



# Department of Environmental Quality



To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.

Matthew Mead, Governor

Todd Parfitt, Director

November 12, 2014

Mr. John Cash – VP Regulatory Affairs  
Lost Creek ISR, LLC  
5880 Enterprise Drive, Suite 200  
Casper, WY 82609

Re: **Lost Creek ISR LLC, TFN 6 3/105 – KM Mine Plan Revision and  
TFN 6 4/105 Lost Creek East Amendment**

Dear Mr. Cash:

The Wyoming Department of Environmental Quality – Land Quality Division (WDEQ/LQD) District 2 Office received Lost Creek ISR's (LSI) KM Mine Plan Revision (TFN 6 3/105) and Lost Creek East Amendment (TFN 6 4/105) on September 24, 2014. The two submittals are intimately tied together as the Mine and Reclamation Plans for the KM Mine Plan Revision are found within the Lost Creek East Amendment. Public Notice is required for these actions and given the tie between the two submittals a single Public Notice can be used to cover both actions.

Because of the link between the two, a single declaration of *Incomplete* is rendered for both actions. The reasons for this declaration are the unclear definition of what horizon is to be defined as the underlying aquifer and inadequate characterization of the underlying aquifer,

In addition to the above, the Lost Creek East Amendment application was not submitted according to earlier agreements made with the WDEQ/LQD. It is my understanding that LSI was informed that while baseline appendices could be submitted as stand-alone documents, the Mine and Reclamation Plans must be a single document, thus, the existing (approved) plan must be revised accordingly. Please see the Introduction to the enclosed reviews for further discussion.

If there are any questions please contact Brian Wood in the Lander Land Quality Division office at (307) 332-3047.

Sincerely,

Brian R. Wood  
WDEQ/LQD District 2 Assistant Supervisor

cc: Mark Newman – BLM-Rawlins Field Office, 1300 North Third St., Rawlins, WY 82301  
**John Saxton – US Nuclear Regulatory Commission**  
John Erickson - WDEQ-LQD, District II → TFN 6 3/105 and TFN 6 4/105  
Ramona Christensen – WDEQ-LQD Cheyenne, TFN 6 3/105 and TFN 6 4/105  
Brian Wood, Chron

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## MEMORANDUM

**To:** File, TFN 6 4/105 – Lost Creek East Amendment

**From:** Brian Wood, WDEQ/LQD District II Hydrologist

**Date:** November 12, 2014

**Subject:** Completeness Review – 1<sup>st</sup> Round, Lost Creek East (LCE) Amendment

### Introduction

Lost Creek ISR's (LSI) Lost Creek East Amendment application was received on September 24, 2014. Below is the first round of Completeness comments. The submittal is found to be incomplete for several reasons, which include format, inadequate definition of the underlying aquifer, and an incomplete Mine Operations Plan.

### Comments

#### *General*

- G-1 The cover letter provided with the revision application does not indicate if the submitted material is intended to be a stand-alone series of volumes or if the material is intended to be incorporated into existing volumes. No Index Sheet was provided. If the intent is to make the application a stand-alone series of volumes, then the "Master Table of Contents" is required to be incorporated into Volume 1.
- G2 Application format. It is the reviewer's understanding that the accepted format for uranium applications once being amended is that there will be a single Adjudication Volume, Baseline Appendices volumes that area specific (i.e. original permit area, Amendment 1, amendment 2, etc.) and a single, all encompassing, Mine Operations and Reclamation Plan. It is also believed that much of this concept was discussed with LSI prior to submittal. Please also see Comment MP-1. The current format in which the application was submitted is not acceptable.
- G3. The size of the proposed amendment area is large enough to cause Public Notice. No response required.

#### *Appendix D5*

- D5-1 The cross-sections provided, based on the direction provided in WDEQ/LQD Guideline 4, Reference Document 3, Section E (3), should be adequate to characterize the site geology. For example, Cross-Section A<sub>3</sub> to A<sub>4</sub> there is a span of 2,500 feet along the cross-section where the base of the "KM" production remains undefined. The issue

grows when attempting to define the extent of the underlying aquifer. Please also see Comment D6-4. Please discuss and make appropriate revisions to the application.

#### Appendix D6

- D6-1 Several references are cited throughout the Appendix, yet no reference list is provided. Please either direct the reviewer as to where the reference list can be found or provide a complete reference list.
- D6-2 No flow estimates were provided for the two major watersheds within the proposed amendment area. Please provide.
- D6-3 Figure D6.2-1. There is no legend for this figure, please revise and resubmit.
- D6-4 From the reviewer's perspective, there is conflict between what is presented in the K-M Mine Plan Revision and what is presented in the LCE Amendment application. Within the K-M Mine Plan Revision, the "L" and "M" horizons appear to be treated as separate and distinct hydrologic units (see Volume 7, Figure D5-1) whereas within the LCE Amendment they are treated as "Sub-horizons" within the "KLM horizon".

Review of the isopach maps and cross-sections indicates that the K-shale characteristics within the original permit area and the LCE are similar. Furthermore regarding baseline sampling to define the underlying aquifer, for the K-M Revision, the "L" horizon (Sub-horizon) was sampled for baseline water quality. This would suggest it is the underlying aquifer. For the LCE, the distinction of the "L" and "M" horizons appear to be ignored and only the KM horizon proper and "N" horizons are sampled. This would suggest the "N" horizon is being considered the underlying aquifer.

In summary:

- A) Using one nomenclature for the K-M Revision and another for the LCE Amendment is not acceptable when describing the same unit.
- B) It does not seem possible to protect the "L" horizon within the original permit area and then leave it unprotected within LCE as can be concluded from the information presented, which suggests the "N" is the underlying aquifer.
- C) Looking toward the future, what does LCI propose the aquifer exemption boundary to be? Please also see Comment D12-1.

Please address and make the appropriate updates to the text. Please note that dependent on the response to this comment, additional comments may be asked concerning adequate characterization of the underlying aquifer.

- D6-5 Attachment D6-4 referenced in several locations within Sections D6.2.2.2 and D6.2.2.3. The tab for this attachment references a previous submitted report. I have researched the files and do not seem to be able the report, solely the initial work plan. The reality is

that Volume 8C should be identified as Attachment D6-4. Please make the appropriate revision(s) to the application.

- D6-6 Page D6-12, third bullet. What horizon / sub-horizon is being referred to in this discussion? Please revise the text accordingly.
- D6-7 Page D6-24. The text divides the K-M Horizon (sub-horizon) into three distinct "sands". The remainder of the document, including the stratigraphic column provided divides the K-M solely into the Upper and Lower. How is LC-ISR characterizing the K-M horizon; two or three distinct sands? Characterization should be consistent within K-M revision and the LCE Amendment. Please make the appropriate revisions to the application(s).
- D6-8 Page D6-24. The last bullet item under the "KM Horizon" states "L Horizon is the underlying aquifer to the KM Horizon, but will require additional hydrologic characterization". Please also see Comment D6-4, provide an explanation/discussion, and make the appropriate updates to the application.
- D6-9 Page D6-24 references Attachment D6-4 as the location for the premine potentiometric surface maps. Figures 2-5 through 2-8 are not acceptable. Please see the agreed upon standard in WDEQ/LQD Guideline 4, Reference Document 3, Section F (1)(b).
- D6-10 Page D6-24 states the ground water gradient for the "FG" and "N" mimic that of the "HJ" and "KM" which are between 0.8% and 1.9%. The surface gradient for the "N" shown in the northern portion of the LCE is 3.3%; almost 50% greater than the maximum inferred for the permit area. Please address and revise the text as appropriate.
- D6-11 Attachment D6-4, Volume 8C. Within the proposal presented to the WDEQ/LQD in May 2013, the proposed monitoring for the *Central Cluster* test included Well MB-11, which is completed in the "L" Horizon. The results and analyses for the LCE series of tests do not include any data for this well. Please explain.

#### Appendix D7

- D7-1 The Goslin series makes up a very minor component of the various soils within the Amendment Area. The recommended salvage depth for this series is zero, which is based solely on Saturation Percentage. The marginal range within Guideline 1 is <25%. The Saturation Percentage for the upper six inches is 23% with no other limiting factors within this section of the profile. The WDEQ/LQD expects that should this series be affected and salvage required that six inches of soil be salvaged.

#### Appendix D8

- D8-1 Section D8-1.3.1, last sentence, second paragraph. If the half-mile buffer was not included as part of the sample point selection process for a vegetative cover

assessment, then this is not acceptable. Please see Craig Smith's memo of September 17, 2012. Please address.

#### *Appendix D9*

D9-1 The WDEQ/LQD awaits the outcome of the DDCT assessment.

D9-2 Copies of this Appendix and any mitigation measures outlined in the Mine and Reclamation Plans have been sent to WGFD and USFWS for review and comment. The WDEQ/LQD is awaiting any comments they may have on the application.

#### *Appendix D10*

No comments on this section.

#### *Appendix D11*

No comments on this section.

#### *Appendix D-12*

D12-1 Appendix D-12 was not provided. Please provide a Draft Statement of Basis for the Aquifer Reclassification.

#### *Mine Plan*

MP-1 Prior to submitting the KM revision and the Lost Creek East Amendment applications, the reviewer understands that there were some discussions as to how the application was to be put together. While baseline information for various mine areas could be housed in independent volumes, the Operations (Mine) and Reclamation Plans were to be all-encompassing. Obviously, this is not what was submitted. Furthermore, there are certain portions of the existing Plans that are no longer applicable that should be superseded by this submittal and were not. Lastly, each Figure, Table, and Exhibit should be uniquely identified, whereas this submittal borrows identifiers from previously submitted and approved materials without superseding them; this only leads to confusion and is not acceptable. Please address the above and make the appropriate revisions to the application.

MP-2 The text in Section OP 1.0 states that approximately 642 acres will be affected by mining. How was the figure estimated? The question is posed considering the degree of disturbance associated with wellfield operations and the areal extent of wellfields presented on Plate OP-2B.

MP-3 Page OP-15. As partially discussed in Comment MP-1, this should be a complete submittal, which includes updating the list of monitoring wells. Replacement pages and an Index Sheet should have been included with this submittal. Furthermore, the adequacy of the proposed plan is dependent on what aquifer is slated to be the underlying aquifer for operations. Please address the above and make the appropriate revisions to the application.

MP-4 Plates OP-2A and 2B. These maps are unacceptable in their current form for the following reasons:

- a. The legend is inaccurate,
- b. The abbreviation "RA" (presumably *Resource Area*) does not appear to be defined in the text, nor on the map. Is a *Resource Area* synonymous with a *Mine Unit*? Be consistent with terminology.
- c. No access is shown to Deep Disposal Well DP-1.
- d. It is understood that there will be some overlap between Mine Units. However, to have a mine unit within a Mine Unit is puzzling without further explanation. I believe the intent is that certain Mine Units are targeting the "HJ" horizon while others are targeting the "KM". If this assumption is correct then this should be made clear in the Mine Plan map.

MP-5 The schedule shown on Figure OP-4a is not consistent with what is presented on Plates OP-2A and 2B. Please address and make the appropriate revisions to the application.

MP-6 Page OP-12, Section OP 2.6, first paragraph. The text states that "KM Mine Units will be accessed using existing primary roads with extensions of secondary roads as shown in Plate OP-2B." KM mine units exist not only in the Lost Creek Area (Plate OP-2B), but also within the Lost Creek East area (Plate OP-2A) as well, thus, the statement is not entirely reflective of what is to occur. Please revise.

MP-7 Page OP-15, Section OP 2.11.2.2. Where are the 2 kilometers derived from? The search radius is three miles (WDEQ/LQD NonCoal Rules and Regulations Chapter 2, Section 2 (a)(i)(I)(II)).

MP-8 Page OP-17, Section 3.2, second paragraph. The text states that "Mining is planned in the KM prior to attempting to mine any immediately overlying mineral in the HJ Horizon." This doesn't appear entirely true as mining of the HJ has already been initiated within Lost Creek. Further since there appears to be no identification as to what are HJ and KM units on Plates OP-2A and 2B (see Comment MP-4) and the schedule (Figure OP-4a) does not match Plates OP-2A and 2B (see Comment MP-5), the statement cannot be verified.

MP-9 Page OP-18, Section OP 3.2.2.4, first paragraph. Please see Comment D6-4. As described in this comment, the WDEQ/LQD and LCI must reach agreement as to what the underlying aquifer to the KM horizon is. At this point the LCE amendment application appears to consider the "N" horizon to be the underlying aquifer, whereas the KM

Revision appears to consider the "L" horizon as the underlying aquifer. From the information presented I don't believe there are any distinct differences in the shale's characteristics that separate the "L" and "KM" horizons between the original and amendment permit areas. Agreement as to the "KM's" underlying aquifer will be reached through this application, not sometime in the future.

MP-10 Section OP 3.6.3.3. The pump tests conducted in the LCE amendment ignored the "L" Horizon, so to be able to assess the effectiveness of the shale underlying the "KM" would be difficult. The reviewer concedes that it was monitored during the "KM" tests in the original permit area.

MP-11 Plates OP-4A and 4B should be redrawn to reflect inclusion of the LCE amendment.

MP-12 Section OP 3.6.3.3 only discusses the "HJ" horizon, there is no mention of the underlying "KM" horizon in the discussion. This entire section needs to be rewritten.

MP-13 Section OP 3.6.4, the first sentence states "In general, the HJ Horizon will be mined prior to the underlying KM Horizon." The text on page OP-17 states "Mining is planned in the KM prior to attempting to mine any immediately overlying mineral in the HJ Horizon." The two statements are obviously in conflict. Please rectify.

#### *Reclamation Plan*

RP-1 Section 4.6 makes no mention of the "KM" Horizon in the discussion. Please make the appropriate revisions to this section.

## MEMORANDUM

**To:** File, TFN 6 3/105 – KM Mine Plan Revision

**From:** Brian Wood, WDEQ/LQD District II Hydrologist

**Date:** November 12, 2014

**Subject:** Completeness Review – 1<sup>st</sup> Round, KM Mine Plan Revision

### Introduction

The KM Mine Revision Application was received on September 24, 2014. The application has been deemed a Major Revision, requiring Public Notice (see Comment G-2). The proposed KM Mine Plan Revision will result in additional disturbance within the original permit area. A revised Appendix D-9 was not included with the application, specifically addressing the Sage Grouse issue and additional core area activity within the original Permit Area. This should be addressed in some fashion by either supplying the revised DDCT findings for the proposal or indicate that it was addressed through the Lost Creek East Amendment Application with the revised Mine Plan.

This Revision is intimately tied with the Lost Creek East Amendment. There is a substantial difference in what appears to be defined as the underlying aquifer between the two applications. Resolution to this issue must be reached before moving forward with both applications. Further, there must be consistency in the use of terminology within the application.

### Comments

#### General

- G-1 The cover letter provided with the revision application does not indicate if the submitted material is intended to be a stand-alone volume, if the material is intended to be incorporated as an addendums to the existing Appendix D5 and D6, or intended to replace the existing the Appendix D5 and D6. No Index Sheet was provided. Please address and make the appropriate formatting changes as necessary.
- G-2 No Mine and Reclamation Plans were included with K-M Revision, rather these plans were included as part of the Lost Creek East Amendment application. The Mine Plan is significant enough to cause Public Notice per NonCoal Rules and Regulations, Chapter 7, Section 2 (b)(ii)(F). Public Notice can occur simultaneously with that of the Lost Creek East Amendment. No response required.
- G-3 Each Figure, Table, and Exhibit should be uniquely identified, whereas this submittal borrows identifiers from previously submitted and approved materials without superseding them; this only leads to confusion and is not acceptable. Please address the above and make the appropriate revisions to the application.



## Appendix D5

- D5-1 Page D5-3, last paragraph in Section D5.1.1. This paragraph references Figure D5-1 twice. The first reference appears to refer to the original Figure D5-1 and the second reference to the stratigraphic column included with the revision application. Two different figures can't be identified by a single Figure number. Please also see Comment G3 and make the appropriate revisions.
- D5-2 Page D5-4, the last paragraph references Figure D5-1. I believe the reference should be to Figure D5-2 based on what is being discussed. Please and make the appropriate changes as necessary.

## Appendix D6

- D6-1 Baseline information presented in this volume for mining the KM Horizon within the Original Permit Area would suggest that the "L" Horizon is the underlying aquifer. However, the material presented in the Lost Creek East Amendment application would suggest differently. This issue must be resolved before moving forward.
- D6-2 Figures D6-11i through 11k are the premine potentiometric surface maps for the potential underlying aquifers (see Comment D6-1). The maps as presented are not acceptable. Please see the agreed upon standard in WDEQ/LQD Guideline 4, Reference Document 3, Section F (1)(b).
- D6-3 Well KPW-1A. According to Table D6-5, the well was originally drilled to a depth of 540' and the screened interval is 520' to 540'. Table D6-9d indicates screened intervals of 520' to 565' and 575' to 810'. What is correct?
- D6-4 Page D6-10, October 2011 – Internal Testing. Where is Resource Area 3? It does not appear to be identified on any map within this submittal. Based on mapping supplied with the Lost Creek East Amendment Application, it lies within the original permit area, thus what is meant by the term "amend"?
- D6-5 Page D6-13, 2<sup>nd</sup> to the last paragraph. Throughout the document, there is discussion of the "KLM" horizon, "KM" horizon, the "L" horizon, and "M" horizon. While it may seem intuitive to the author at the time, it can become confusing since all four are referred to as horizons. Further, Figures D5-1 and D5-2 make no mention of the "KLM" horizon, rather "L", "M", and "N" horizons are referred to as the "Deep Horizons" in the text. It would be helpful to the reader if there was some consistency in terminology and stratigraphic references between sections of the document. To eliminate confusion, perhaps it would be cleaner to just refer to the KLM as a "composite" and remove the term "horizon", this would make the descriptions closer to the terminology used in Appendix D5.

D6-6 Page D6-13, last paragraph. The conclusion is that Resource Area 3 can be mined without impact to the over and under lying horizons. Plate D5-1a indicates "KM" mineralization on the west end of the original permit area. Mine Plan maps presented do not provide clear representation of what horizon ("HJ" or "KM") is being mined within each Mine Unit. Based on the degree of mineralization mapped, it is assumed the western reaches will be mined, thus, what conclusions can be reached concerning mining impacts to the over and under lying horizons across the original permit area?