

From: Malliakos, Asimios
Sent: Friday, January 10, 2014 11:03 AM
To: 'Knowles, Timothy'
Cc: 'Slama, Chuck'; Raddatz, Michael; Hsueh, Kevin; Lemont, Stephen
Subject: RE: Clarification Needs on the URENCO USA Responses to NRC Request for Additional Information

Tim,

Please see below the NRC responses in **blue**.

Your response will posted in ADAMS as publicly available.

Thank you

Asimios

From: Slama, Chuck [<mailto:Chuck.Slama@urencocom>]
Sent: Friday, December 06, 2013 11:57 AM
To: Malliakos, Asimios
Cc: Raddatz, Michael; Knowles, Timothy
Subject: RE: Clarification Needs on the URENCO USA Responses to NRC Request for Additional Information

Asimios,

This email is the response to the 8 RAIs emailed previously, see original email below. As discussed in our phone calls and in an attempt to minimize confusion in many emails, I waited for the completion of all 8 responses prior to sending this email. Those with short answers, are answered in the email text below. Otherwise, please see the supporting attachments.

Regards,

Charles (Chuck) James Slama
Licensing Project Manager

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Clarifications on RAI 1b response

1. The response to RAI 1b refers to the footnotes to Tables 4.2-2 through 4.2-4. There are no footnotes to the tables in ER Rev. 21 as discussed in the response. Please provide the footnotes. Contrary to the response which states that Table 4.2-4 does not exist, Table 4.2-4 does exist in ER Rev. 21. The title of Table 4.2-4 is "Radiological Latent Cancer Fatalities from Accidents during Transportation of Radioactive Materials" and appears out of order in the document (after Table 4.6-3).

UUSA Response:

A review of ER Rev 21 by UUSA personnel noted that the footnotes do exist as discussed in the response to RAI 1b. It is believed that the reviewer may be looking at the Supplemental ER in error. Please see the attached pages from ER Rev 21 with the referenced tables and footnotes.

The response to RAI 1b referring specifically to UUSA ER Rev 21, not the Supplemental ER.

- a. The referenced footnotes exist in ER Rev 21; they do not exist in the Supplemental ER.
- b. Neither table 4.2-4 nor any table titled "Radiological Latent Cancer Fatalities from Accidents during Transportation of Radioactive Materials" exists in ER, Rev 21; table 4.2-3 exists with this title in the Supplemental ER.
- c. The final revision of the Supplemental ER will be corrected to change table number 4.6-3 to table number 4.2-2.

NRC Staff Response:

The versions of ER Rev 21 (Environmental_Report_Rev_21_10MSWU_Redline(11-10-12).doc and Environmental Report Rev 21 10MSWU Redline(11-10-12) Accepted.doc) provided do not have the tables as provided in the UUSA response (Jan. 2013 version). Regarding the transportation analysis, the inconsistencies in the number of shipments for each shipment type among the ER (Nov. 2012, Rev. 21), the Supplement ER (Rev. 4c), and the LPES (2013) transportation risk report need to be rectified. It is understood that the number given for each shipment type is an estimate and depends on potentially varying future conditions, but they should be the same in the Supplement ER and LPES reports and the difference with the 3 MSWU shipment numbers in Rev. 21 of the ER (Jan. 2013) explained. The biggest problems to date have been trying to ascertain the basis for the different numbers given in the different reports and that the calculated risks are not always clearly identified (or misidentified) with respect to the number of shipments considered in the calculations. UUSA has posted in ADAMS the ER Rev. 21 as non-publicly available. Make Rev. 21 publicly available in ADAMS..

Clarifications on RAI 1c response

2. The Supplement ER and LPES report (LPES, 2013) do not provide an analysis for return transportation of the empty 48Y "heel" cylinders from UUSA to Port Hope and Metropolis. The LPES report (LPES, 2013) does note the potential radiation hazard near the "heel" cylinders, but does not provide a transportation analysis. The Supplement ER also does not include any impacts from transportation of "heels" cylinders. Please provide the analysis.

UUSA Response:

See attached response to RAI 2.

NRC Staff Response:

The response provides the requested clarification.

3. As noted in RAI 1a, an average of four 30B product cylinders is expected to be on an enriched product shipment. The LPES RADTRAN analysis (LPES, 2013) for product

cylinders appears to use the external dose rate based on exposure to one cylinder, not four cylinders, thereby underestimating external exposure impacts to the public. Why was an external dose rate based on four cylinders not used? Also, the single cylinder dose rate at two meters was used in the analysis. Since the RADTRAN dose rate input used is for one meter from the vehicle, it would be more appropriate to use the one meter dose rate to be conservative (even though the sides of the cylinders will be back from the side edge of the vehicle) and thus not further underestimate the risks. There is also no discussion in either the Supplement ER or LPES report (LPES, 2013) as to the assumed package configuration on the transport vehicle. The accident risk analysis does consider the contents of four 30B product cylinders.

UUSA Response:

See attached response to RAI 3.

NRC Staff Response:

The request for clarification is with respect to the external dose rate of the 30B product shipments as it pertains to potential population risk. Transportation risks to both the crew and the public should be estimated in the same manner as originally done in NUREG-0170, *Final Environmental Statement on the Transportation of Radioactive Material By Air and Other Modes*." Note that both ER Rev. 20f and ER Rev. 21 state in Section 4.2.7 that "The dose equivalent to the public and worker for incident-free transportation has been conservatively calculated to illustrate the relative impact resulting from transporting radioactive material." The use of external dose rate from one cylinder is certainly not conservative if four cylinders are on the shipment. Provide either:

- 1) an estimate of the external dose rate at one meter from the side of the transportation vehicle (with 4 30B cylinders loaded in the intended configuration) or
 - 2) a rationale as stated in the clarification request for the apparent use of the external dose rate from one cylinder to estimate a conservative population risk when 4 cylinders are on the shipment.
4. The LPES report (LPES, 2013) considers transportation of liquid radioactive waste. Please state what is the liquid waste considered in this analysis. State if this is referring to the additional solid waste from solidified wastewater which had previously been slated for treatment through evaporative processes (Supplement ER, Section 4.2.7). If this is the additional solid waste, The LPES report (LPES, 2013) only evaluates 4 "liquid waste" shipments rather than "approximately 20 additional truckloads of low level waste transported to Clive, Utah, annually" as stated in Section 4.2.7 of the Supplement ER.

UUSA Response

See attached response to RAI 4.

NRC Staff Response:

Further clarification is needed. Section 4.2.6.4 of the Supplemental ER (Rev. 4c.) states "The number of these waste material packages will increase with the expansion, from

approximately 477 fifty-five gallon drums of solid waste annually, to between 1,140 and 1,380. Using a nominal 60 drums per waste truck shipment, approximately 19 to 23 low level waste shipments per year are anticipated with the expansion.” The present response indicates that all 23 shipments “are the result of the solidified wastewater”. If that is the case, what would become of the solid radioactive waste generated as described in Section 3.12.6 of the Supplemental ER (which refers to Section 3.12.2 of the ER)? According to Table 4.2-2 of ER 21 (Jan. 2013 version), as provided in response to #1 above, 160 waste shipments are going to Barnwell, Clive, or Oak Ridge. Are the 23 shipments due to solidified wastewater in addition to the 160 or are they part of the 160? Or is the 160 now reduced to 23? In addition, Table 4.13-1 of the Supplemental ER shows a projection for the annual amount of radioactive waste generated during Phase 5 which totals 2,198,371 lbs, the bulk of which is solidified wastewater. Typical full loads (legal weight) on a tractor/semi-trailer combination are about 40,000 to 45,000 lbs. If a full load based on weight (40,000 lbs) were sent each time, approximately 55 annual shipments would be required to transport the waste in Table 4.13-1. Clarify the number of annual shipments of radioactive waste expected when the UUSA facility is operating at 10 MSWU per year. Give the expected breakdown by radioactive waste type as listed in Table 4.13-1 of the Supplement ER and revise the Supplement ER and transportation report accordingly.

5. Section 4.2.6.4 of the Supplement ER states that 60 fifty-five gallon drums per shipment are assumed in order to estimate that 19 to 23 low-level waste shipments will be needed annually. The LPES RADTRAN analysis (LPES, 2013) assumes only 8 drums per shipment for the solid waste shipments and only 4 drums for the “liquid waste” shipments. Why did the analysis only consider 8 or 4 drums per shipment when the Supplement ER assumed 60 per shipment? In addition the external dose rate used is for only one drum (instead of 60) at a distance of 2 meters rather than 1 meter. In this case, the drums would be fairly close to the side of the vehicle and the 1 m dose rate would be more appropriate. If the radionuclide inventory per drum as input to RADTRAN is truly representative, then the accident risk impacts will be notably underestimated if there are 60 drums per shipment. Explain why the external doses used were for one drum instead of 60 drums and why for 2 meters instead of 1 meter.

UUSA Response:

See attached response to RAI 5.

NRC Staff Response:

Similar to #3 above, the request for clarification is with respect to the external dose rate of the low-level waste shipments as it pertains to potential population risk. Transportation risks to both the crew and the public should be estimated in the same manner as originally done in NUREG-0170, *Final Environmental Statement on the Transportation of Radioactive Material By Air and Other Modes*. Note that both ER Rev. 20f and ER Rev. 21 state in Section 4.2.7 that “The dose equivalent to the public and worker for incident-free transportation has been conservatively calculated to illustrate the relative impact resulting from transporting radioactive material.” The use of external dose rate from one drum is certainly not conservative if sixty drums are on the shipment. Provide either:

- a) an estimate of the external dose rate at one meter from the side of the transportation vehicle (with 60 cylinders loaded in the intended configuration) or
- b) a rational as stated in the clarification request for the apparent use of the external dose rate from one drum to estimate a conservative population risk when 60 drums are on the shipment.

Also provide the potential population accident risks for 60 drum low-level waste shipments..

- 6. Section 4.2.6.1 of the Supplement ER anticipates a range of up to 1,365 feed shipments per year, but the updated tables for the Supplement ER peak year analyzed in the supporting transportation report only consider 1,259 shipments (LPES, 2013). Please explain discrepancy.

UUSA Response:

Preceding the last round of transportation impact modeling, a review of the feed shipment inputs was performed. Based on current information from URENCO logistics for the annual feed shipments through full facility capacity of 10 MSWU, the maximum number of annual feed shipments (one 48Y cylinder per truck) is 1,259. This maximum rate was predicted to occur in the years 2020 and 2021. The RADTRAN run performed in 2013 used a maximum feed shipment rate of 1,259 on an annual basis. The Supplemental ER text which contains the reference to 1,365 feed shipments will be amended to correct the basis for the evaluation of potential impacts.

NRC Staff Response:

The response provides the requested clarification.

- 7. Section 4.2.6.2 of the Supplement ER suggests that approximately 220 enriched product shipments would occur annually. The supporting transportation report, (LPES, 2013), lists and analyzes 235 shipments for a peak year which is then bounding. Please clarify which is the correct number of shipments the 235 or the 220 shipments. Also, to avoid any confusion, include the number of shipments considered in the result tables.

UUSA Response:

The number of shipments considered in the LPES result tables is up to 235 annually, each carrying 4 cylinders per shipment. The underlying purpose for the modeling run in 2013, as reported in LPES 2013, was to correct a previous under accounting error in modeling for the number of shipments of product represented in the Supplemental ER. The model output previously did not account for the 220 shipments of product cylinders, but rather modeled impact from 59 shipments annually. During the course of reviewing the plans by URENCO logistics department, it was determined that there would be one year in the projection through full scale which would involve up to 235 annual shipments

of product cylinders. Therefore, to be conservative and bounding, the LPES 2013 model run includes impacts from 235 annual shipments of 4 cylinders each of product.

NRC Staff Response:

The shipment number in the Supplement ER should be revised accordingly.

8. The new radiological latent cancer fatality impacts provided in the LPES report (LPES, 2013) and in the updated Table 4.2-2 for the "CREW", "OFF LINK" and "ON LINK" do not appear to be from the results in the RADTRAN output provided with the RAI 1c response. It is not clear as to why the impacts for shipments of the same number of tails cylinders to Paducah are about twice the values for shipment of tails cylinders to Hobbs, but the distance to Paducah is about 90 times the distance to Hobbs. Please provide clarifications.

UUSA Response:

See attached response to RAI 8.

NRC Staff Response:

The response provides the requested clarification.

From: Timothy Knowles
Sent: Friday, September 13, 2013 8:15 AM
To: 'Malliakos, Asimios'
Cc: Raddatz, Michael; Chuck Slama
Subject: RE: Clarification Needs on the URENCO USA Responses to NRC Request for Additional Information

Asimios,

We will start working on the questions that you have provided.

Regards,

Tim Knowles
Licensing and Performance Assessment Manager

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From: Malliakos, Asimios [<mailto:Asimios.Malliakos@nrc.gov>]
Sent: Friday, September 13, 2013 7:42 AM
To: Timothy Knowles

Cc: Raddatz, Michael; Chuck Slama

Subject: Clarification Needs on the URENCO USA Responses to NRC Request for Additional Information

Tim,

The discussion and questions below are in reference to the transportation analysis responses to RAI 1b and RAI 1c from the URENCO USA (UUSA) "Response to NRC Request for Additional Information on License Amendment Request (LAR) 12-10 Capacity Expansion of UUSA Facility (TAC L34193)", dated July 8, 2013 and the UUSA "Response to NRC Request for Additional Information on License Amendment for Capacity Expansion of URENCO USA Facility (TAC NO. L34227)" dated August 14, 2013. Please respond to the clarifications below.

Clarifications on RAI 1b response

1. The response to RAI 1b refers to the footnotes to Tables 4.2-2 through 4.2-4. There are no footnotes to the tables in ER Rev. 21 as discussed in the response. Please provide the footnotes. Contrary to the response which states that Table 4.2-4 does not exist, Table 4.2-4 does exist in ER Rev. 21. The title of Table 4.2-4 is "Radiological Latent Cancer Fatalities from Accidents during Transportation of Radioactive Materials" and appears out of order in the document (after Table 4.6-3).

Clarifications on RAI 1c response

2. The Supplement ER and LPES report (LPES, 2013) do not provide an analysis for return transportation of the empty 48Y "heel" cylinders from UUSA to Port Hope and Metropolis. The LPES report (LPES, 2013) does note the potential radiation hazard near the "heel" cylinders, but does not provide a transportation analysis. The Supplement ER also does not include any impacts from transportation of "heels" cylinders. Please provide the analysis.
3. As noted in RAI 1a, an average of four 30B product cylinders is expected to be on an enriched product shipment. The LPES RADTRAN analysis (LPES, 2013) for product cylinders appears to use the external dose rate based on exposure to one cylinder, not four cylinders, thereby underestimating external exposure impacts to the public. Why was an external dose rate based on four cylinders not used? Also, the single cylinder dose rate at two meters was used in the analysis. Since the RADTRAN dose rate input used is for one meter from the vehicle, it would be more appropriate to use the one meter dose rate to be conservative (even though the sides of the cylinders will be back from the side edge of the vehicle) and thus not further underestimate the risks. There is also no discussion in either the Supplement ER or LPES report (LPES, 2013) as to the assumed package configuration on the transport vehicle. The accident risk analysis does consider the contents of four 30B product cylinders.
4. The LPES report (LPES, 2013) considers transportation of liquid radioactive waste. Please state what is the liquid waste considered in this analysis. State if this is referring to the additional solid waste from solidified wastewater which had previously been slated for treatment through evaporative processes (Supplement ER, Section 4.2.7). If this is the additional solid waste, The LPES report (LPES, 2013) only evaluates 4 "liquid waste" shipments rather than "approximately 20 additional truckloads of low level waste transported to Clive, Utah, annually" as stated in Section 4.2.7 of the Supplement ER.

5. Section 4.2.6.4 of the Supplement ER states that 60 fifty-five gallon drums per shipment are assumed in order to estimate that 19 to 23 low-level waste shipments will be needed annually. The LPES RADTRAN analysis (LPES, 2013) assumes only 8 drums per shipment for the solid waste shipments and only 4 drums for the “liquid waste” shipments. Why did the analysis only consider 8 or 4 drums per shipment when the Supplement ER assumed 60 per shipment? In addition the external dose rate used is for only one drum (instead of 60) at a distance of 2 meters rather than 1 meter. In this case, the drums would be fairly close to the side of the vehicle and the 1 m dose rate would be more appropriate. If the radionuclide inventory per drum as input to RADTRAN is truly representative, then the accident risk impacts will be notably underestimated if there are 60 drums per shipment. Explain why the external doses used were for one drum instead of 60 drums and why for 2 meters instead of 1 meter.
6. Section 4.2.6.1 of the Supplement ER anticipates a range of up to 1,365 feed shipments per year, but the updated tables for the Supplement ER peak year analyzed in the supporting transportation report only consider 1,259 shipments (LPES, 2013). Please explain discrepancy.
7. Section 4.2.6.2 of the Supplement ER suggests that approximately 220 enriched product shipments would occur annually. The supporting transportation report, (LPES, 2013), lists and analyzes 235 shipments for a peak year which is then bounding. Please clarify which is the correct number of shipments the 235 or the 220 shipments. Also, to avoid any confusion, include the number of shipments considered in the result tables.
8. The new radiological latent cancer fatality impacts provided in the LPES report (LPES, 2013) and in the updated Table 4.2-2 for the “CREW”, “OFF LINK” and “ON LINK” do not appear to be from the results in the RADTRAN output provided with the RAI 1c response. It is not clear as to why the impacts for shipments of the same number of tails cylinders to Paducah are about twice the values for shipment of tails cylinders to Hobbs, but the distance to Paducah is about 90 times the distance to Hobbs. Please provide clarifications.

Reference:

(LPES, 2013), LPES, Inc. Engineering and Planning, “Risk Assessment for the Transport of Radioactive Materials for the Proposed URENCO USA Facility Capacity Expansion Lea County, New Mexico,” August 2013.

Can your response be posted in ADAMS as publicly available?

Thank you

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