2% for a private-works project, which is the level for the EFR surety.

I agree with Mr. Smith that the DEQ oversight budget appears to be low. I have not yet formulated an appropriate budget for oversight; this work is ongoing, and will use the Gantt chart and other schedule-related refinements. I cannot recommend an adjustment without justification, and that justification is lacking at the moment.

I agree with Mr. Smith that we have not explicitly accounted for the procurement phase of the project. All we have right now is 2.25% for "engineering redesign." This work requires research to see what the expected time requirement is, what the associated work would entail, and what it would cost. I have identified that issue to address along with other front-end issues such as the costs and delays associated with bankruptcy proceedings. If I find supporting data for a figure at the 12% Mr. Smith suggests, or any other appropriate figure, I will be prepared at that point to advance that request as a placeholder pending further refinement. Mr. Smith is welcome to provide me any documentation he can produce to assist in my researches.

Mr. Smith appears to misunderstand the purpose of the engineering redesign line item. The work will be commissioned by the DRC, prepared, peer reviewed and stamped by a PE at a design firm, reviewed at the DRC by a PE whose license would only be exercised in providing the owner's review, and the designer's stamp will be the only stamp appearing on the documents. This all falls well within the legal framework of professional engineering.

23. Long-term care fund: At current deposit interest rates a fund of \$847,862 provides an annual cash flow of about \$12,000. This provides for no on-site care and is unlikely to provide for the mandatory report filings. A more reasonable provision is \$100,000 per year, at least for the decades immediately following closure, increasing the long-term care fund requirements to \$7,485,471. (p. 10)

Mr. Smith should substantiate his estimate of \$100,000 per year. The perpetual care fund does require additional scrutiny. However, without support, I cannot recommend Mr. Smith's estimate.

24. A reasonable range of closure costs can be estimated by approaching the costs from two directions: adjusting the EFRI cost estimate for the line-item corrections discussed in the prior section, and applying the benchmarked costs to the White Mesa closure areas. (p. 10)

Having already noted problems with Mr. Smith's line-item corrections and benchmarking, I won't repeat the comments I have already made here. I find Mr. Smith's estimate to lack support. While he makes a few good points, arguments lack the rigor the DRC would require to justify increases in the surety.