Appendix A

CRESP Comments to Site Specific RBES Vision Documents

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CRESP Comments to Argonne National Laboratory-East Site Specific RBES Vision Document Checklist

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General Comments

ANL-E is a good example of a site that, while it did not follow an RBES approach per se, is far along and has received value from the approach that was taken. Many cleanup decisions were based on the conservative assumptions of Tier I analysis under the Illinois Tiered Approach to Corrective Action Objectives (TACO). This resulted in cleanup to residential levels for several portions of the site, although the site is clearly industrial. The value, however, from doing this is that "No Further Action" determinations were obtained for these portions.

Other portions of the site, where residual hazards will remain, will require land use controls.

Finally, D&D activities, not regulated under TACO, have targeted and will continue to target unrestricted use/reuse conditions.

Consequently, the comments provided below, that address the extent to which the approach followed or will follow an RBES vision, may appear negative or critical. That is not the reviewer(s) intent at all, but does result from responding to the questions that are being asked.

Putting this another way, it seems that the site is on track and there may very well be little to be gained from converting to an RBES approach for the remaining remedial activities.

Part I. Specific Content Questions for RBES Vision Document:

Land use

1. Does the site have a land use plan that fully describes the end state and the future land use at the site?

2. For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?

3. Has the future land use been communicated to the regulators and is it acceptable to them?

4. Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

5. Is the site's cleanup plan consistent with the end state depicted in its land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent.

6. Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?

Risk/hazards

7a. Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?

The risk-based end state approach was generally not used. Rather, the site agreed to clean some Hazard Areas to a more stringent level (i.e., clean up of land to residential standards that otherwise would have been classified industrial) for reasons that are provided in the document.

Page 5, 3rd and 4th full paragraphs:

"ANL-E is and will remain a DOE multi-program science laboratory. Therefore, the ANL-E RBES cleanup level is industrial/commercial. However, most of the ANL-E sites were cleaned to residential objectives because it was cost-effective to achieve remedial objectives and because IEPA *(Illinois Environmental Protection Agency)* requires Land Use Controls for remediation sites that do not meet them.

The ERAP *(ANL-E Remedial Action Project)* project was completed on September 30, 2003 (ANL-E, 2003). Most of the sites were cleaned to TACO *(Tiered Approach to Corrective Action Objectives)* residential objectives

and were granted a determination of No Further Action by IEPA." (italics added).

Seven sites however, where residual hazards will remain, will require land use
controls. There do not appear to be any risk assessments for these sites.

7b. The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass “risk balancing” in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include for example risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.

There does not appear to be any discussion of risk balancing.

8. Have all the hazards that will remain, that drive the land use, been identified?

For most hazard areas, but in some areas (such as Areas 2, SWMU No. 744 on page 21) there is statement “Contaminated groundwater was identified”, but no indication of the specific contaminant or class of contaminants.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

Full implementation and maintenance of site controls, in compliance to IEPA and other standards, would appear to be protective of potential receptors. However, Hazard Area 4 cleanup will not start until 2004. The report should indicate whether there are any endangered species that utilize the site, given the presence of its wetlands and its proximity to a Forest Preserve.

10. Are the residual hazard levels protective of the end-state?

Information on the residual hazard levels is not provided. However, cleanup to residential levels and the containment procedures employed should be protective, at least in the short term. There is no discussion of monitoring, maintenance, long-term performance, or contingencies in the event of a release from a contained area.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

Restrictions are present. For example, Hazard Area 3 (page 26) groundwater is restricted from use as potable water, and the land in this area is restricted to industrial/commercial use.
The land use basis is regulatory and memorandum of understanding (LUCMOA), but the document could be improved from this perspective.

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

For Hazard Areas with completed D&D, it is reported that "no hazards remain --" (page 24) or "All known hazards in the Hazard Area have been remediated" (page 17). Therefore, presumably, the residual risk should be very low at such Areas and no risk assessments are referenced for the CSMs. There have been ecological and TACO Tier 3 risk assessments for groundwater seeps of the 300 Area, but because of the very low risks found there are no groundwater CSMs in the report.

13a. Have all the EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment and have those documents been approved for use by the appropriate senior DOE site manager? For instance where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

No. Several sites were remediated to residential levels. It is not clear that any risk assessment, apart from Tier I analysis (and groundwater of the 300 Area), was done.

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (from both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?

The CSMs should be prepared in the format described in the Guidance in terms of identifying all secondary media, and transport and exposure pathways.

13c. Is the CSM and narrative consistent?

The narrative behind the CSMs should be expanded to explain what has already been accomplished and what is still yet to be completed in terms of

contaminant removal or use of protective measures likes caps, etc.. A description of potential failure scenarios for the containment systems is needed as well. A discussion is also needed concerning the feasibility/certainty that groundwater treatment systems will achieve desired target levels, and events that might prevent that from occurring within the time frame and cost estimates being used.

The CSMs should also be accompanied/supported by tables that identify the individual contaminants and associated concentrations currently and expected after full implementation of the RBES vision. (see Dec 23, 2003 memorandum from Gene Schmitt "Risk Based End State Guidance Clarification.")

13d. Is sufficient information provided as follows?
List of hazards/contaminants of concern and their concentration levels, as well as the cleanup level for each hazard
Pathways to the environment
Projected risk levels expected and/or concentrations expected after remediation
Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit.

No concentrations nor cleanup levels are provided. COCs are not listed.

13e. Are all potential receptors and pathways identified?

They may not have adequately identified all the possible media and their Inter-relationships, nor all of the possible exposure pathways since the CSM guidance was not followed.

13f. For all potentially complete exposure pathways identified in the current state CSM, Does the RBES CSM show that the pathways will be blocked?

With the exception of D&D sites that have not been completed, the Current State and RBES are shown to be the same. Pathways are shown to be blocked.

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

No. There is a brief section on the Ground Water Management Zone for HA1 in Table 1.

13h. Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?

No. While there will be several engineered barriers, there is no discussion of failure, monitoring, or maintenance.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

No. Completed remediation was done to residential levels for a site that is industrial so that "no further action determinations" could be obtained.

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

Apparently all of the cleanup decisions have been made. For the most part they do not appear to have been driven by RBES, but rather by the benefits of compliance with TACO Tier I. HA4 (D&D), not covered by TACO, will be targeted for unrestricted use or reuse.

15. Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented and those implemented but that will continue to have project costs and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?

Not enough information to tell. Ground water management is not discussed in detail.

16. Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the “disconnects” between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?

While the remediation, for the most part, has not been driven by RBES objectives, the benefits of the approach that has been taken are implied. There might be merit to provision of more detail here on the value of the benefits received.

17. Have the future roles and responsibilities of the parties involved in site cleanup been identified (e.g., DOE, current owner, future owner, other federal and state agencies)?

    Yes

18. To what degree does the site's regulators, key stakeholders, Tribal nations and local government representatives agree with the currently identified and the planned risk based end-state?

    There is the implication that agreement has been obtained with the regulators. Also, reference is made to the DOE establishment of a "Community Leaders Round Table" and an excellent working relationship with this group and the Forest Preserve District.

Variances

19. Has the vision document identified all applicable variances between the current end state and the RBES?

20. If potential variances are not listed, list variances that should be considered and provide short description for each.

21. Were the variances adequately evaluated per the guidance (e.g., per page D-1 of the guidance are the key attributes [cost, schedule, scope and risk] listed, are barriers identified, and are next steps identified)?

Other Comments (cross cutting issues, coordination with other programs and Corporate Projects)

22. List as Comments any other items of concern with the document, such as text that is confusing, clarity and completeness of maps and CSMs.

    The maps do not follow the guidance. See checklist.

23. The reviewer's overall perception regarding his/her review of the site's RBES document should be summarized through statements responding to the following:

    -Does the site RBES submission adequately articulate an end state vision for the site that is risk based, readily sustainable, appropriately protective of human health and the environment, and consistent with the site and surrounding area's planned land use? Explain and cite examples.

Hard to say. The approach, understandably, seems to be here's what we have done and why we did it. Sustainability is not addressed for engineered barriers and other areas requiring land use controls.

-Are variances between the end state RBES vision and the current site cleanup baseline end state clearly identified and defined? Explain.

-If there is no variance identified, is there adequate justification as to why the current site cleanup baseline end state meets the requirements for a RBES, i.e., does the RBES document show that the cleanup is sustainable, protective, and consistent with the site's surrounding land use? Explain.

Is a conference call with the site necessary? ___ yes ___ no

Part 1a. Comments addressing improvements to the RBES Vision documents

24. The comments that will be generated in response to the questions in Checklist Parts I & II will for the most part address the compliance of the RBES Vision document with the RBES Policy statement and its associated published guidance. That is, the review team conclusions to the questions will in summary provide to the sites that information and the specific changes to the document necessary to produce a compliant document.

    In addition to this information, the RBES Review Team is to provide back to the sites items for consideration that would improve the RBES Vision document(s). These comments are to be separately identified as improvement items, as opposed to compliance items.

    - This could include for example, recommendations for additional contextual information that would further the explanation of any proposed individual RBES, or a site's position that the currently planned end state is appropriately risk based and sustainable. Other data, analyses, or examples illustrating positions being proposed germane to the RBES Vision discussion or justification could be recommended for inclusion if that would make an RBES hypothesis more readily understandable.

    - Another fruitful area would include additional information to be included in the Variance report that would provide analysis of the variance(s) of the RBES from currently planned end state(s). Such analyses could be aimed at identifying issues, obstacles, and concerns with the variances identified and how the Department will address and resolve them.

    - The items listed under Question #23 in Part I should be considered again for the purposes of this section of the Checklist. That is, what improvements in the RBES Vision document clarity could be made to improve either its understanding or otherwise support decision making by DOE relative to pursuit of any change in EM project/site end state and subsequent initiation of discussions with site regulators, stakeholders, or interested or affected Governments?

February 6, 2004

CRESP Comments to Brookhaven Site Specific RBES Vision Document Checklist

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Part I. Specific Content Questions for RBES Vision Document:

Land use

1. Does the site have a land use plan that fully describes the end state and the future land use at the site?

Brookhaven has a future use plan developed almost ten years ago, plus a land use vision and a combined land use/institutional control plan completed in 2003.

The RBES plan does not discuss in detail the future land use needs at the BNL site. The end states are discussed in broad generalities. Emphasis is placed on the current state of the site. Land uses are shown on maps included in the report.

2. For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?

There is no mention of these plans.

3. Has the future land use been communicated to the regulators and is it acceptable to them?

The RBESV states that New York state and EPA input was sought on the endstate visions, but the feedback from EPA has not yet been received. A letter from the state regulator is attached to the document, commenting that the Interagency Agreement

must be honored and that the state has reservations about the proposed endstate for the Graphite Reactor.

The final draft should include a more complete and detailed discussion of communication with regulators about end state and future land use.

4. Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

BNL plans are "consistent" with zoning designations of the two nearest towns of Brookhaven and Riverhead towns, but it is unclear whether all types of land use and development plans from the region, such as master plans, regional plans, economic development plans, etc. have been reviewed for consistency. A planned mixed use development (residential and commercial) just west of the boundary may require a change in the cleanup levels or controls placed on contaminants with potential pathways to that area.

Some of the open space that currently continues beyond site boundaries is protected by state and local legislation, according to the RBESV. The permanence of these designation, particularly at the local level, is not guaranteed and could easily change. More description of the type of state or local management of these lands should be included and BNL should be proactive in monitoring any changes that might affect a change in use. A government-to-government relationship should be established between BNL, the two towns and Suffolk County for communication on land use, infrastructure, growth and development issues.

The maps showing surrounding land use and ownership, as well as plume footprints, are good.

While property use/uses adjacent to the site have been identified, the RBES plan does not discuss how site use, current and future, has been integrated with surrounding land use in great detail. The Plan notes that land use both on and off the site is unlikely to change significantly during the approximate two years it will take to complete the EM clean-up work. However, the growth of the region, dense residential development and growing population of the surrounding area mean that over time, many changes will occur. The future land use, beyond 2005, has not been well described.

5. Is the site's cleanup plan consistent with the end state depicted in your land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent?

It is mostly consistent. The designation of the Upton Ecological Preserve raises the question of use of that portion of the site in terms of possible exposures to hikers or researchers.

6. Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?

The entire BNL will remain in Federal ownership for at least 100 years. Surrounding land ownership has been identified, but the majority of the land is privately owned. It is not stated whether all private land owners were notified of the RBES Vision and it is impossible to tell whether they are in agreement with planned uses.

The primary mechanism for public input has been through the Community Advisory Council, and it can be assumed that advertised public meetings gave an opportunity for landowners to provide their comments. Many comments from nearby residents and stakeholder organizations are included in the last Appendix of the RBESV.

GENERAL

This is an excellent Vision document that could serve as an example. The incorporation of stakeholder views in the process, in addition to the Core Team and the regulators, is well done and a model for other sites. The detailed response comments from the site were very useful. We questions whether the RBES is complete if not all EM hazards (including those not currently included in CERCLA) are discussed.

WAYS TO IMPROVE THE VISION STATEMENT

1. They could improve the overall vision by discussing the High Flux Bean Reactor, and the recently discovered TRU waste at the boneyard area, event though they are not explicitly covered by the Superfund program.

2. While the Core Team approach is working for regulators, the document also contains additional information about the role of the very active, local stakeholders - a plus for this document.

3. An explicit statement should be included in the introduction about planned land use.

4. Make clear whether the public is allowed onto the Upton Ecological Research Reserve (now or in the future).

5. The document would be more complete if the risk assessments (both human and ecological) that were conducted for the interim decisions and RODs were referenced appropriately and listed in the reference list in Attachment C. Further, the Executive Summary does not make the difference between current, baseline and RBES risks clear.

PART I:
Risk/hazards

7a. Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration integrated appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?

The document generally does an excellent job of examining risk (see Table 3) for three of the four hazard areas. However, they do not provide quantitative risk projections for the RBES. The table would be improved by putting in references to the specific risk assessments that contributed to this table.

Ecological risk could be expanded in this table, particularly for groundwater (and risk to humans means there could be exposure to ecological receptors). References to the Tiger Salamander risk assessments or other documentation should be cited in Table 3).

The discussion of the sole source aquifer, and BGRR have now been added clearly.

7b. The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include for example risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.

In general, risk balancing was considered well, particularly among human receptors. However, the ecological receptors are not included in the CSMs to the fullest degree, nor are they integrated in the hazard/risk discussions. In general, if human can be exposed (except in buildings), ecological receptors are. Animals eat plants from home grown gardens, and secondarily are exposed to well water when it flows into the environment.

A brief description of remedial worker risk for soil excavation and removal activities seems warranted as part of the risk-balancing analysis. Indeed, a comparative risk evaluation for excavation and leave in place options for the BGRR should be identified (per the guidance clarification) as an additional needed activity. The comparison should depict full risk balancing and life cycle costs for the 2 alternatives.

8. Have all the hazards that will remain, that drive the land use, been identified?

Yes, except for the contaminated sediment not removed from the Peconic River. Further, it might help to add PCBs as a contaminant of concern for the Peconic River, to the Executive Summary

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

Yes, although some discussion of the potential failures and their remedies of institutional controls should be included. Ecological receptors are now better integrated, particularly for the Peconic River. However, the discussions of benchmark values (page 59) would be improved by presenting the benchmark levels and RBES levels for some contaminants/aquatic organisms, with appropriate references. Further, a further description should be included about the institutional controls required for the closed landfills.

10. Are the residual hazard levels protective of the end-state?

Yes, except for hazard area 4, where risk assessments have not yet been conducted.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

There are restrictions on groundwater use, and the overall discussion is much improved. The discussion of the Magothy aquifer could be slightly enhanced (with respect to possible breakthrough).

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

Yes, although direct references to the ecological and human health risk assessments (in the text and references) would be helpful even though they were not completed specifically for the RBES.

13a.Has the current status of risk assessment for the site been reviewed and approved?

Have all EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

A table with the appropriate risk assessments by hazard area (appropriately cited), with approval dates would make this clearer. For example, on page 50, they state that a risk assessment was conducted for the Tiger Salamander, but do not reference it.

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (from both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?

Generally the CSMs are complete, and are sufficient to understand the RBES. Some of the ecological pathways should be included, for both aquatic and terrestrial receptors. Any pathways that lead to the public (except for workers in buildings) can lead to ecological receptors. Animals come into gardens to eat (often claiming more than the household owners), and carry any contaminants back out into the environment. Similarly, most places where there is plant uptake, there can also be food chain effects since animals eat those plants, which are then secondarily taken into both aquatic and terrestrial environments.

Similarly, if residents can be exposed through inhalation (through wind erosion of soils), then ecological receptors can as well since many live on site and are likely to be more in the path of air currents.

These deficiencies can be easily corrected by going over the CSMs with an eye toward additional ecological exposure (this does not mean only to endangered/threatened species, but to ecological receptors in general).

13c. Is the CSM and narrative consistent?

Yes. Many of the narratives would be improved with documentation to specific reports. Wherever a decision was made based on a risk assessment, that risk assessment should be cited in the narrative. For example: in tables 3 and 10, in text wherever the word risk assessment occurs, and particularly for the hazard section on the Peconic River (pages 57-65) since this is of concern to local stakeholders and regulators. Where food chain models are mentioned (page 59), they should be referenced.

13d. Is sufficient information provided as follows?

List of hazards/contaminants of concern and their concentration levels, as well as the cleanup level for each hazard. Yes, this information is generally provided in tabular form.

Pathways to the environment projected risk levels expected and/or concentrations expected after remediation.

Most pathways to the environment (soil, water, sediment) are clearly described, although the pathways to ecological receptors need to be expanded in many of the CSMs. For example, in the Peconic CSM (p. 64) bioaccumulation to fish is sown to affect aquatic receptors, but aquatic receptors (such as invertebrates and fish) are then eaten by terrestrial mammalian and avian predators (and this pathway should be shown).

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

Data are sufficient.

13e. Are all potential receptors and pathways identified?

On some of the CSMs, complete ecological receptors are not identified (see 13b and 13d).

13f. For all potentially complete exposure pathways identified in the current state CSM, Does the RBES CSM show that the pathways will be blocked?

Yes, pathways are blocked.

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

The plumes are adequately mapped and described,.

13h.Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?

This aspect requires separate discussion for each barrier - perhaps in tabular form. It is not clear whether these analyses have been performed, nor is any information provided on monitoring, maintenance, and contingencies.

February 12, 2004

CRESP Comments to Fernald Closure Project Site Specific RBES Vision Document Checklist

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Fernald Closure Project

The on-site and off-site groundwater cleanup plan is not risk-based and is instead driven by the regulatory requirement to reduce contaminate levels in the Great Miami Aquifer (GMA) to residential drinking water standards. Previous discussions about replacing the outfall point of compliance with a mid-river POC, and related change in discharge concentration limits that would take into consideration mixing effects and existing levels of Uranium in the river were not not included in this version of the Vision. This would have eliminated the need for ongoing treatment of groundwater. In addition, an earlier proposal to stop groundwater pumping when off-site cleanup levels are reached (about 2016) and relying on MNA from that point forward for on-site compliance, were not included in this version of the Vision. We understand that these changes were made because of strong objections raised by regulatory and public stakeholders, and approved by EM-1.

It would have been useful if the RBES document identified the silos as a separate hazard area, given the nature of the wastes and the risk & cost profiles of alternative disposal strategies that were and are continuing to be considered.

Part I. Specific Content Questions for RBES Vision Document:

Land use

1. Does the site have a land use plan that fully describes the end state and the future land use at the site?

The Fernald site consists of 1,050 acres with about 140 acres dedicated to the original production facilities and 37 acres dedicated to the historical waste storage areas. An Environmental Assessment prepared in 1998 proposed that 900 acres of the site be restored and dedicated as an Undeveloped Park with limited public access. This has since been revised to 975 acres as Undeveloped Park and 75 acres dedicated to the On-Site Disposal Facility (OSDF). The land will continue to

be owned by the federal government and the long-term stewardship of the OSDF will be the responsibility of OLM.

2. For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?

N/A

3. Has the future land use been communicated to the regulators and is it acceptable to them?

The proposed future land-use was selected through discussions between the Fernald CAB, USEPA, Ohio EPA and DOE, and documented in the January 1996 OU5 ROD.

4. Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

An undeveloped park reuse designation would seem consistent with the prevailing residential/farming land use currently surrounding the site. Total population within a 5-mile radius of the site is only 22,900 which is indicative of a more rural area.

Groundwater cleanup of the Great Miami Aquifer, however, is to residential standards and not associated with the proposed future land use.

5. Is the site's cleanup plan consistent with the end state depicted in its land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent.

Most of the site's surface soil cleanup plan appears consistent with a recreational user being the primary receptor, however the RBESV notes that it is overly conservative to use surface soil standards based on inhalation for sediments covered by streams, ponds and other open waters. However, some stream and pond sediments may be exposed during dry, low water periods, so it is unclear what the final resolution should be.

A large portion of the contaminated soil and debris from other areas of the site will be stored at the OSDF, which is consistent with it being a highly restricted land use, although leachates in surface waters could represent an ecological risk (more information needed).

The on-site and off-site groundwater cleanup plan is not consistent with the proposed future land use, and is driven by the regulatory based requirement to

reduce contaminate levels in the Great Miami Aquifer (GMA) to residential drinking water standards. The GMA is a regulated sole-source aquifer that serves as the principal drinking water supply in the region. Previous discussions about limiting future pump & treat operations and relying more on MNA, or using a mid-river point of compliance (instead of the outfall) to reduce the long-term need to treat ground and surface waters, appear to have been dropped by the site in this RBES version.

6. Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?

The proposed future land-use was selected through discussions between the Fernald CAB, USEPA, Ohio EPA and DOE, and documented in the January 1996 OU5 ROD. No change in land use is proposed under the RBES Vision.

The RBES cleanup strategies have been discussed with regulators and other stakeholders, and several proposed changes have already been eliminated by the site since September to meet their objections.

Risk/hazards

7a. Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?

Most of the site's surface soil cleanup plan appears consistent with risks to a recreational user as the primary receptor, however the RBESV notes that it is overly conservative to use surface soil standards based on inhalation for sediments that are covered by water (streams, ponds and other open water areas). The site proposes standards that are more risk-based.

The current restrictions on maximum contaminate levels of soils and debris deposited in the OSDF, the buffer zone, and perimeter fence will make it protective of a risk-level of 10^{-7} to the recreational user. The RBES proposes to blend wastes and use an averaging method of measuring for total Uranium within each cell, versus the current not to exceed restriction. This will result in the OSDF still being protective of human health at a risk level of 10^{-5}. It is unclear whether this will change the contaminant levels of any leachate discharged to onsite surface waters and if this will require additional institutional controls and monitoring.

The on-site and off-site groundwater cleanup plan is not risk-based and is instead driven by the regulatory based requirement to reduce contaminate levels in the

Great Miami Aquifer (GMA) to residential drinking water standards. The GMA is a regulated sole-source aquifer that serves as the principal drinking water supply in the region. Previous discussions about limiting future pump & treat operations and relying more on MNA, and using a mid-river point of compliance (instead of at the outfall) to reduce the need to treat ground and surface waters, appear to have been dropped by the site.

7b. The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include for example risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.

No discussion of risk balancing as it pertains to workers is included in this RBES document. This is an important consideration in the D&D of the silos and evaluation of alternative disposal scenarios of the high activity, low level wastes. Additionally, there were major discussions in the mid 1990s related to the possible risks associated with low level (above background) Uranium contamination across an 11 square mile area, versus the significant costs of cleaning such a large area to residential standards. There is some indication that a balancing was negotiated that limited soil cleanup to a 400 acre area, permitted most of the soil and debris to remain on-site in an OSDF, and significantly reduced associated cleanup costs, in return for residential like cleanup of the Great Miami Aquifer.

8. Have all the hazards that will remain, that drive the land use, been identified?

All of the hazards driving future land use have apparently been identified.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

It is unclear whether the untreated OSDF leachate and surface waters in the former production area will be protective of ecological receptors under the RBES scenario.

10. Are the residual hazard levels protective of the end-state?

Residual hazard levels appear to be protective of the end-state under RBES, but more discussion should be provided regarding the risks associated with leaving the

outfall lines and drains. More information is also needed on the sustainability and protectiveness of the proposed institutional controls and monitoring systems.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

Yes.

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

A Comprehensive Risk Analysis and Risk Evaluation (CRARE) was developed in 1994 in conjunction with the OU4 ROD, and updated in each subsequent ROD. The CSM narratives reference risk levels established in associated RODS, not risk assessment reports per se.

13a. Have all EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

A Comprehensive Risk Analysis and Risk Evaluation (CRARE) was developed in 1994 in conjunction with the OU4 ROD, and updated in each subsequent ROD. No new risk assessments have been prepared to support the changes proposed under RBES.

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (from both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?

The CSM narratives are very brief and the diagrams do not adequately identify all potential ecological receptors or how they will be protected from all pathways of possible exposure. The numbered barriers are not accurately described. Example: Leachate from the OSDF is shown on the CSM as being blocked by the OSDF capping structure, but the RBES document notes on page 1-10 that OSDF leachate will be discharged to onsite ponds under RBES instead of being treated. No failure analyses information is provided with any of the CSMs.

13c. Is the CSM and narrative consistent?

No. Barriers are not adequately identified or explained, and diagrams are not consistent with information provided elsewhere in the RBES document (see 13b above).

13d. Is sufficient information provided as follows?

List of hazards/contaminants of concern and their concentration levels, as well as the cleanup level for each hazard

No tables or other detail provided on concentration levels.

Pathways to the environment

Inadequately identified and described

Projected risk levels expected and/or concentrations expected after remediation

General risk level targets are noted, but not in terms of concentrations after remediation.

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

More information is needed with regard to understanding the basis in risk for existing cleanup requirements related to soil sediments, OSDF "not to exceed" concentration limits, and need to remove buried infrastructure.

13e. Are all potential receptors and pathways identified?

Potential ecological receptors and pathways associated with OSDF leachates and other possibly contaminated surface waters in the former production area under RBES are not adequately identified or described.

13f. For all potentially complete exposure pathways identified in the current state CSM, Does the RBES CSM show that the pathways will be blocked?

The CSM diagrams and related narratives are not always accurate in showing or explaining how certain pathways are blocked (see comment in13b).

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

No information is provided on plumes, and what is shown on the maps is not consistent with the narrative. The narrative describes off-site groundwater contamination that will not reach FRL level for Uranium (30 ppb) until 2013, but this off-site plume is not shown on the site-wide or hazard area maps. This may be the result of changes in the new version that are not reflected in all parts of the document.t

13h.Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?

No.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

Several current cleanup strategies are not risk-based. Most of the site's surface soil cleanup plan appears consistent with risks to a recreational user as the primary receptor, however the RBESV notes that it is overly conservative to use surface soil standards based on inhalation for sediments that are covered by water (streams, ponds and other open water areas). The site proposes standards that are more risk-based, however, some stream and pond sediments may be exposed during dry, low water periods, so it is unclear what the final resolution should be.

The current restrictions on maximum contaminate levels of soils and debris deposited in the OSDF, the buffer zone, and perimeter fence will make it protective of a risk-level of 10^{-7} to the recreational user. The RBES proposes to blend wastes and use an averaging method of measuring for total Uranium within each cell, versus the current not to exceed restriction. This will result in the OSDF still being protective of human health at a risk level of 10^{-5}. However, leachates discharged to surface waters could represent an ecological risk (not adequately addressed in document).

The on-site and off-site groundwater cleanup plan is not risk-based and is instead driven by the regulatory based requirement to reduce contaminate levels in the Great Miami Aquifer (GMA) to residential drinking water standards. The GMA is a regulated sole-source aquifer that serves as the principal drinking water supply in the region. Previous proposals to limit future pump & treat operations and relying more on MNA, and use of a mid-river point of compliance (instead of at the outfall) to reduce the need to treat ground and surface waters, have been dropped by the site because of strong objections raised by regulatory and public stakeholders.

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

15. Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?

16. Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the "disconnects" between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?

Variances

19. Has the vision document identified all applicable variances between the current end state and the RBES?

20. If potential variances are not listed, list variances that should be considered and provide short description for each.

21. Were the variances adequately evaluated per the guidance (e.g., per page D-1 of the guidance are the key attributes [cost, schedule, scope and risk] listed, are barriers identified, and are next steps identified)?

February 1, 2004

CRESP Comments to Hanford Site Specific RBES Vision Document Checklist

April 2004 Abreviated Version

Contributors:

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Part I. Specific Content Questions for RBES Vision Document:

Land use

1. Does the site have a land use plan that fully describes the end state and the future land use at the site?

Reference is made to the Hanford Comprehensive Land-Use Plan Environmental Impact Statement (HCP EIS) Record of Decision (DOE 1999a) as the basis for land uses on the site at end state [referred to hereafter as CLUP].

2. For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?

N/A

3. Has the future land use been communicated to the regulators and is it acceptable to them?

The CLUP has been in place as a ROD since 1999, but the current baseline cleanup plans for the 100 and 200 Areas are not consistent with these agreed on

4. Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

No mention is made of integrating future land uses on the site with surrounding communities outside of the CLUP.

5. Is the site's cleanup plan consistent with the end state depicted in its land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent.

No in the 100 Area. The current baseline assume a resident farmer who spends 80% of his life for 30 years on the waste site, and that he eats plants, fish, milk and meat raised on the site. The farmer also irrigates with 3 feet of water per year. The ROD land use is conservation and preservation, with no full time residents and no consumption of groundwater.

No in the 300 Area. The current baseline assumes that a worker is present 8 hrs a day and spends a portion of his time indoors 15 ft below grade and outdoors. This risk scenario is based on Washington State's Model Toxics Control Act (MTCA) default value, and does not appear to be consistent with the "industrial restricted surface use" specified in the ROD, unless what is being described as the remediation worker risk. However, there is no other potential receptor mentioned. Discussions are also underway that would require cleanup of 8 waste sites/burial grounds located outside of the 300 Area industrial complex to unrestricted surface use for a residential non-farmer similar to Area 100, even though the land use remains industrial.

6. Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?

No mention is made of neighboring landowners. This abbreviated vision document focuses on major contaminant areas and current and proposed RBES cleanup strategies. Given the huge size of the site and location of the contaminants, adjoining land use issues would probably be addressed in one of the missing sections.

Risk/hazards

7a. Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?

The current baseline cleanup strategies for the 100 Area is risk based, but the assumptions used are inconsistent with the agreed upon land uses. The baseline for the 100 Area assumes a resident farmer who spends 80% of his life for 30 years on the waste site, and that he eats plants, fish, milk and meat raised on the site. The farmer also irrigates with 3 feet of water per year. The ROD land use is conservation and preservation, with no full time residents and no consumption of groundwater. The RBES vision would align the cleanup strategy with the agreed on land use.

The baseline for the 300 Area uses the State's MTCA default of a worker who is present 8 hrs a day and spends a portion of his time indoors 15 ft below grade. The worker is thus exposed through dermal contact, inhalation and ingestion. This risk scenario does not appear consistent with an "industrial restricted surface use" of the land specified in the ROD. Discussions are also underway that would require cleanup of 8 waste sites/burial grounds located outside of the 300 Area industrial complex to unrestricted surface use for a residential non-farmer similar to Area 100, even though the land use remains industrial.

7b. The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include for example risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.

This was one of the only vision documents that speaks directly about balancing the remediation worker risk and transporting of contaminants vis-à-vis the on-site risk levels being sought. However, it does not take into consideration ecological damage associated with excavating and moving so much dirt around the site.

8. Have all the hazards that will remain, that drive the land use, been identified?

Unclear

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

Insufficient data provided that would support such a conclusion.

10. Are the residual hazard levels protective of the end-state?

Insufficient data provided that would support such a conclusion.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

Unclear with regard to groundwater.

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

The CSMs lack descriptive narratives on proposed barriers or their effectiveness, contaminant concentration tables and other supporting documentation.

13a. Have all EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

Many baseline cleanup remedies and risk assessments are based on outdate land use assumptions.

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (from both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?

Some narrative is provided on existing conditions and pathways, but little or nothing is provided on end-state conditions, proposed barriers, potential failures, etc. The before and after diagrams were drawn on a single page, which limited the ability to show all potential transport and exposure pathways. Barriers were numbered but there was no related narrative or explanation.

13c. Is the CSM and narrative consistent?

CSMS are too weak in terms of content to comment.

13d. Is sufficient information provided as follows?

List of hazards/contaminants of concern and their concentration levels, as well as the cleanup level for each hazard
Pathways to the environment
Projected risk levels expected and/or concentrations expected after remediation
Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

No

13e. Are all potential receptors and pathways identified?

Not adequately.

13f. For all potentially complete exposure pathways identified in the current state CSM, Does the RBES CSM show that the pathways will be blocked?

Yes, but no detail or explanation is provided.

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

No

13h. Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?

None mentioned.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

Not in Areas 100 & 300. Either inconsistent with proposed land use and/or based on State MTCA defaults.

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

No - Discussions are also underway that would require cleanup of 8 waste sites/burial grounds located outside of the 300 Area industrial complex to unrestricted surface use for a residential non-farmer, even though the land use remains industrial.

15. Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?

16. Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the “disconnects” between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?

17. Have the future roles and responsibilities of the parties involved in site cleanup been identified (e.g., DOE, current owner, future owner, other federal and state agencies)?

18. To what degree does the site’s regulators, key stakeholders, Tribal nations and local government representatives agree with the currently identified and the planned risk based end-state?

Variances

19. Has the vision document identified all applicable variances between the current end state and the RBES?

Seven variances are proposed, but it is unclear as to how strongly supports EM-1 pursuing them. It is difficult to understand why no effort has been made to prepare risk assessments that are consistent with land uses approved almost 5 years ago (in 1999 for 100 & 300 Areas), versus continuing down an outdated cleanup path stipulated by older interim RODS.

20. If potential variances are not listed, list variances that should be considered and provide short description for each.

21. Were the variances adequately evaluated per the guidance (e.g., per page D-1 of the guidance are the key attributes [cost, schedule, scope and risk] listed, are barriers identified, and are next steps identified)?

Other Comments (cross cutting issues, coordination with other programs and Corporate Projects)

22. List as Comments any other items of concern with the document, such as text that is confusing, clarity and completeness of maps and CSMs.

23. The reviewer's overall perception regarding his/her review of the site’s RBES document should be summarized through statements responding to the following:

    -Does the site RBES submission adequately articulate an end state vision for the site that is risk based, readily sustainable, appropriately protective of human

health and the environment, and consistent with the site and surrounding area's planned land use? Explain and cite examples.

-Are variances between the end state RBES vision and the current site cleanup baseline end state clearly identified and defined? Explain.

-If there is no variance identified, is there adequate justification as to why the current site cleanup baseline end state meets the requirements for a RBES, i.e., does the RBES document show that the cleanup is sustainable, protective, and consistent with the site's surrounding land use? Explain.

Is a conference call with the site necessary? ___ yes ___ no

Part 1a. Comments addressing improvements to the RBES Vision documents

24. The comments that will be generated in response to the questions in Checklist Parts I & II will for the most part address the compliance of the RBES Vision document with the RBES Policy statement and its associated published guidance. That is, the review team conclusions to the questions will in summary provide to the sites that information and the specific changes to the document necessary to produce a compliant document.

    In addition to this information, the RBES Review Team is to provide back to the sites items for consideration that would improve the RBES Vision document(s). These comments are to be separately identified as improvement items, as opposed to compliance items.

    - This could include for example, recommendations for additional contextual information that would further the explanation of any proposed individual RBES, or a site's position that the currently planned end state is appropriately risk based and sustainable. Other data, analyses, or examples illustrating positions being proposed germane to the RBES Vision discussion or justification could be recommended for inclusion if that would make an RBES hypothesis more readily understandable.

    - Another fruitful area would include additional information to be included in the Variance report that would provide analysis of the variance(s) of the RBES from currently planned end state(s). Such analyses could be aimed at identifying issues, obstacles, and concerns with the variances identified and how the Department will address and resolve them.

    - The items listed under Question #23 in Part I should be considered again for the purposes of this section of the Checklist. That is, what improvements in the RBES Vision document clarity could be made to improve either its understanding or otherwise support decision making by DOE relative to pursuit of any change in EM project/site end state and subsequent initiation of discussions with site regulators, stakeholders, or interested or affected Governments?

February 25, 2004

CRESP Comments to INEEL Site Specific RBES Vision Document Checklist

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Summary: The CRESP comments on the INEEL document that follows basically seek to step into the document provided by the site and make internal positions/arguments related to both risk and land use at the site. Our comments would generally suggest that there are creative ideas for variances suggested in the document. We go with what the site provides, so identify gaps and weaknesses as well in maps and CSM's.

But there is a much more important issue to raise about what is **not adequately** addressed in this RBES than what is addressed. There are fundamental challenges to completion at the INEEL site: the calcine (sodium-bearing) wastes and the bins and other storage facilities in which they sit, the HLW tanks and the buried waste of all sorts and particularly in the TAN and INTEC areas. Only the latter problem is addressed with a variance – and those 2 variance discussions rely entirely on a change in land use that projects no residential use for the area and would generally allow a reduction in excavations from 10 to 4 feet. Any consideration of worker of in-remediation risk is, we believe, entirely missing. (See CRESP's answer to check list question 7b on risk balancing – below). And yet there is, in respect to the buried waste, at least some recognition given to the fact that a risk based, land use-cognizant end state is relevant. The variance table haltingly suggests that an evaluation be done and if both risk and cost-benefit factors warrant, agencies approached for a variance.

Much more disturbing is the fact the HLW tank and sodium bearing waste and calcine and associated storage facilities are not, we believe, depicted in a manner that in any way conforms to their relative importance to the site cleanup process. No problem deserves a more careful look given established arguments about the safety and durability of current storage arrangements, the duration of the hazardousness of the stored materials and the complicated (and expensive) processes through which at-risk workers would go to meet the off-site shipping goals that are consistent with the 1995 agreement. We see none of that analysis in this document. Finally, the discussion of

the HLW tanks is frozen by the current legal debate. The opportunity to explore the remedial options while the legal process continues is ignored.

The purpose of the RBES guidance was to provide sites with a consistent way of depicting the geography that surrounds and is found inside site borders and then to relate this common depiction to the pathways and receptors at stake in the various hazardous areas on site. Any site as large as INEEL faces a challenge: how to guide a knowledgeable reader through the entire site, highlighting the major challenges – sharply distinguishing in what the hazardous areas are currently and then depicting two paths – the current compliance or planned path and the RBES one, particularly at where the cleanup challenge is most difficult, risk and costly. This document guides us well to the smaller less complex areas where current plans and variances exist. We have to struggle at length before being quite certain the "big" risk and ticket items get very short shrift indeed.

Another failing throughout (a variance from guidance) relates to the fact that there is no geographic or CSM depiction of the currently planned as distinguished from proposed RBES end-state. This leaves the reader trying to sort out how to wade through an exceedingly complex document to "follow" the fate of specific site cleanup problems. One has to have fingers in three or four parts of the document to find out "what is happening and is to happen" (under current planning) and get some idea of what variance is (or is not) proposed.

Part I. Specific Content Questions for RBES Vision Document:

INEEL - Land use

1. **Does the site have a land use plan that fully describes the end state and the future land use at the site?**

The 1996 *Comprehensive Facility and Land Use Plan* for INEEL fully describes current and future land use on the site and in the surrounding region. It is assumed that the RBESV is consistent with this detailed land use plan. Current use is not expected to change at end state.

2. **For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?**

INEEL is a Nuclear Energy and Science (NE) PSO site, but these plans are not mentioned in the RBESV.

3. **Has the future land use been communicated to the regulators and is it acceptable to them?**

INEEL operates under a tri-party agreement with State and EPA regulators, so it is assumed that regulators are aware of future land use determinations and have found them acceptable, since they have not changed since the time of these agreements. The site will continue to interact with regulators regarding any land use changes.

4. **Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?**

The RBESV does not contain specific information about planned land uses of areas adjacent, except that the Federal and state-owned lands are expected to continue as recreational, open space and cultural preservation areas. It is unclear whether land use plans from the surrounding Counties were collected and reviewed for consistency. Tribal uses of land both onsite and offsite are important to understand to assure that risk assessments reflect this type of use.

5. **Is the site's cleanup plan consistent with the end state depicted in your land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent?**

It is generally consistent and protective. Acreage within INEEL is currently classified as industrial or mixed use, with the great majority of site area undeveloped. Undeveloped areas could be used for ecological preservation, research and controlled grazing and hunting. It is not anticipated that these uses will change and the entire site will stay under Federal ownership until at least 2095. Previous CERCLA-based remedial action plans have assumed possible residential use after this point, which may be unrealistic given the remoteness of this site and the lack of growth pressures from surrounding population centers.

The RBESV states that in the future, land use changes will prompt changes in cleanup strategy, when necessary.

The RBESV repeatedly states that the site has "restricted access to prevent intrusion by the public," but it is clearly impossible to prevent people from wandering, hiking or otherwise intruding upon such a massive area (over 890 square miles). More detail could be provided about how the access is restricted and how grazing cattle are restrained from areas of exposure.

6. **Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?**

There is no anticipated change in land ownership on the site itself. Surrounding landowners include the National Forest Service, the State of Idaho and private landowners, and this is identified in the document. It is not stated whether those landowners are in agreement with planned land use.

Risk/hazards

7a. Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?

Yes. However, a potential problem is that some of the end states and future land uses were determined a few years ago so there are differences in how these were applied. Further, ecological risk values are not provided in the RBESV document so one does not know if they are integrated. The RBESV document indicates (on p. 4-5) the risks are de minimus; however, INEEL plans to continue monitoring ecological systems (or "implement long-term ecological monitoring") because of multiple uncertainties, data gaps, and assumptions. INEEL does not indicate, for example, if the deer shot are routinely tested, or whether any have shown high levels of Cs137, for example. Mention is made, however, on p. 3-5 of the RBESV document of the "extensive environmental surveillance program [that] is in place for air, soil, surface and subsurface water, big game animals, and local produce (e.g., potatoes, wheat, lettuce, and dairy milk) for the INEEL Site and surrounding areas." This mention should be expanded to give a better indication of the adequacy of the surveillance program.

Another example is the INTEC release sites (on p. 4-44) where the "assumed that remedies selected to protect human health also will address ecological risks." Additional information is necessary to justify said assumption.

7b. The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include for example risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to

off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.

It is not apparent that risk balancing was generally considered in the preparation of the INEEL RBESV document. There are isolated instances (e.g., on p. 4-45) where the risks to workers and the general public from potential excavation of the contaminated soils around the INTEC tank farm and under buildings are being considered in the cleanup decision. If risk balancing was considered, it should be made more apparent in the RBESV document.

8. Have all the hazards that will remain, that drive the land use, been identified?

It is likely that all such hazards have been identified in the RBESV document. For example, the INEEL RBESV document indicates (on p. 4-2) that

> "To meet the RAOs, remediation goals are established. Remediation goals establish acceptable exposure levels that are protective of human health and the environment. These goals generally are quantitative cleanup levels based upon human health and the environment and are based upon the results of a baseline risk assessment and evaluation of anticipated exposures and risks for selected remedial alternatives. A 1 × 10-4 (1 in 10,000) cumulative carcinogenic risk or cumulative hazard index of 1 for noncarcinogenic contaminants, whichever was more restrictive for a given contaminant, was the primary basis for determining remediation goals for release sites. Remediation goals for contaminated soil are based on soil concentrations that satisfy the 1 × 10-4-carcinogenic-risk goal or noncarcinogenic hazard index of 1 for current workers, future workers, and residents. Risk-based remediation goals are used to verify the effectiveness of the selected remedial action and to determine if additional remedial action is necessary before closing a particular release site."

However, there is NOT a table or concise summary that gives the specific remaining hazards with current levels and/or expected risk levels after remediation. Such a table should be added to the report to clarify the extent of the hazards at INEEL.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

It appears that current hazards are in states that will be protective of both human health and the environment based upon, primarily, institutional controls. However, this will only be true if INEEL can clean up the groundwater and prevent further contamination of the Snake River and the Snake River Plain Aquifer (SRPA). There is uncertainty pertaining to the future conditions relating to Technetium-99 in the

SRPA near INTEC as the source has not been determined and, therefore, any necessary remedies and potential hazards are poorly known.

Human Health: Please refer to the quotation presented in the answer to Question 8.

Ecological Receptors: The RBESV document mentions the Snake River and the sole source SRPA as key habitats that must be protected. INEEL does have a biomonitoring plan for big game animals (as indicated on p. 3-5 of the RBESV document; however, INEEL does not mention if it is for numbers or contamination. One might infer from the paragraph in question that contamination is monitored for, but it is not explicitly stated.

10. Are the residual hazard levels protective of the end-state?

End State: Continued mission of nuclear energy research with the buffer areas (most of the site) remaining for environmental research and grazing.

Hazard levels/receptor blocks: Yes

As indicated on p. 4-2 (see previous question), it appears that remaining hazards will be left in states that will be protective of both human health and the environment (although the end states vary from the end of the EM cleanup mission as dictated by the Federal Guidance to others requiring 400 years for sufficient cesium-137 and progeny decay to meet standards as indicated on p. 4-89 for the SL-1 Reactor Burial Ground). However, this will only be true if INEEL can adequately clean up the groundwater and prevent further contamination of the Snake River and the Snake River Plain Aquifer (SRPA). There is uncertainty pertaining to the future conditions relating to Technetium-99 in the SRPA near INTEC as the source has not been determined and, therefore, any necessary remedies are unknown.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

INEEL expects to continue groundwater monitoring and remediation beyond 2035 (i.e., the end of the EM cleanup mission) and predicts that MCLs will be below maximum contaminant levels by 2095 for most areas. (An exception is the SL-1 Reactor Burial Ground area which may require 400 years for sufficient cesium-137 and progeny decay to meet standards as indicated on p. 4-89.)

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

Yes, the pertinent risk assessment reports are mentioned in the RBESV document (although not always in the pertinent narrative section). In some cases, contaminant

levels are provided; however, they do not specifically reference the pertinent risk assessment documents in the text or in the literature cited (although many times the pertinent RODs are cited, which might contain the desired information).

For the ecological receptors, the pertinent risk assessment reports are not referenced in the INEEL RBESV document.

NEW (with the Feb review):

13a. Have all EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

This author's understanding is that a site-wide risk assessment was performed.

Some of the remedies either already in place or planned are referenced in the INEEL RBESV document; however, it is not always clear whether they have been approved to the extent necessary.

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (from both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?

Using the text and tables provided in the RBESV document, it is possible to construct the CSMs; however, the CSMs do not currently show all pathways and receptors. For example, Fig. 4-1a2a shows only ingestion and physical contact, but does not show or distinguish the various pathways to potential ecological receptors. Furthermore, this CSM does not show plant uptake or food chain effects. The table (Table 4-1a on p. 4-12) accompanying this CSM lists some species and implies that there are exposure pathways for these (however, no references are provided). Thus the reader must construct his or her own CSMs for this system. On a positive note, the INEEL document is one of the only RBESV documents that evaluate individual species. Other CSMs often list biota, or terrestrial biota without any description of what the receptors are, or the method of exposure (food chain, e.g. Fig 4-5a2).

The CSMs for human receptors consider residential and occupational situations but not intruders (and there may be intruders because cattle and sheep are routinely grazed on site). INEEL does a better job on the exposure routes, and some of this

information should be incorporated into the CSMs that deal with ecological receptors.

For those CSMs that have human visitors, the same pathways normally exist for biota and should be shown on the appropriate CSMs.

13c. Is the CSM and narrative consistent?

Yes, they are consistent; however, the CSMs should include more information on the pathways and routes of exposure as well as on specific receptors. They do not follow the guidance in that under receptors there should be routes of exposure (e.g., ingestion, inhalation, etc.) rather than dots, and the biota should be broken at least into terrestrial and aquatic receptors.

13d. Is sufficient information provided as follows?

List of hazards/contaminants of concern and their concentration levels, as well as the cleanup level for each hazard

The hazards and contaminants are usually provided, but not in tabular form that would make it easy to find the hazard and risk levels for each contaminant. The concentration levels are not normally provided.

Pathways to the environment

The pathways are not as clearly enumerated as necessary or as specific as required. Specific ecological receptors are only mentioned for the first CSM (surface soil) and not thereafter. Thus it is unclear if the same receptors were or were not considered for each hazard or hazard area.

Projected risk levels expected and/or concentrations expected after remediation

As indicated above, the risk levels are sometimes provided and the expected concentration levels are often not provided.

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

It would be difficult to evaluate the sufficiency of the risk information from the information provided in the INEEL RBESV document. It would likely be necessary to read through the various risk assessment, RODs, and other cited documents to evaluate this information.

13e. Are all potential receptors and pathways identified?

The potential receptors and pathways provided are not described in sufficient detail on the CSMs. Furthermore, some of the CSMs show complete exposure routes (as indicated by a dot) on the risk-based end state, but then show the pathway as blocked as indicated by a dashed line (i.e. Fig 4-3b2, and others).

One note that should be clarified in the INEEL RBESV document is that contamination (e.g., TCE, Tc-99, etc.) has been found in the SRPA; however, every pathway on every current and end state CSM provided in the vision document is blocked. On the surface, this appears to be a logical inconsistency. This should be clarified.

Furthermore, some of the CSMs do not include all the pathways and receptors: at times there are pathways for intruders; however, none are shown for biota. (If visitors can be exposed, so can biota.) Food chain effects are not shown on any of the CSMs—they only indicate ingestion.

Even in areas with contaminated buildings and tanks, there is the possibility of pathways to ecological receptors (through burrowing animals and/or those receptors, such as rattlesnakes, that might enter buildings in winter). There is no discussion of burrowing animals.

13f. For all potentially complete exposure pathways identified in the current state CSM, [d]oes the RBES CSM show that the pathways will be blocked?

As indicated above, each potentially complete pathway on each of the current (as well as the corresponding future) CSM indicates that the pathway is blocked. However, this appears to be inconsistent with known evidence of contamination (e.g., in the SRPA). Furthermore, there are potentially complete pathways to potential receptors (e.g., burrowing animals) that have not been considered on the CSMs that may not have blocked pathways.

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

The RBESV document indicates on p. 4-22 that

> "Figure 4-1a1c shows the current extent of plumes at the INEEL. Only those constituents above the Idaho Groundwater Quality Standards (or MCLs) for each facility are plotted. These plumes have generally reached a state of equilibrium with natural processes of diffusion, dispersion, sorption, and decay and appear stagnant or, in the case of tritium (caused by radioactive decay), appear to be retreating. The outermost contour value and constituent for each plume are listed in Table 4-1b."

However, the extents of the various plumes are not obvious on Figure 4-1a1c. One reader would have preferred seeing a contour plot (or plots) indicating the various concentrations of contaminants color-coded by constituent.

There was no specific, quantitative information on rate of movement or depth of the plumes given in the RBESV document.

13h. Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?

No failure analyses were presented in the RBESV document. One would thin that these would be important, especially for those institutional controls that will be in place (for up to 400 years) for many of the hazardous sites at the INEEL.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

15. Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?

16. Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the “disconnects” between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?

17. Have the future roles and responsibilities of the parties involved in site cleanup been identified (e.g., DOE, current owner, future owner, other federal and state agencies)?

18. To what degree does the site’s regulators, key stakeholders, Tribal nations and local government representatives agree with the currently identified and the planned risk based end-state?

Variances

19. Has the vision document identified all applicable variances between the current end state and the RBES?

20. If potential variances are not listed, list variances that should be considered and provide short description for each.

21. Were the variances adequately evaluated per the guidance (e.g., per page D-1 of the guidance are the key attributes [cost, schedule, scope and risk] listed, are barriers identified, and are next steps identified)?

Other Comments (cross cutting issues, coordination with other programs and Corporate Projects)

22. List as Comments any other items of concern with the document, such as text that is confusing, clarity and completeness of maps and CSMs.

23. The reviewer's overall perception regarding his/her review of the site's RBES document should be summarized through statements responding to the following:

    -Does the site RBES submission adequately articulate an end state vision for the site that is risk based, readily sustainable, appropriately protective of human health and the environment, and consistent with the site and surrounding area's planned land use? Explain and cite examples.

    -Are variances between the end state RBES vision and the current site cleanup baseline end state clearly identified and defined? Explain.

    -If there is no variance identified, is there adequate justification as to why the current site cleanup baseline end state meets the requirements for a RBES, i.e., does the RBES document show that the cleanup is sustainable, protective, and consistent with the site's surrounding land use? Explain.

GENERAL COMMENTS

The readers' general feeling is that INEEL did a relatively good job with certain aspects of the RBES process that the others appeared to have failed. There is good documentation, and INEEL tried to have the text and CSMs "cohere". As can be seen from the general comments below, the CSMs are a bit too generic and DO NOT follow the guidance with respect to format. Pathways and routes of exposure were mixed on the CSMs. Furthermore, while some ecological species of concern were indicated, ecological factors are not integrated to the degree they could and should be.

There is also no obvious stakeholder involvement to this point. This is particularly problematic given the Tribal and farming interests in the site.

INEEL has numerous institutional controls that address worker and visitor scenarios but not ecological receptors. (Anywhere a visitor can go, biota can also.)

The RBESV document not have a table with hazards and risks (current and residual after cleanup) as requested. There is also very little in the way of contaminant concentrations provided.

COMMENTS

a. It is mentioned that the land use designations were derived after input from a range of stakeholders, including tribal nations. On p. 1-1, the document states

> "The final version of this document will present the RBESV for the INEEL Site at the completion of the EM cleanup program based on future land-use projections developed through public meetings and consultation with regulators (i.e., the state of Idaho and EPA), regional government entities (e.g., Shoshone-Bannock tribes and city and county representatives), INEEL Citizens Advisory Board, and special interest groups. The end state vision is based on the premise that access to the INEEL will remain under federal U.S. government control."

Thus there is an indication that considerable more input into the future land use decisions will be collected prior to the final version of the INEEL RBESV document being issued.

b. The INEEL site will remain DOE owned and operated (as indicated in Comment (a) above).

c. Many of the initial maps are drawn to such a small scale that the information is not useful. It is suggested that such maps be enlarged so that locations of on-site or adjacent features are clear.

d. In some cases, the end-state and current state maps are the same (Figures 3-1a, 3-2a). For example, the RBESV document indicates that "Figure 3-1a represents the end state as well as the current state of the INEEL Site. Although physical features will change significantly in certain developed portions of the Site, they are not visible on Figure 3-1a because of the scale of this map." Perhaps the map scale can be changed or additional maps added to clarify the foreseen changes in physical features.

It is expected that land use will remain the same, including the on-site grazing

(over half of the site is used for grazing). As indicated on p. 3-4 (in regards to Figure 3-2a), “[t]here are no differences between the current and end states, as the current land uses described below are expected to remain the same at the end of the EM cleanup mission.”

e. Land for INEEL was initially withdrawn from public lands and is now under DOE, however, BLM maintains some responsibilities (such as granting and administering rights of way and grazing permits for over half of the land). Other parts of INEEL were purchased from the State and from private landowners and DOE owns these areas outright.

f. A total of eight CSMs are provided including one for sitewide soil and groundwater whereas the others are for specific site areas. The eight provided are:

   1. Sitewide soil and groundwater (current and end state)
   2. Test Area North (current and end state)
   3. Idaho Nuclear Technology and Engineering Center (current and end state)
   4. Radioactive Waste Management Complex (current and end state)
   5. Central Facilities Area (current and end state)
   6. Waste Reduction Operations Complex, Power Burst Facility, and Auxiliary Reactor Area (current and end state)
   7. Test Reactor Area (current and end state)
   8. Argonne National Laboratory-West (current and end state)

g. A good job is done of citing the relevant ecological and human health risk documents in the text; however, insufficient information is provided in the text to evaluate whether there is a risk to the potential ecological receptors. ROD decisions are referenced clearly in the text.

h. It is one of the best examples of considering organisms at different levels of the food chain (e.g., Table 4-1a on page 4-12), but this information is not integrated in the CSMs, and the HI or other risk numbers are not provided.

i. There does not appear to have been stakeholder input to this Vision document, although previous land use and other documents have had stakeholder input (although there are also indications that additional stakeholder input will be collected before the final version of the vision document is issued).

j. There is an inconsistency in the INEEL approach to institutional controls: it is stated that institutional controls are in place for workers and that public access to the site is restricted (e.g., p. 4-35); however, the "public" has access to the site when grazing their sheep and cattle. (BLM leases rights to grazing on much of INEEL.)

k. They are successful in listing potential variances at the end of each discussion of the relevant CSMs, which is a good feature.

l. The document would profit from a table that lists the hazards with appropriate risk levels for the different hazard areas (either one table for them all, or separate tables). Additional information concerning the current concentrations of contaminants would allow evaluation of the current and future risks.

m. The CSMs are not consistent with the Federal guidance:

- sometimes pathways and routes of exposure are mixed up,
- the appropriate route of exposure is not listed under the receptor type, and
- the controls and blocked pathways cohere.

For example, offsite vegetation is not a pathway; neither is the subsurface soil. Plant uptake is not a "release mechanism" (as indicated on p. 4-87).

Is a conference call with the site necessary? ___ yes ___ no

Part 1a. Comments addressing improvements to the RBES Vision documents

24. The comments that will be generated in response to the questions in Checklist Parts I & II will for the most part address the compliance of the RBES Vision document with the RBES Policy statement and its associated published guidance. That is, the review team conclusions to the questions will in summary provide to the sites that information and the specific changes to the document necessary to produce a compliant document.

    In addition to this information, the RBES Review Team is to provide back to the sites items for consideration that would improve the RBES Vision document(s). These comments are to be separately identified as improvement items, as opposed to compliance items.

    - This could include for example, recommendations for additional contextual information that would further the explanation of any proposed individual RBES, or a site's position that the currently planned end state is appropriately risk based and sustainable. Other data, analyses, or examples illustrating positions being proposed germane to the RBES Vision discussion or justification could be recommended for inclusion if that would make an RBES hypothesis more readily understandable.

    - Another fruitful area would include additional information to be included in the Variance report that would provide analysis of the variance(s) of the RBES from currently planned end state(s). Such analyses could be aimed at identifying issues, obstacles, and concerns with the variances identified and how the Department will address and resolve them.

    - The items listed under Question #23 in Part I should be considered again for the purposes of this section of the Checklist. That is, what improvements in the RBES Vision document clarity could be made to improve either its understanding or otherwise support decision making by DOE relative to pursuit of any change in EM project/site end state and subsequent initiation of discussions with site regulators, stakeholders, or interested or affected Governments?

JB ECOLOGICAL RISK FORM

INEEL

Operator: DOE owned (some, some is still under BLM), and operated

Continuing Mission? YES, nuclear energy research

End state: Nuclear energy research; end state and current use the same. Will continue to have some grazing on the site.

Surrounding Land (Urban, industrial, residential, agricultural, ecological, preserved,):

Public: grazing, mining, wildlife management, recreation
Private: grazing and farming (25 % irrigated).

Expected Growth
Is information given? yes
Is growth expected? Predicts a population decline of.05% by 2010, and 2% by 2035; but could be some growth in some of the surrounding communities. They give references for their data.

References to Ecological Risk Assessment Documents

Human Health Risk Assessment Documents Yes, they mention them but sometimes do not reference them or site them at the back. Do not give specific hazard levels or risk levels (current or residual).

Species lists or appropriate trustees No species list, but do talk about trustees of the wildlife. Also give reference in text and in lit cited to ecological risk assessments (page 4-4). Mention a few species that form a trophic web, but do not relate this to the CSMs or give risk information. This is the widest mention of species and trophic level indicators.

Tribal nations: mentioned as stakeholders; shows tribal lands on their map. Mentions location of Ft. Hall Indian Reservation.

Mentioned in Text:

Aquifers: Snake River aquifer; to be maintained below MCLs by 2095. Describes it well (stores as much water as in Lake Erie). It is a sole source aquifer. This water also

used for irrigation and for livestock.

Species at risk, mention vs map. They discuss migration of birds of prey and mammals through the site. In some winters thousands of pronghorn antelope and sage grouse winter here. 30% of Idaho's antelope use it as winter range. Mule deer and elk reside on site. They have bobcats, mountain lions, badgers and coyotes. 43 mammals, 210 birds, 11 reptiles, 9 fish, 2 amphibians on site.

Species at risk - give designations? none listed as threatened or endangered.

Hazard Quotients for individual species: none given

Unique habitats; mentions Snake River; mentions some of the only remaining Shrub-steppe habitat in west.

On site ecological preserves YES; Sabebrush-Steppe Ecosystem Reserve.

NERPs declared a NERP in 1975. mentions this.

*Mention environmental monitoring of environmental media, but also big game animals, and local produce on surrounding lands.

Ecological draws: Sagebrush-Steppe Ecosystem Reserve, with some of only remaining habitat in the west. (page 3-4) The big game animals, such as antelope, elk.
Snake River nearby; Recreation in the area (hunting, fishing, boating, skiing and camping on adjacent lands).
On site there are archeological sites, 215 historical buildings and 1 National Historic Landmark (Breeder reactor I).
Though not usually considered ecological, 341,000 of the sites 569,600 acres are used for cattle and sheep grazing, which draws employees of these activities to the site where they can observe or watch animals on site.
Mentions cultural resources

Conceptual Site Models: They mainly deal with occupational/residential.
Inclusion of eco receptors (how, soil/sed, type, …)

Bitoa: XX
Ecological:
Terrestrial Biota: XX
Eco soil and sediment:
Other

Notable inconsistencies (table with CSMs) Do not show ecological pathways or food

web.

Completeness of pathways and ecological receptors: do not show specific pathways for ecological receptors, do not mention food web.
Graphical presentation of ecological receptors? NO

February 6, 2004

CRESP Comments to ITL Site Specific RBES Vision Document Checklist

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Part I. Specific Content Questions for RBES Vision Document

Risks/hazards

7a. *Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate or consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?*

Yes. The site cleanup is geared to current and future industrial land use. There will be a point in time (approximately 2030) whereby the residual radiation will have degraded further, to nearly residential use levels.

7b. *The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include, for example, risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.*

No risk balancing was provided, however, its inclusion at this stage would be irrelevant since activities that would have included it have already been completed.

8. *Have all the hazards that will remain, that drive the land use, been identified?*

Yes. The key contaminants of the four (soils at Hot Ponds and Sewage Lagoon sites; groundwater at Sewage Lagoon and Diesel Spill sites) hazard areas have been identified in the text. However, only TDS and Sulfates (because they exceed standards) have been listed in tabular form (pages 25 and 35) with applicable standards and sampling results displayed. The report would benefit from a more comprehensive list of the measured contaminants, their concentrations or combined mrem contributions, and applicable standards. For example, the reader would benefit from viewing the concentrations (and applicable standards) found in groundwater for polyaromatic hydrocarbons, 1,2 DCB, 1,3 DCB, 1,4 DCB, BTEX, etc. at the Diesel Site. Radionuclides identified on page 30 as potential COCs (e.g., Cs-137, Sr-90; and the range of current activities in pCe/g, residual radioactivity and limits) should be included in table.

9. *Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?*

A statement should be made that characterizes the risk basis of the applicable DOE remediation Orders and the State of New Mexico regulations (WQCC standards, NMED UST requirements)..

10. *Are the residual hazard levels protective of the end-state?*

The radionuclide measurements and modeled values appear to be protective currently for industrial use and, with decay over time – although risk levels associated with the modeled mrem levels are not specified. The report also models radioactive attenuation over time and predicts mrem values consistent with residential farmer use by the year 2030. The report does not specify why the residential farmer scenario is mentioned throughout the document, yet the expected land use is industrial. The legacy waste and contamination from the 30 or so laboratories and work areas have yet to be characterized and cleaned up, so no statement can yet be made regarding their future degree of protectiveness.

11. *If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?*

Residual contamination levels in groundwater exceeding New Mexico Water Quality Control Commission (WQCC) standards are the basis for drinking water restrictions. Groundwater under the Sewage Lagoon (for total dissolved solids and for sulfate) and the residual contamination from the Diesel Spill (for methylnaphthalene) exceeds WQCC contamination standards. The risk basis for the WQCC standards should be noted in the document. There is no use of this water for human consumption, with blockage obtained through institutional and access controls.

Potential soil mediated radiation doses for industrial land use scenarios are currently acceptable, but residential farmer land use scenarios are expected to reach acceptable levels through radioactive decay by 2030. The current radiation levels that restrict potential farmer land use are not given. Restrictions can be identified as administrative controls in CSM.

12. *Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?*

The CSM for groundwater hazards (Figure 4.1b3) is not included in the submitted document. The soil hazard CSM is mistakenly presented twice, with two figure 4.2b2s submitted on pages 27 and 28. No references to site risk-assessment reports are provided.
The noted blocking (pathway control mechanism) should be numbered and expand slightly the explanation in the text. For example, the institutional controls aspect could also include industrial land use designation and restricted land use on air base property.

13a. *Have all EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.*

Specific human health risk assessments have been performed (see page 30 for Sewage Lagoon soils, radiological and non-radiological risk assessments; page 32, for Former Hot Ponds Site risk assessment), but are not referenced. No ecological risk assessments have been done. Further, the risk assessments that have been done are not referenced, and there is no text to indicate that a senior DOE site manager has or has not approved such assessments.

13b*. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?*

Ecological receptors, while probably not key at this site, should still be discussed. It is not clear what the dermal contact for ecological receptors means in figure 4.2b2. Assumptions and uncertainties are not mentioned for the CSMs.

13c. *Is the CSM and narrative consistent?*

No. The text mentions potential “inhalation of particulate matter” regarding the Sewage Lagoons (page 30), yet fails to describe whether such a pathway is complete. The Soils CSM (Figure 4.2b2) does not show an air pathway for such particulate matter. This inconsistency should be resolved.

13d. *Is sufficient information provided as follows?*

List of hazards/contaminants of concern and their concentration levels as well as the cleanup level for each hazard.
The contaminants of concern are mentioned, but could be presented better in a list format, along with concentrations and cleanup level.

Pathways to the environment
Yes, except for the airborne pathway (noted above).

Projected risk levels expected and/or concentrations expected after remediation
The potential annualized mrem/yr of exposure is modeled for current industrial use and for future residential farmer use (year 2030). While radiation-related risk data is well known, the related risks are not stated in the report.

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit
The risk basis is not stated, although the basis for radiation exposure limits is well known to be risk-related. A brief statement on risks would place the effort in proper context for the general reader.

13e. *Are all potential receptors and pathways identified?*

Airborne pathway is possible, yet not mentioned.

13f. *For all potentially complete exposure pathways identified in the current state CSM, does the RBES CSM show that the pathways will be blocked?*

Yes.

13g. *Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of the rate of movement of plumes) to the extent that it aids the explanation of the risk basis for the end state under discussion?*

The depth of groundwater samples is provided, the extent of plumes is shown on the provided maps. There is no indication of the rate of plume movement.

13h. *Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?*

A general discussion of failure analysis has been provided. A comment should be provided to indicate what happens if institutional controls fail. A consequence assessment has not been performed, possibly because of limited population access and limited degree of risk.

February 11, 2004

CRESP Comments to Kansas City Site Specific RBES Vision Document Checklist

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KANSAS CITY PLANT

Part I: Introductory Comment to Specific Content Questions for RBES

KCP is a site scheduled for transfer in 2006 from EM to NNSA to allow the continued use of the site, post-cleanup, as a NNSA facility. Early in the document, the remaining steps, prior to that transition are defined as follows:

> The KCP is very near the end of its environmental management (EM) program mission, having all solid waste units (SWMU's) investigated and assessed under RCRA Facility Investigation (RFI) and Corrective Measure (CMS) components of the RCRA corrective action process. Only the approval of one SWMU remains. Final remedies have been selected for all other SWMU's at the site….. (p. 4 in both October and February versions identically introduces this SWMU, the famous 95th terrace and the confounding storm water drain that traverses part of it)

The remaining SWMU (the single strand separating KCP from moving between EM completion and NNSA supported LTRA) has, however, been sitting at MDNR in Jefferson City for more than two years. There are a variety of scenarios as to how to prompt action on this decision and what can happen in response to the CMS on this "43rd SWMU". It may be that the State of Missouri will simply accept the RBES-consistent CMS for institutional controls. It may well seek much more aggressive remediation. **Still, one SWMU decision/implementation and EM is through.** But as one reads the entire document, this fact is lost and even contradicted.

In its earlier comments to the site (in response to the October 31 RBES) the HQ team drew attention to the fact that the first draft of the RBES opened pathways to discussion of what RBES should mean for follow up actions across the entire site. After noting that

the guidance to define a new RBES and its variances was not followed and the groundwater compliance strategy was not RBES consistent, the HQ team said:

> Possible variances are mentioned or alluded to, but are not proposed or developed. Some of these are specific to the remaining EM mission [i.e. the remaining SWMU], and some pertain also the LTSM mission that will be the responsibility of the landlord.

This new draft Vision is a dramatic improvement over the November draft --as an RBES with variances. What has, however, been almost entirely lost in the new document is what the HQ team clearly pointed out: some of the variances apply to the remaining EM responsibility; most of the variances have to do with the fact that the site has signed up for a compliance program that entails for the landlord an expensive, long-term Remedial Action (i.e. operating and maintaining a complex set of pump and treat operations) to meet standards that are not risk-based. Rather than help the reader understand who has responsibility for what, the document moves back and forth between the final SWMU and all of the other site issues and, in fact, actually recommends that EM pay for laying the groundwork for utilizing a RBCA based system (that the state may implement in the next few years) as the basis for renegotiating the already completely implemented RCRA program and the consequent NNSA long tail of post-completion obligations! The RCRA corrective action program that achieves these more aggressive levels and goals is complete; if the landlord seeks to reduce its LTRA obligations, that clearly is its responsibility.

The RBES document is intended to have sites describe cost-effective, protective and sustainable RBES' But it is not useful to have the EM and the post-EM landlord's work confused. *There is a ready way to remedy the vision* – and that remedy should be required for the final KCP RBES vision. It involves two additions:

> 1) The document needs more and distinct maps related to CSM's, clearly distinguishing issues of how the SWMU's (not identified anywhere in the maps) relate to Figure 4 (the CSM for the 42 completed SWMU's), and how these hazard areas, in turn, relate to the Blue and Indian Creek flow systems. Similarly, maps should help us understand the relationship between the 95th Terrace (the final SWMU) and these flow systems. By not being given the required maps of hazards that are then related to CSM's, the reader is never given the anchoring in geography that is a major purpose of the Vision as defined by the Guidance. In this case, the relationship between what is "EM completed" and the sole remaining EM responsibility to achieve completion is never geographically depicted and as a result never made understandable.[1]

[1] The current vision claims (p. 2) that the site-wide site hazard maps "provide sufficient site detail to allow the reader all relevant information. That is demonstrably not so. The reader cannot clearly distinguish what remains to be decided and what has already been decided.

2) Still, the site is right to suggest that had RBES guided its work, it would have gone about characterization and remediation differently. In fact, an ***additional*** "set" of maps and CSM's is needed for this RBES, precisely because the variances described between current baseline and RBES end state are so dramatic. One set should show what is the existing baseline (what the 12/23/03 Guidance Clarification calls the current cleanup baseline end state) and the second set of maps and CSM's should provide the geography and CSM's for the proposed RBES.

Why aren't they here? Both the November and February KCP drafts state that "KCP is required only to prepare RBES Vision documents as the site is very near completion." But as the 12/23/04 Guidance Clarification states unequivocally, where important differences between the current baseline and the RBES exist, the sites are required to depict these in different CSM's and maps.

Additionally, there is consistent reference in the document to decisions made by "DOE". In all cases it is imperative that the PSO (or former PSO) be identified so that the reader has some idea who was the decision maker as well as what was the DOE decision. Is it DOE-NNSa, or DOE-EM, or DOE-who that is the referent. One is left trying to figure out who did what.

And finally, the document provides no insight at all into what would constitute an appropriate transition between EM and landlord missions and responsibilities. The best RBES's have been those that make clear how an effective transition will allow the protective ands sustainable RBES to be achieved. Getting on with precisely defining that transition and not simply waiting for the MDNR decision would be a goods use of time and resources.

PART I: Specific Content Questions for RBES Vision Document

1. Does the site have a land use plan that fully describes the end state and the future land use at the site.

Yes. There will be a continuation of mission and multi-agency federal activities at the Bannister Federal Complex.

2. For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan ?

It is explicitly stated that the continued industrial/commercial activities are consistent with the 10-20 year land use recommendations of the City.

3. Has the future land use been communicated to the regulators and is it acceptable to them?

Yes

4. Is the site's land use plan full integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

Yes

5. Is the site's cleanup plan consistent with the end state depicted in your land use plan in terms of cleanup levels, future uses, and remaining hazards? If not please specify?

42 of 43 release points have been completed and approved. With the exception of the groundwater cleanup to drinking water standards, remediation has been largely compatible with RBES.

6. Have the landowners (current and planned) been identified and communicated with? Is the land ownership clearly identified in the vision document" If so, are those landowners in agreement with the planned land use.

Yes. Federal complex.

Risk/Hazards

7. Is risk (ES&H) risk, not project risk) fully considered and appropriate or consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?

This information is not provided. The post closure permit requires cleaning up groundwater to drinking water standards and is not risk-based for an industrial land use scenario. "This runs counter to the risk based end state to which the KCP ascribes" (p.5).
The new Missouri RBCA program should be more amenable to risk considerations.

8. Have all the hazards that will remain that drive the land use, been identified?

Yes. It is stated that only TCE, the degradation products of TCE, and PCB are hazards of concern. As, Fe and Mn, from naturally-occurring site soils, are present at concentrations above their respective primary and secondary drinking water standards.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

Yes, except that engineered barriers are “only partially effective”. The failure analysis provides a very good discussion of potential failure mechanisms and the responses needed to ensure continued protection.

10. Are the residual hazard levels protective of the end state?

Yes, provided ground water plume(s) are contained on-site by active pumping. Institutional controls are required**.**

11. If restrictions are imposed on ground water, provide basis for restriction.

RCRA post-closure permit prohibits use of groundwater as a drinking water source.

12. Do the CSMs and narratives reference the site risk-assessment reports where they are completed?

Not explicitly. Site is waiting for implementation of MDNR RBCA program.

13. Have all EM cleanup remedies either in place or anticipated to be enacted undergone a formal risk assessment and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is to be performed has such risk assessment been similarly approved?

Not explicitly addressed in the document.

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (both human health and ecological?)

The CSM for the Solid Waste Management Unit is highly simplified and generalized. This may be sufficient for a relatively simple site, although KCP is somewhat more complex, with 43 sources.

The CSM for the Blue River Flow System is more detailed. The barriers (such as partial barriers to dispersion and advection) that are identified on Figure 4, are not identified on figure 6. Institutional controls are considered effective. A column is given for ecologic receptors but no completed pathways are shown. Although the guidance identifies the codes, it would be helpful for the designations: NRW, CW, V to be spelled out at the bottom of the figure, since this is supposed to be a risk communication document.

No barriers are shown from surface water to receptors.

The overall site is 136 acres. Some of the land in the north appears to be parkland and there are park areas contiguous. The CSMs should at least consider potential pathways to ecological receptors onsite and offsite. The text addresses this by saying there are no ecologic receptors of concern.

13c. Is the CSM and narrative consistent?

Yes.

13d. Is sufficient information provided:

List of hazards/contaminants of concern and their concentration levels. Yes, TCE (and its breakdown products) and PCB. The PCB data is limited. There is also the question about whether there really are no other hazards from a manufacturing facility that employed metal fabrication, cleaning, finishing, and plating operations, generated waste paints, thinners, laboratory and other wastes and has an extensive history. Perhaps a little on the RFI that was done could address this.

Pathways to the environment. Yes, described in adequate detail.

Projected risk levels expected and/or concentrations expected after remediation. There is inadequate documentation of actual numbers and criteria, but good discussion of the request for Alternative Concentration Limits. Also, reference is made to the continuing presence of subsurface DNAPLs and the corresponding high groundwater concentrations associated with their presence.

Basis in risk for existing requirements, or for regulatory limits to provide the risk context for the applied limit?

Not completely, but the site will be in a better position to do so under the MDNR RBCA program.

13e. Are all potential receptors and pathways identified?

Yes. But offsite ecologic receptors have been ignored. This omission should be more clearly discussed to justify it. It is argued that any ground water contamination reaching Blue River is below regulatory concern. Stakeholders---particularly site neighbors - would likely ask for more justification/consideration.

13f. For all potentially complete exposure pathways identified in the current state CSM, does the RBES CSM show that the pathways will be blocked.

For most they are blocked, although capping is stated to be imperfect and institutional controls are considered adequate to interdict transport.

13g. Is information on plumes provided? (ie depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

The information is extensive and includes depth and extent. It would be helpful in the maps if an arrow showed the direction of the plume.

13h. Has there been a failure analysis completed? Are the failure modes for each barrier identified and their consequences mentioned.

There is a qualitative statement on Figure 4 and a good discussion of failure modes on pp 20-21.

Does the document identify the site's cleanup standards?

No.

Note: It is not stated how the long-term pumping program will be maintained, nor are there estimates as to how long it would need to be sustained.

February 6, 2004

CRESP Comments to Los Alamos Site Specific RBES Vision Document Checklist

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LOS ALAMOS REVIEW

GENERAL: Los Alamos did not submit an integrated Vision statement that incorporates all of the changes and suggestions made by HQ in phone conversations. Rather, they submitted sections which they will integrate during the next two months to show the direction of their revisions. In many cases, there are headings for paragraphs that will be included at a later stage. Because of this, it makes it difficult to evaluate how well risk is integrated with land use. Further, it is impossible to evaluate the CSMs because new ones were not provided (except for the site wide CSM).

It is unclear in this version whether there will be a change to reflect a congruence between the hazard areas and the CSMs. From the generic CSMs it is difficult for a regulator or other stakeholder to evaluate specific hazard areas.

The Introduction section has been revised, and new sections on ecological risk assessment and aggregation of watersheds for defining RBES have been added. Revised maps of aggregated areas (at watershed level) and a revised site wide CSM for human and ecological exposure have been added as prototypes of further changes in CSMs. These modifications and additions demonstrate a commitment to modify the original document; however, since the changes are incomplete, it is not clear whether the revised version will completely reflect suggested modifications and additions.

Despite the changes made to the RBES Vision report, some of the material is poorly integrated, making it difficult to follow, particularly for stakeholders. Detailed comments follow.

HOW COULD LANL VISION DOCUMENT BE IMPROVED?

1. A Table showing the risk levels in the various hazard areas (corresponding to CSMs) currently, at baseline, and at risk-based end state is required to be in compliance, and would make it easier to integrate total risk on the site. The hazards are well described, but the residual risk (under current, baseline and RBES) are not clear.

2. Provide more information on stakeholder involvement in this Vision document, particularly the regulators and Native Americans.

3. The new site wide CSM for terrestrial receptor is excellent, although it is not clear why it does not include aquatic receptors that might be exposed through the surface water.

4. The new ecological risk assessment section is responsive to comments, and improves the document markedly. This section could be improved with additional references, justification for not using other species, and stakeholder input into the process. The section on endangered and threatened species is important in supporting the risk balancing.

5. To be consistent with the Vision documents from the other sites, it would be useful if LANL called them CSMs.

Part I. Specific Content Questions for RBES Vision Document:

Land use

1. Does the site have a land use plan that fully describes the end state and the future land use at the site?

Both the end state land use and the future land use are described generally, but not fully. For instance, the RBESV states that 10 parcels of land that are being transferred to the Pueblos or to the County of Los Alamos, but there is no detail provided about exactly where these parcels are, or about what lands will be transferred to NPS or NFS. The likely human uses of these parcels, and of site area that is to remain mission-oriented, is not fully explained. For example, the RBESV does not include any information about how the parcels transferred to the County are likely to be used according to local or regional land use plans.

The RBESV contains a discussion of programmatic elements of an LTES program. Part of this program should be a proactive step to re-evaluate land uses both on and near the site, as well as local and regional land use plans, in order to track changes that might affect LTES protectiveness and require new strategies.

2. For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?

The RBESV does not mention these plans, so it is impossible to evaluate.

3. Has the future land use been communicated to the regulators and is it acceptable to them?

It is not specifically stated whether future land uses have been communicated to regulators. The RBESV acknowledges that much regulatory review and approval still needs to occur and that the State "may not agree" with the end state as described – in particular the industrial standards. Therefore it is too soon to state with certainty whether the land uses will be acceptable. The RBESV also notes that LTES will require ongoing reporting and negotiating with regulators.

4. Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

According to the RBESV, LANL has used "all available" land use plans developed by regional, county and tribal governments in developing the planned end state conditions. Without reviewing those plans, however, it is difficult to judge whether the site's plan is well-integrated with those of adjacent areas.
The agricultural use of some of the tribal lands could create receptors that require a different level of protection and a different exposure scenario, for example, including consumption of crops or livestock grown on the land. The RBESV points out that ceremonial practices may also affect exposures, but no further detail is provided.

5. Is the site's cleanup plan consistent with the end state depicted in your land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent?

Since LANL has completed a risk assessment for only one of eight hazard areas, it is difficult to evaluate if cleanup is going to be risk-based and consistent with proposed end-state land uses.

The RBESV states that land that is transferred to the County or to the Pueblo will be cleaned to residential standards; land that will be transferred to the National Park Service or National Forest Service will be recreational; and lands retained for use by NNSA will be industrial. Although difficult to judge without more information, it could be inconsistent to clean the County land to residential if, for instance, it will be used for an industrial park. Likewise, the NPS and NFS land use might be more similar to residential use than recreational, if it is includes a campground or ranger housing. It is

not clear if remaining hazards and cleanup levels, as written, are consistent with actual likely future uses. The document also states that recreational use on and near the site is “prevalent,” with current recreational use or access in six of the eight watersheds, suggesting that the activities and locations of those potential receptors need to factored in to risk-based end state determinations.

6. Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?

The land ownership is clearly identified, but it is not specifically stated if the landowners are in agreement with the planned land use, or if and by what method they have been notified.

Significant communication has occurred, according to the RBESV, regarding the land transfers to the County and to the Pueblo, indicating at least some agreement on future land use with these two landholders. A continued strategy of government-to-government communication with the Federal agencies, the County and the tribal government regarding land use, even after transfer occurs, will be a necessary element.

RISK/HAZARDS

7a. Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration integrated appropriate and consistent with the site’s end-state use so that cleanup standards are consistent with the planned end state land use?

Many of their risk assessments are not yet completed, making it difficult to evaluate whether cleanup is consistent with planned end state. Risk assessments are completed for only one of eight hazard areas. Thus, risk is explicitly considered, but has not been examined fully because the risk assessments are not yet completed.

7b. The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include for example risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.

They have integrated the various risk receptor categories well in the Vision document. Risk balancing among ecological receptors is not included (although aquatic receptors should be added to systems with surface water). These risk balancing considerations, however, are largely qualitative because the risk assessments have not yet been completed. The inclusion of a new section on ecological receptors provides adequate information on the risk to these receptors.

LANL seemed to address balancing risks among most of the following "competing" issues: ecological and human health, worker and public health, among competing contaminated areas, among temporal patterns of cleanup, among species, among the sites across the complex, including considerations of national equity, current versus future risks, and short-term versus long-term risks.

8. Have all the hazards that will remain, that drive the land use, been identified?

The hazards have been adequately described, but residual hazard/risk is not always clear. The hazard, and thus the risk, from MDAs in groundwater contamination require additional investigation and description. The source terms could use some additional information, especially in the areas of the original waste forms, and expected current and future states.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

There is insufficient information on risk assessments and on hazard remaining to evaluate if conditions will be effective in protecting human and ecological health. However, for humans, the CSMs show that pathways are blocked to protect human and ecological health. The new section on Ecological Risk Assessment (3.1.2.1) is an excellent addition because it provides some risk data that can be used to evaluate ecological risk.

Some of the barriers need further explanation, particularly institutional ones.

10. Are the residual hazard levels protective of the end-state?

There is insufficient information to evaluate, except that their CSMs show blocks.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

Because the local, sole source aquifer is so deep, it is assumed that private wells will not exist. Monitoring will be on-going to assure safety. There are groundwater restriction, which are based on risk and are consistent with end use.

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

The revised CSMs need to delineate blocked exposure pathways by dashed lines. Understandably, the site-wide CSM does not show specific source areas. However, it must be stressed that CSMs for specific TAs must show these areas in order to make the specific CSMs conform to guidelines. A detailed narrative that describe the administrative/engineering controls and potential failure modes is essential.

Since there are not completed risk assessments for most of the hazard areas, they cannot be referenced.

13a. Has the current status of risk assessment for the site been reviewed and approved? Have all EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

Most of the risk assessments have not been completed, and so are not approved. Since the risk assessments should serve as a basis for the RBES document, this is a serious flaw. The RA is completed for Mortandad Canyon, but it is not clear if it is approved.

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (from both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?

The original CSMs were for three hazard categories (airborne, surface solid and liquid, and subsurface solid and liquid), which did not correspond to the hazard areas. The new document does not have revised CSMs, except for the site wide conceptual model. Since no new narrative was provided for this model, it is difficult to evaluate.

However, the new site wide CSM is more responsive, particularly in showing the risk to different receptors. The inclusion of aquatic receptors should be considered.

13c. Is the CSM and narrative consistent?

The CSMs originally did not conform to the hazard areas, making them inconsistent. The new document does not have revised CSMs, except for the site-wide model. Since no new narrative was provided for this model, it is difficult to evaluate. While useful, the site-wide models are difficult to interpret because of the large and complex nature of the

site. The potential for human and ecological risk will vary by location (and this should be apparent to the regulators and stakeholders through CSMs).

A narrative accompanying the CSM has not yet been included, but it is expected that the completed revision will have such narratives for each CSM.

13d. Is sufficient information provided as follows?

List of hazards/contaminants of concern and their concentration levels, as well as the cleanup level for each hazardPathways to the environment.

No, more detailed information is required.

Projected risk levels expected and/or concentrations expected after remediation.

No, more detailed information is required.

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit.

Because so much of the risk assessment work is still to be completed, uncertainty remains in the residual risk.

13e. Are all potential receptors and pathways identified?

Without all the CSMs, it is difficult to evaluate this aspect. However, the site-wide CSM did not include aquatic receptors, and it is unclear how they will be incorporated into the final document. Since the overall discussion on risk is not likely to differentiate between risks from operational and legacy contamination, the only method of isolating exposures from legacy contamination is through CSMs. Hence, it is expected that the CSMs for legacy contamination will have exhaustive coverage of all exposure pathways. The further division of ecological receptors into terrestrial wildlife and plants, and the differentiation of human receptors by activity is a step in the right direction.

13f. For all potentially complete exposure pathways identified in the current state CSM, Does the RBES CSM show that the pathways will be blocked?

They did in the initial CSMs. The new site-wide CSM shows them blocked, but without the key for the meaning of numbers it is unclear whether these will be sufficient. The blocks are not adequately described. The blocked pathways must be shown as dashed lines, per the guidance document.

In addition to showing blocks, failure modes for those blocks should be discussed.

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

No, information on plumes is not adequately provided. This was discussed extensively on the phone conversations, and the site defended their use of wells rather than plumes. If they are using models to predict contamination, this should be explicitly described.

The site defended its decision to not depict plumes on the basis that maps of point concentrations provide a more realistic measure of risk of exposure. It is strongly recommended that the revised document include an expanded discussion justifying the omission of plumes in the maps, and describing how the point concentrations can be used to obtain defensible exposure and risk estimates.

13h.Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?

Failure modes are not adequately described for each barrier. Consequences are not adequately described. The is a general lack of acknowledgment of the failure modes and their potential impacts. There is a great deal of information available on cap failures and other probable failure modes and these should be added.

A failure analysis is expected to accompany the narratives for the CSMs. The site may provide a detailed fault tree analysis if it so chooses, but a verbal discussion will suffice.

February 13, 2004

CRESP Comments to LBNL Site Specific RBES Vision Document Checklist

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General Comments:

This document provides an excellent example of how risk assessments and end state visions can be used to provide protective remediation while at the same time obtaining substantial gains in efficiency. It is well written and is responsive to both the Guidance and to comments on the previous version. The RBES is for the Year 2007 when EM's mission will be completed and the Office of Science will assume ongoing responsibility for the site. Tables 1.2a and 1.2b provide valuable information on cancer risk and hazard indices that were used to support risk-based levels that differ significantly from mandated MCL values.

The means of communicating the RBES vision to stakeholder groups, however, should be more clearly described.

Part I. Specific Content Questions for RBES Vision Document
Land use

1. *Does the site have a land use plan that fully describes the end state and the future land use at the site?*

   The land used by the DOE is owned by the State through the University of California. The Berkeley Lab, which is operated by the University under contract from the DOE, is expected to remain an Office of Science sponsored laboratory into the foreseeable future.

2. *For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?*

   Not discussed

3. *Has the future land use been communicated to the regulators and is it acceptable to them?*

The future land use will be industrial type institutional, and appears agreeable to the Regulators. The Office of Science will assume responsibility for the long-term response action plan beginning in 2007 (Sec 1.1, page 3).

4. *Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?*

   The land occupied by the lab and much of the surrounding area is owned by the State through the University of California. Private residential properties are located to the west and northwest; student residence halls, the Berkeley campus and downtown Berkeley are located to the west-southwest; and, Berkeley educational and research facilities are located to the north and northeast. East of the site is the Tilden Regional Park and undeveloped open space. The City of Berkeley recently approved its General Plan update, which included language that "planned uses are in most cases similar to existing uses" (Section 3.2, page 21).

5. *Is the site's cleanup plan consistent with the end state depicted in its land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent.*

   The land use will be industrial type institutional. The current baseline plan, however, follows regulatory cleanup requirements of unrestricted access to groundwater. The RBES plan would more closely align with the proposed land use and knowledge that groundwater under the site is not currently used for domestic, irrigation or industrial purposes (page 2)

6. *Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?*

   There is no indication in the document that the RBES vision, in terms of its different cleanup strategy, has been discussed with the University or other nearby landowners.

Risks/hazards

7a. *Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate or consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?*

Yes. This document benefits extensively from utilizing site-specific studies, including information derived from a human health risk assessment conducted by LBNL, reported in May, 2003. The end state vision is clearly stated, and the proposed RBES cleanup strategies are consistent with the end state land use.

7b. *The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include, for example, risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.*

Risk balancing was not specifically discussed, but specific mention was made that the risk assessments did not consider on-site remediation workers.

8. Have all the hazards that will remain, that drive the land use, been identified?

Yes.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

Yes. The State's cleanup criteria for groundwater is considered overly conservatively and protective. The RBES (based on risk assessment studies) provides alternative criteria that are adequately protective. Groundwater under the site is not currently used for domestic, irrigation or industrial purposes, and the only exposure pathways that exceed a risk-based level of concern are the soil and groundwater inhalation pathway for potential indoor workers, and a direct contact pathway for outdoor workers. Actions are proposed to reduce these risks to acceptable levels, but administrative and land use restrictions will likely be required on future building plans near several buildings until risk-based cleanup levels are achieved.

10. Are the residual hazard levels protective of the end-state?

Yes, as noted above.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

California regulations require cleanup of groundwater to MCLs for the protection of potential future drinking water sources. Groundwater under the site is not currently used for domestic, irrigation or industrial purposes, and municipal water is provided for local site and all off-site uses. The RBES thus proposes to cleanup soils and groundwater, and use administrative and land use controls to protect workers against inhalation and direct contact risks.

12. *Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?*

References are provided that clearly indicate the Berkeley Lab Human Health Risk Assessment (HHRA) as being the primary basis of the current and baseline CSMs. RBES changes to the baseline cleanup strategy appear to be consistent with addressing the worker inhalation and direct contact risks identified in these assessments.

13a. Have all the EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment and have those documents been approved for use by the appropriate senior DOE site manager? For instance where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

Formal human and ecological risk assessments have been conducted and reports were released in 2003 and 2002, respectively. The HHRA was accepted by the State in August 2003. The on-site approval mechanism for these reports is not stated.

13b. *Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?*

All of the potential transport and exposure pathways and possible receptors at risk are identified, however, several exposure pathways are left as solid lines. It is unclear if this is a mistake or if there are residual risks that have not been fully contained. An example from several RBES CSMs is that inhalation of VOCs from the groundwater remains an active pathway, even though various technologies are proposed to reduce this risk to acceptable levels. These same CSMs do not show the administrative and/or land use controls that were discussed earlier in the vision as required to block this potential pathway, until groundwater contamination levels are reduced to acceptable levels.

13c. *Is the CSM and narrative consistent?*

Generally yes, except as noted in 13b above.

13d. *Is sufficient information provided as follows?*
List of hazards/contaminants of concern and their concentration levels as well as the cleanup level for each hazard

Yes, in excellent table format.

Pathways to the environment

Yes

Projected risk levels expected and/or concentrations expected after remediation

Maximum concentrations detected in ground water and soils at each of the hazard areas, along with regulatory and risk-based cleanup standards, are shown in table format for each contaminant present.

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

The current requirements are not clearly risk based, however the risk assessments do provide alternative risk-based cleanup standards.

13e. *Are all potential receptors and pathways identified?*

Yes.

13f. *For all potentially complete exposure pathways identified in the current state CSM, does the RBES CSM show that the pathways will be blocked?*

Yes, except as noted in 13b above, several exposure pathways are left as solid lines. It is unclear if this is a mistake or if there are residual risks that have not been fully contained. An example from several RBES CSMs is that inhalation of VOCs from the groundwater remains an active pathway, even though various technologies are proposed to reduce this risk to acceptable levels. These same CSMs do not show the administrative and/or land use controls that were discussed earlier in the vision as required to block this potential pathway, until groundwater contamination levels are reduced to acceptable levels.

13g. *Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of the rate of movement of plumes) to the extent that it aids the explanation of the risk basis for the end state under discussion?*

Yes, except for rate of movement. – which is indirectly described.

13h. *Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?*

The site is in the process of completing a Corrective Measures Study (CMS), which includes an evaluation of many of the remedial technologies used in baseline and RBES visions and CSMs. Many are undergoing pilot-scale tests, and results to date indicate that their effectiveness appear to be limited. Soil flushing looks to be potentially effective for reducing groundwater contamination in the more permeable zones, but other technologies may have to be considered if pilot testing shows that they are not sufficiently effective in reducing contaminant risks.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

Current groundwater cleanup is to regulatory standards intended to protect potential future drinking water sources.

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

No – groundwater regulations will dictate remediation choices unless changed by DOE.

15. Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?

16. Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the "disconnects" between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?

Regulatory drivers are clearly stated, as are the disconnects and variances between what is proposed under the RBES vision and the current baseline strategy.

17. *Have the future roles and responsibilities of the parties involved in site cleanup been identified (e.g., DOE, current owner, future owner, other federal and state agencies)?*

    Yes, Office of Science to take over responsibility from EM in 2007.

18. *To what degree does the site's regulators, key stakeholders, Tribal nations and local government representatives agree with the currently identified and the planned risk based end-state?*

    Unclear what communication has taken place with regard to RBES cleanup strategy.

February 6, 2004

CRESP Comments to LEHR Site Specific RBES Vision Document Checklist

Contributors:
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PART I: **Specific Content Questions for RBES Vision Document**

This CRESP review of the 2nd draft of LEHR's RBES Vision Document addressed:

1) compliance of the document with the RBES guidance
2) how the document could be strengthened
3) how the document could be clarified as a risk assessment tool for stakeholders.

Overall comments: LEHR provided a superior document in the first round and has addressed the issues that were raised in the November critique and subsequent conference calls. It largely meets the guidance. Some suggestions for enhancing the quality of the document are included.

BACKGROUND BY Gochfeld

LEHR is a small site with relatively many waste units. It is mostly remediated. The document is generally clear and risk levels are explicitly stated. The main risk problem are the ecological risks (above background) for soil invertebrates and burrowing mammals. Since the site is not expected to support natural ecosystems, and since the ERA used conservative assumptions throughout, this is not likely to interfere with transition to closure and transfer to UC Davis.

LEHR site operated from 1958 to 1988 and was placed on the NPL in 1994 due to groundwater contamination. Cleanup is mostly complete and is scheduled for completion by end of 2005. The current state is thus treated as congruent with the RBES, which is not consistent with guidance. Future land use is for education/research and an industrial cleanup scenario was used.

1. Does the site have a land use plan that fully describes the end state and the future land use at the site.
Yes. UC Davis is the landlord and will use the site for education/research.

3. Has the future land use been communicated to the regulators and is it acceptable to them?

Apparently yes. Only regulators have been considered. Aside from DOE, UC Davis, EPA and State, no mention is made of other stakeholders.

4. Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

Yes. Surrounding area is agricultural and/or campus.

5. Is the site's cleanup plan conistent with the end state depicted in your land use plan in terms of cleanup levels, future uses, and remaining hazards? If not please specify?

Yes.

6. Have the landowners (current and planned) been identified and communicated with? Is the land ownerhip clearly identified in the vision document" If so, are those landowners in agreement with the planned land use.

Yes. UC Davis will assume responsibility.

7. Is risk (ES&H) risk, not project risk) fully considered and appropriate or consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?

Document states that the ecological risk assessment was overly conservative and will be re-calculated. If the revised risk assessment indicates excess risk post-remediation, further actions will be evaluated in an RI. However, no sensitive species or natural ecosystems are expected to exist on the site, although seven special-status wildlife species have a moderate or high potential to visit the site.

The ERA driver in the Southwest Trenches is selenium to the Ornate Shrew. The selenium is probably of natural occurrence.

8. Have all the hazards that will remain that drive the land use, been identified?

Yes

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

Human hazards are below levels of concern. Ecologic risks are elevated for soil invertebrates and fossorial (burrowing) mammals, using conservative assumptions. Further management may be required. .

10. Are the residual hazard levels protective of the end state?

For the most part yes.

11. If restrictions are imposed on ground water, provide basis for restriction.

Ground water will not be used for drinking water.

12. Do the CSMs and narratives reference the site risk-assessment reports where they are completed?

Yes.

13. Have all EM cleanup remedies either in place or anticipated to be enacted undergone a formal risk assessment and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is to be performed has such risk assessment been similarly approved?

CSM narratives note that risk assessments show a Hazard Index above 1 for certain ecological receptors in former hazard areas 1, 2 & 3. The site believes that the assessments were based on overly protective model assumptions, and that it is working with the University of California-Davis and the RPMs to re-run these calculations using additional data and more realistic model assumptions. If the ecological risk values are found to be unacceptable, remedial alternatives would be addressed in the ongoing FS.

I (MG) have separately reviewed the site-wide ecological risk assessment. My assessment was sent to LEHR on 2/2/04.

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (both human health and ecological?)

A single CSM is provided for the entire site, but detailed narrative is provided for each of the six former hazard areas. All contaminant sources have been removed, thus providing a sustainable risk-based end-state. All potential pathways and receptors are indicated, although the ecological receptors could have been broken out into separate categories.

13c. Is the CSM and narrative consistent?

Yes.

13d. Is sufficient information provided:

List of hazards/contaminants of concern and their concentration levels.

Limited information is provided on the list of hazards. A Table showing contaminants and before and after concentrations would be helpful.

Pathways to the environment.

Yes, adequate information on pathways is provided.

Projected risk levels expected and/or concentrations expected after remediation.

A Table showing contaminants and before and after concentrations would be helpful.

Basis in risk for existing requirements, or for regulatory limits to provide the risk context for the applied limit?

Not explicit. Basically it is stated that industrial land use scenario is used and that cleanup is mostly complete. Cleanup levels are not specified, nor their basis in risk (or otherwise) indicated.

13e. Are all potential receptors and pathways identified?

They are identified in the text under the separate areas, but although consistent with the guidance, the CSM could be improved. All ECO are lumped in a single category, while distinctions between different types of ECO receptors (soil invertebrates, burrowing animals, etc) would have been helpful. Moreover, since the text mentions that some listed species might use the site, these carnivorous birds and mammals warrant a separate entry.

13f. For all potentially complete exposure pathways identified in the current state CSM, does the RBES CSM show that the pathways will be blocked.

The CSM shows that all of the contaminant sources have been removed, thus all pathways are blocked. However, the CSM narratives note that risk assessments show a Hazard Index above 1 for certain ecological receptors in former hazard areas 1, 2 & 3. The site believes that the assessments were based on overly protective model assumptions, and that it is working with the University of California-Davis and the RPMs to re-run these calculations using additional data and more realistic model assumptions. If the ecological risk values are found to be unacceptable, remedial alternatives would be addressed in the ongoing FS.

13g. Is information on plumes provided? (ie depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

There is concern about future groundwater contamination from nitrate waste in Southwest Trenches (area 3). DOE may conduct additional cleanup or may monitor groundwater.

13h. Has there been a failure analysis completed? Are the failure modes for each barrier identified and their consequences mentioned.

Yes. A single barrier is used. This is source removal. This is considered sustainable. It is considered not subject to failure.

Does the document identify the site's cleanup standards?
Not explicitly. It merely says that the cleanup criteria have been met in most cases.

Cleanup Strategy/Regulatory----
Questions 14-16, 18 not addressed by CRESP

17. Has the further roles and responsibilities involved in cleanup been identified?

Yes – But these non-DOE roles are not being responsibly played. RBES is achieving exit strategy, accepting regulators, totally in control of UC Davis. RBES while interesting and contributing to understanding pre complex completion is irrelevant to LEHR site. Future site management should focus on regulatory closure by any of a variety of available legal tools

Variances: Questions 19-21, not addressed by CRESP

In the case of LEHR where the current state is treated as almost congruent with the RBES they conclude that no variance is required.

Is a conference call with the site necessary NO

February 11, 2004

CRESP Comments to LLNL Site Specific RBES Vision Document Checklist

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Lawrence Livermore National Lab (LLNL)

There are, in this newly revised LLNL RBES vision, an otherwise elegant and even exemplary document, several gaps and thoroughgoing sources of confusion. The site has responded with more risk data (particularly in citing - very often[2] its site-wide Baseline Risk Assessment) – but that data actually obscures rather than clarifies the relationship between the site's current condition[3] and the two possible end state futures identified.

The essential confusion is the relationship between calculated risk levels defined in the Baseline Risk Assessments and the fact that **no** risk levels are cited for the 2 different cleanup goals for the site. Why is that? The way in which the site differentiates between the two "end states" it describes is to posit two different "places" (Points of Compliance) where its contamination is to be measured. The point of compliance for the current baseline is where contamination of the groundwater occurs; the point of compliance for the RBES scenario is at the site boundary. In both cases the "measure" of what it to be achieved is Maximum Concentration Limits (defined by contaminant in table 1).[4] At no point in the document, however, do its authors seek to translate to risk those MCL's for the 14 contaminants found in/threatening groundwater at the site.

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[2] The two ways of calculating risk under the Baseline Risk Assessment methodology are cited time and again throughout the document – and in ways that do not clarify whether the authors themselves remember that they are only describing "what their pre-remediation levels are" or are confusing the these calculations with what can be/would be achieved. Remediation goals and current baseline risk assessments are frequently depicted in very bewildering ways in the RBES vision documents. And that leads to sheer confusion.

[3] It should be noted, however, that this assessment is now 13 years old and does not reflect gains likely made in subsequent extraction and remediation activities at the site. Data that compares the Baseline Risk Assessment with what has been achieved by subsequent remediation would provide a far better guide than is provided in this document to a cost-effective RBES strategy.

[4] MCL's are frequently, even typically, levels at which an off-site resident would consume 2 liters water a day for 70 years from a well that meets the MCL's and would not incur a more than 10^{-6} increased cancer risk. (Frequently other factors than this risk level shape the specific concentration level specified by a specific MCL, but MCL's are generally meant to achieve this level of protection). But note: this is at the protective limit of the CERCLA two order of magnitude risk range of 10^{-4} to $10^{-6.}$ The Livermore current baseline is not set to achieve only MCL level of protection for any actual potential receptors. (The site itself is recognized to be able to protect against groundwater use for drinking water on the property grounds of what will be a special use industrial site for the foreseeable future.) Instead, the use of MCL's as the cleanup goal at Livermore is meant to achieve a level that would preserve

Failure to link the Baseline Risk numbers to corresponding risk levels to be achieved by reaching MCL's lends a strange affect to the RBES vision presentation. We are constantly reminded of how to assess current risk at hypothetical off-site wells and yet never told what risk protection would be sought/achieved through the two different remediation regimes (baseline and RBES). For either end state, and particularly for the RBES one, this results in a scenario where the ***risk protection*** to be achieved is never discussed. The document not only is misleading as a result, but is surely guaranteed to be misunderstood by stakeholders, including regulators.

The document is probably accurate in saying that the site does not know how to calculate how long its pump and treat operations would have to continue to achieve the MCLs at the point of compliance (POC) in either of the two strategies or end states. Instead the documents says that the expected 75 years and $690M of remediation will likely not obtain compliance at either POC. But it is precisely at that point that an extremely important element is merely noted in passing: that the way in which the extraction well system would be configured is entirely different when set to achieve the different points of compliance. That is, one would array the extraction resources differently if one were focused solely on an end state to reduce/protect against future offsite migration as compared with arraying the extraction system to intercept groundwater in such a way as finally to achieve MCL's on the LLNL property itself. When one is projecting 75 years of remediation, the difference between these two remediation designs, and their importance to risk protection of receptors in the long and short term becomes exceedingly important. Although the site does note that additional characterization and remediation design efforts are needed to elucidate the RBES option, nowhere in the document is one helped to understand the public-health protection advantages of having pursued the "intercept before the boundary" design. (Note, most private PRP's would have made this difference a major aspect of their compliance agreement negotiations.)

Why is this major difference not pursued here? As in many RBES', this vision document is focused only on the post-remediation goal. It then fails to achieve an important RBES vision purpose -- to assure that both short and long-term protection as well as protection of different receptor groups are fully explored. The original Guidance, and the Guidance Clarification in particular, stress the importance of risk-balancing assessments among all receptors be an important ingredient in the RBES. As noted later in our comments, there is no reference to risk-balancing in this document.

These critical comments should not conceal the fact that the site has been responsive to most of the comments by the HQ review team in written and teleconferencing contexts. The checklist that follows, recognizes these advances. What has happened is

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as a natural resource all the groundwater affected by the site's contamination – whether under or outside the site. For this reason, the current baseline is rightly described in the RBES as not risk based.

that with the inclusion of missing data, important missing elements of the fully persuasive RBES Vision have emerged. And if the site follows these comments, it will develop a document that may well make LLNL a focal point of a key RBES initiative.

Part I. Specific Content Questions for RBES Vision Document:

Land use

1. Does the site have a land use plan that fully describes the end state and the future land use at the site?

The onsite land will remain under DOE (NNSA) control and continue to be used for research on advanced defense technologies, energy, environmental sciences, biosciences, and basic science applied to enhancement of national security. All offsite lands are privately owned. Land use to the West is residential; to the North it is moving away from agriculture and more into commercial; and is expected to remain agriculture to the East. Sandia National Lab borders LLNL on the South and is expected to change from industrial to agricultural use – do we know that for certain??

2. For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?

The RBES vision is consistent with the NNSA Ten Year Comprehensive Site Plan.

3. Has the future land use been communicated to the regulators and is it acceptable to them?

Continued use of the site by DOE for research purposes seems to be a given that is acceptable by the regulators and surrounding town. Although not explicitly stated in the document, it is likely covered in one or more of the referenced reports and agreements.

4. Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

Fully integrated is probably the wrong description. Access to the site is highly restricted; it is surrounded by a fence; and patrolled by LLNL security.

5. Is the site's cleanup plan consistent with the end state depicted in its land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent.

The Baseline and RBES end-state land uses are the same, but the Baseline requires cleanup of on-site groundwater to MCLs to protect it as a future source of water. The RBES cleanup would protect off-site groundwater contamination above MCLs, but not the on-site groundwater since it is not a source of drinking water. The driver is point of compliance for groundwater cleanup and not land use.

6. Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?

The land will remain under DOE (NNSA) control.

Risk/hazards

7a. Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?

The RBES vision proposes risk based cleanup standards that are consistent with the planned end-state land use, and also protective of human health and the ecology.

7b. The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include for example risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.

No mention is made of risk balancing, and specifically risk to workers during construction or treatment. The technologies being employed to reduce groundwater contamination levels to MCLs (soil vapor extraction and ground water extraction) do not appear to create a risk to workers, but further drilling and excavation associated with the installation of additional treatment units on the site in the future could raise such an issue. Similarly, there is no consideration given to the near and longer time frames within which receptors might be adversely affected.

8. Have all the hazards that will remain, that drive the land use, been identified?

Yes

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

Modeling to predict residual concentration and distribution of groundwater contamination under the RBES scenario has not been performed. Changes would likely be made in the need for and location of the additional groundwater and soil vapor extraction treatment systems proposed under the current baseline cleanup strategy. The stated objective would be to reduce and maintain groundwater contamination levels at the site boundary below MCLs. There is no exposure pathway to on-site workers

10. Are the residual hazard levels protective of the end-state?

Modeling to predict residual concentration and distribution of groundwater contamination under the RBES scenario has not been performed. Changes would likely be made in the need for and location of the additional groundwater and soil vapor extraction treatment systems proposed under the current baseline cleanup strategy. The stated objective would be to reduce and maintain groundwater contamination levels at the site boundary below MCLs. There is no exposure pathway to on-site workers.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

The Baseline end-state requires on-site and off-site cleanup to MCLs. The on-site restrictions are intended to protect this as a future source of drinking water and required by California drinking water regulations. The RBES end-state removes the MCL restriction for on-site groundwater on the basis that it is not a drinking water source and represents no risk to anyone expected to be on the site.

There is, however, some question as to whether the Baseline cleanup to MCL levels can be achieved. The site is currently projecting that MCL levels will not be achieved until 2077 and at a cost of $692 million (current dollars??). It also identifies several uncertainties (see CSM narratives) with regard to changing subsurface conditions (ones that could reduce effectiveness of technology) and changes in groundwater use off-site in closer proximity to the site (could alter groundwater flow patterns). Estimating that it will take 75 years to reach MCLs is, in the authors' opinion, an admission that the technologies may not be capable of removing the contaminants to such low levels.

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

Yes

13a. Have all EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

Risk assessments have been prepared for the Baseline scenario, but none have been prepared for the proposed RBES scenario. However, data from the Baseline assessments indicate that there would be no human or ecological risk on-site under the RBES proposal, because the only risks present relate to consumption of the groundwater or plants irrigated with contaminated water, which would be prevented through institutional and other controls. No risk assessments for the risk-based end state scenario are planned, because the site believes this scenario is not consistent with current regulations and compliance agreements .

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (from both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?

Yes

13c. Is the CSM and narrative consistent?

Yes and very thorough. But see Introductory Comments

13d. Is sufficient information provided as follows?

List of hazards/contaminants of concern and their concentration levels, as well as the cleanup level for each hazard

The contaminants are listed and existing and proposed MCL objectives are provided. No detail is provided as to what levels will actually be achieved under either the Baseline or RBES scenarios.

Pathways to the environment

Yes

Projected risk levels expected and/or concentrations expected after remediation

Existing risk levels, in terms of incremental risk of cancer to a residential user, have been computed, but no estimates are provided with regard to similar risk levels after remediation under either the Baseline or RBES scenarios.

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

None other than assumption that MCLs represent risk to a residential user from drinking water for 70 years.

13e. Are all potential receptors and pathways identified?

Yes

13f. For all potentially complete exposure pathways identified in the current state CSM, Does the RBES CSM show that the pathways will be blocked?

Yes

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

Some description of the ground water plume is included and shown on the maps, but greater detail would make for a stronger case that the technology being used will achieve the desired end-points for the Baseline or RBES end-states. The site is currently projecting that the Baseline cleanup will not achieve MCLs on and off-site until 2077 and at a cost of $692 million (current dollars??). Greater modeling information on the plumes and alternative technologies to achieve the RBES end-state at the site boundaries need to be developed for an accurate comparison. It would also be useful if modeling could be applied to estimating the impacts of the possible changes in subsurface and surface conditions mention in the CSM narratives (see 13h).

13h.Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?

No failure analysis has been completed, but uncertainties and potential failure modes have been identified. They include changing subsurface conditions that might reduce the effectiveness of soil vapor and groundwater extraction technologies, and changes in groundwater use off-site in closer proximity to the site that might alter groundwater flow patterns and thus the contaminant plume. No description of consequences and response strategies is provided.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

The RBES vision is based on a risk-based end state. The Baseline end-state is based on regulatory compliance.

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

The site intends to continue using technologies and cleanup objectives that are based on the California drinking water standards, unless instructed otherwise by EM-1.

15. Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?

The Baseline end-state requires pump and treat and soil vapor extraction for as many as 75 more years at a cost of at least $692 million – and there is no guarantee that it will achieve the required on and off-site MCLs. However, the site indicates that significant progress has been made in reducing the extent and concentrations of the groundwater VOC plume that extends offsite to the West, and in controlling and reducing concentrations and mass of onsite VOCs. As a result, moving to the proposed RBES site boundary point of compliance may require far less soil vapor extraction and groundwater treatment than is currently planned.

A comprehensive life-cycle costing should be made of the Baseline and RBES scenarios, and should take into consideration the potential failures or changes described in 13h.

16. Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the “disconnects” between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?

Point of compliance on groundwater cleanup is the overriding issue. On-site cleanup to MCLs is driven by regulation and not risk.

Variances

19. Has the vision document identified all applicable variances between the current end state and the RBES?

Yes. The major variance between Baseline and RBES end-states is that the RBES scenario drops the requirement that on-site groundwater be cleaned up to MCLs, and that the point of compliance be moved from the impacted groundwater body to the groundwater at the site boundary. The site notes that the RBES cleanup standard is in violation of State and Federal regulations/laws.

20. If potential variances are not listed, list variances that should be considered and provide short description for each.

21. Were the variances adequately evaluated per the guidance (e.g., per page D-1 of the guidance are the key attributes [cost, schedule, scope and risk] listed, are barriers identified, and are next steps identified)?

Other Comments (cross cutting issues, coordination with other programs and Corporate Projects)

22. List as Comments any other items of concern with the document, such as text that is confusing, clarity and completeness of maps and CSMs.

23. The reviewer's overall perception regarding his/her review of the site's RBES document should be summarized through statements responding to the following:

    -Does the site RBES submission adequately articulate an end state vision for the site that is risk based, readily sustainable, appropriately protective of human health and the environment, and consistent with the site and surrounding area's planned land use? Explain and cite examples.

    Yes, but the site does not believe it is feasible without considerable involvement of EM-1 in addressing State and Federal regulations that prevent its implementation.

    -Are variances between the end state RBES vision and the current site cleanup baseline end state clearly identified and defined? Explain.

    -If there is no variance identified, is there adequate justification as to why the current site cleanup baseline end state meets the requirements for a RBES, i.e., does the RBES document show that the cleanup is sustainable, protective, and consistent with the site's surrounding land use? Explain.

Is a conference call with the site necessary? ___ yes _X_ no

February 1, 2004

CRESP Comments to LLNL-300 Site Specific RBES Vision Document Checklist

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Lawrence Livermore National Lab – Site 300 (LLNL-300)

Part I. Specific Content Questions for RBES Vision Document:

Land use

1. Does the site have a land use plan that fully describes the end state and the future land use at the site?

The onsite land will remain under DOE (NNSA) control and continue to be used as a remote experimental testing facility for research, development and testing of high explosives and integrated non-nuclear weapons components. All offsite lands are privately owned, primarily ranches, except for a 5,000 acre State off-road recreation area to the south-southwest and a State ecological preserve to the east. Future residential development is planned northeast of the site.

2. For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?

The RBES vision is consistent with the NNSA Ten Year Comprehensive Site Plan.

3. Has the future land use been communicated to the regulators and is it acceptable to them?

Continued use of the site by DOE for research purposes seems to be a given that is acceptable by the regulators and surrounding towns. Although not explicitly stated in the document, it is likely covered in one or more of the referenced reports and agreements.

4. Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

Fully integrated is probably the wrong description. Access to the site is highly restricted; it is surrounded by a fence; and patrolled by LLNL security.

5. Is the site's cleanup plan consistent with the end state depicted in its land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent.

The Baseline and RBES end-state land uses are the same, but the Baseline requires cleanup of on-site groundwater to MCLs to protect it as a future source of water. The RBES cleanup would protect off-site groundwater contamination above MCLs, but not the on-site groundwater since it is not a source of drinking water. The driver is point of compliance for groundwater cleanup and not land use.

6. Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?

The land will remain under DOE (NNSA) control.

Risk/hazards

7a. Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?

The RBES vision proposes risk based cleanup standards that are consistent with the planned end-state land use, and also protective of human health and the ecology.

7b. The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include for example risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.

No mention is made of risk balancing, and specifically risk to workers during soil removal or construction of treatment facilities. References to worker risk in the document are that of a worker on an industrial site.

8. Have all the hazards that will remain, that drive the land use, been identified?

Yes, but land use (industrial) is driven more by the continued need for the site by NNSA for research purposes.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

Yes. Numerous risk assessments show that residual contaminants expected to be present under the Baseline end-state will be protective of both. Although no risk assessments have been performed for the RBES end-state, the only differences in cleanup strategies would be the point of compliance for groundwater.

10. Are the residual hazard levels protective of the end-state?

Risk assessments found that an unacceptable risk (1×10^{-5}) was associated with ingestion of ground water over a 30 year period from a hypothetical offsite well located at the 300 Site boundary down gradient for contamination in the High Explosives Process Area. The closest well is 1,125 feet hydraulically cross-gradient from the TCE plume, and is used only to water livestock. Unacceptable risks were also identified for hypothetical wells located at the 300 Site boundary near the Building 875 dry well release site and near the eastern GSA debris burial trench release site, and in the potential use of two offsite water-supply wells. All such risks would be mitigated through ground water extraction.

Data from the Baseline assessments indicate that there might be a risk to workers from inhalation of VOCs at springs because of reduced cleanup levels proposed in the RBES vision. This has not been confirmed or quantified, and the CSMs show the use of institutional controls to address this potential issue. Ecological risks on-site under the RBES vision were not quantified. This is especially important since the site is habitat for several endangered species.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

The Baseline end-state requires on-site and off-site cleanup to MCLs. The on-site restrictions are intended to protect this as a future source of drinking water and required by California drinking water regulations. The RBES end-state removes the MCL restriction for on-site groundwater on the basis that it is not a drinking water source and represents no risk to anyone expected to be on the site.

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

Yes

13a. Have all EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

Risk assessments have been prepared for the Baseline scenario, but none have been prepared for the proposed RBES scenario. However, data from the Baseline assessments indicate that there might be a risk to workers from inhalation of VOCs at springs because of reduced cleanup levels proposed in the RBES vision. This has not been confirmed or quantified. Ecological risks on-site under the RBES vision were not quantified. No risk assessments for the RBES vision are planned, because the site believes this scenario is illegal under State and Federal regulations/laws.

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (from both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?

Yes

13c. Is the CSM and narrative consistent?

Yes and very thorough

13d. Is sufficient information provided as follows?

List of hazards/contaminants of concern and their concentration levels, as well as the cleanup level for each hazard
Pathways to the environment
Projected risk levels expected and/or concentrations expected after remediation
Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

Yes, and very well presented.

13e. Are all potential receptors and pathways identified?

Yes

13f. For all potentially complete exposure pathways identified in the current state CSM, Does the RBES CSM show that the pathways will be blocked?

Yes. Institutional controls are shown as the mechanism for blocking potential exposure of workers to volatized VOCs near springs treated to lesser cleanup standards than proposed under the Baseline.

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

Some description of the ground water plumes is included, but greater detail would make for a stronger case that the technology being used will achieve the desired end-points for the Baseline or RBES end-states. Greater modeling information on the plumes and alternative cleanup strategies to achieve the RBES end-state, need to be developed for an accurate comparison. It would also be useful if modeling could be applied to estimating the impacts of the possible changes in subsurface and surface conditions mention in the CSM narratives (see 13h).

13h.Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?

No failure analysis has been completed, but uncertainties and potential failure modes have been identified. They include changing subsurface conditions that might reduce the effectiveness of soil vapor and groundwater extraction technologies, and changes in groundwater use off-site in closer proximity to the site that might alter groundwater flow patterns and thus the contaminant plume. No description of consequences and response strategies is provided.

The potential failure of landfill caps are noted, but no description is provided of any actual engineering analyses performed or the nature of the risk that might occur.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

The RBES vision is based on a risk-based end state. The Baseline end-state is based on regulatory compliance.

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

The site intends to continue using technologies and cleanup objectives that are based on the California drinking water standards, unless instructed otherwise by EM-1.

15. Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?

The Baseline end-state requires pump and treat and soil vapor extraction for as many as 55 more years at a cost of at least $175 million. A comprehensive life-cycle costing should be made of the Baseline and RBES scenarios, and should take into consideration the potential failures or changes described in 13h.

16. Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the “disconnects” between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?

Point of compliance on groundwater cleanup is the overriding issue. On-site cleanup to MCLs is driven by regulation and not risk.

Variances

19. Has the vision document identified all applicable variances between the current end state and the RBES?

Yes. The major variance between Baseline and RBES end-states is that the RBES scenario drops the requirement that on-site groundwater be cleaned up to MCLs, and that the point of compliance be moved from the impacted groundwater body to the groundwater at the site boundary. The site notes that the RBES cleanup standard is in violation of State and Federal regulations/laws.

20. If potential variances are not listed, list variances that should be considered and provide short description for each.

21. Were the variances adequately evaluated per the guidance (e.g., per page D-1 of the guidance are the key attributes [cost, schedule, scope and risk] listed, are barriers identified, and are next steps identified)?

Other Comments (cross cutting issues, coordination with other programs and Corporate Projects)

22. List as Comments any other items of concern with the document, such as text that is confusing, clarity and completeness of maps and CSMs.

23. The reviewer's overall perception regarding his/her review of the site's RBES document should be summarized through statements responding to the following:

    -Does the site RBES submission adequately articulate an end state vision for the site that is risk based, readily sustainable, appropriately protective of human health and the environment, and consistent with the site and surrounding area's planned land use? Explain and cite examples.

    Yes, but the site does not believe it is feasible without considerable involvement of EM-1 in addressing State and Federal regulations that prevent its implementation.

    -Are variances between the end state RBES vision and the current site cleanup baseline end state clearly identified and defined? Explain.

    -If there is no variance identified, is there adequate justification as to why the current site cleanup baseline end state meets the requirements for a RBES, i.e., does the RBES document show that the cleanup is sustainable, protective, and consistent with the site's surrounding land use? Explain.

Is a conference call with the site necessary? ___ yes _X_ no

February 17, 2004

CRESP Comments to Mound Site Specific RBES Vision Document Checklist

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Miamisburg Closure Project - Mound

Considerable information is provided about the disagreements between the City and site on what industrial re-use means, especially as it pertains to the buried landfill area, and as to the use of MNA and performance measuring if source removal at several areas does not achieve CERCLA based MCL standards. But neither the City nor DOE have provided risk or economic analyses to support their respective positions on the buried landfill area. The reader is left with an impression that the site and contractor are racing toward closure in 2006, and relying upon old agreements versus solid risk analyses to support its current cleanup strategy; and that the City is relying on community preference language in the CERCLA regulations to permit its economic development of these additional lands. We would strongly suggest development of a risk analysis that factors in the risk to remediation workers of digging up the buried landfill, versus the current strategy of leaving it where it is with institutional controls on reuse. A failure analysis of the current strategy versus other alternatives should also be incorporated. A life-cycle cost analysis of these two alternatives should also be prepared. It might show that cleanup costs far exceed the value of that land for redevelopment.

Part I. Specific Content Questions for RBES Vision Document:

Land use

1. Does the site have a land use plan that fully describes the end state and the future land use at the site?

   The site is to be used for industrial purposes and the land conveyed to the Miamisburg Mound Community Improvement Corporation (MMCIC). A deed restriction will limit the land to such uses, and there will be a prohibition against residential development. Individual parcels will be transferred from DOE to

MMCIC as cleanup is completed, under a quitclaim deed. MMCIC accepts the lands "as is", but DOE retains responsibility for cleanup if contamination from previous DOE activities are discovered in the future (page 6). The site encompasses a total of 306 acres, of which the original Mound buildings occupied 182 acres and 121 acres was an undeveloped buffer between the site and private residences (page 9).

However, the discussion about Hazard Area 1 and related Operable Unit 1 (OU1) on pages 12 & 13, and further in Appendix C, indicates that there is a strong disagreement with the site's restrictions on the reuse of the buried landfill area pursuant to the 1995 OU1 ROD. Although categorized as industrial under CERCLA, these restrictions do not permit the industrial reuse permitted by City zoning and included in MMCIC's Final Revised Comprehensive Reuse Plan (CRP) dated December 2003, which shows development over the landfill.

2. For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?

   N/A

3. Has the future land use been communicated to the regulators and is it acceptable to them?

   Yes (page 6), except that OEPA is now raising questions about reconsideration of the restrictions on the OU1 buried landfill (pages 12 & 13).

4. Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

   Restriction on the reuse of the OU1 buried landfill area is not consistent with the City's zoning of this area as industrial and the MMCIC's recent CRP that assumes industrial redevelopment on this area (see Appendix C and pages 12 & 13). Agreeing to their demands will require additional cleanup of this area. A comparative risk analysis and life-cycle cost analysis should be prepared to better understand the costs and benefits of such an action.

5. Is the site's cleanup plan consistent with the end state depicted in its land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent.

   The site CERCLA based cleanup plan was developed in 1990 and modified in 1999, and call for protection of human health at the 10^{-4} to 10^{-6} excess cancer risk and a Hazard Index of less than 1 for non-carcinogens. This is consistent or

perhaps conservative when compared to an industrial reuse. However, the site's current cleanup plan for Hazard Area 1 – buried landfill and OU1 area – is not consistent with how the City and its agent MMCIC want to redevelop the area.

6. Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?

   The City of Miamisburg has acquired the land and will be developing the larger site as an industrial park. As noted above there is considerable disagreement by the City regarding the zoning and intended reuse of the buried landfill area.

Risk/hazards

7a. Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?

Yes, in terms of a CERCLA risk-based cleanup strategy. However the proposed cleanup standards and strategies in the OU1 area are being contested by the Ohio EPA on the basis that the planned restricted reuse of the landfill area may not be consistent with CERCLA requirements that the Community Acceptance balancing criteria reflect community preferences among or concerns about alternatives.

7b. The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include for example risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.

It is unclear whether risk balancing was taken into consideration, although two scenarios – commercial worker and construction worker – were considered in the risk assessments and development of the CERCLA based cleanup strategy. Risk balancing, specifically the risks to remediation workers, may become a major issue if the site is required to dig up the buried landfill to permit full industrial reuse of the area.

8. Have all the hazards that will remain, that drive the land use, been identified?

There is some question as to whether all of the contaminants in the OU1 area have been adequately characterized.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

Yes, although there is some concern by stakeholders about the effectiveness or appropriateness of using MNA in the OU1 area. There is also some concern that MCL exceedances for tritium in the bedrock aquifer and some offsite seeps will not be resolved by removal of the source term by site closure in 2006, and that performance monitoring is not an acceptable strategy. In addition, we are concerned about the use of long-term deed restrictions where the City and its redevelopment arm are already raising differences of opinion on how the site can be used.

10. Are the residual hazard levels protective of the end-state?

Cannot fully determine. No current or end-state contaminant level data is provided.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

CERCLA required MCL criteria.

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

Mention is made of preliminary ecological studies, but no other risk assessments are referenced.

13a. Have all EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

Ecological risk assessments have been conducted on different areas of the site between 1994 and 2003. No specific reference is made to human risk assessments. A “core team” composed of representatives from DOE, USEPA and OEPA has the responsibility to reach consensus on whether or not certain areas of concern are protective of human health and the environment. The core team has

identified the appropriate exposure pathways, parameters and equations for performing a Residual Risk Evaluation for an industrial future land use.

There is no discussion of what cleanup strategy may be required if the City prevails in requiring that the buried landfill area be cleaned up for commercial reuse.

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (from both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?

The three RBES CSMs are very simplistic in that they show removal of the source contaminant or use of institutional controls as all that is required to block all pathways. All three fail to show an institutional control or other component of the cleanup strategy discussed elsewhere in the document (see 13c).

13c. Is the CSM and narrative consistent?

No. The RBES CSM for Hazard Area 1 does not show removal of source followed by monitoring. The CSM for Hazard Area 2 does not show the institutional controls that prohibit removal of soil from the site. The CSM for Hazard Area 3 does not show the possible need for performance monitoring after removal of the source.

13d. Is sufficient information provided as follows?
List of hazards/contaminants of concern and their concentration levels, as well as the cleanup level for each hazard

None provided

Pathways to the environment

Yes

Projected risk levels expected and/or concentrations expected after remediation

No information provided

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

None other than regulatory requirement.

13e. Are all potential receptors and pathways identified?

Yes

13f. For all potentially complete exposure pathways identified in the current state CSM, Does the RBES CSM show that the pathways will be blocked?

Yes, except that they show simple removal of the source contaminant or use of institutional controls as all that is required to block all pathways. Each of the CSMs is missing one component of the overall cleanup strategy for that hazard area (see 13c).

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

No information provided

13h. Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?

No failure analyses have been undertaken, except to state that if the proposed removal of the source does not achieve the desired results that performance monitoring would be required. More information should be provided, especially about the consequences on not meeting a remediation target. A failure analysis on the strategy of leaving the buried landfill in place may also help in sorting out this controversy.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

They are driven by CERCLA regulatory requirements and agreements reached by the “core team”.

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

15. Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development

process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?

16. Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the “disconnects” between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?

Variances

19. Has the vision document identified all applicable variances between the current end state and the RBES?

20. If potential variances are not listed, list variances that should be considered and provide short description for each.

21. Were the variances adequately evaluated per the guidance (e.g., per page D-1 of the guidance are the key attributes [cost, schedule, scope and risk] listed, are barriers identified, and are next steps identified)?

Other Comments (cross cutting issues, coordination with other programs and Corporate Projects)

22. List as Comments any other items of concern with the document, such as text that is confusing, clarity and completeness of maps and CSMs.

23. The reviewer's overall perception regarding his/her review of the site's RBES document should be summarized through statements responding to the following:

-Does the site RBES submission adequately articulate an end state vision for the site that is risk based, readily sustainable, appropriately protective of human health and the environment, and consistent with the site and surrounding area's planned land use? Explain and cite examples.

-Are variances between the end state RBES vision and the current site cleanup baseline end state clearly identified and defined? Explain.

-If there is no variance identified, is there adequate justification as to why the current site cleanup baseline end state meets the requirements for a RBES, i.e., does the RBES document show that the cleanup is sustainable, protective, and consistent with the site's surrounding land use? Explain.

Is a conference call with the site necessary? ___ yes ___ no

February 20, 2004

CRESP Comments to Rulison Site Specific RBES Vision Document Checklist

Contributors:

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Site: **Rulison Site**

General Comments:

Version 2 of the Rulison Site RBES is substantially improved and addresses previous HQ comments. The site's surface contamination was cleaned closed between 1972-76 and 1995-1998, resulting in acceptance by the State of Colorado in 2003 with "no surface restrictions". The subsurface contamination remains as a target for monitoring, intrusion restrictions, other institutional controls, near (3 mile) offsite well oversight, and determination of the extent of needed restriction boundaries. The role of health and ecological risks "may" define the significance of migrations to and beyond the restriction boundaries and the need to extend those boundaries – if indicated.

Part I. Specific Content Questions for RBES Vision Document
Land use

1. *Does the site have a land use plan that fully describes the end state and the future land use at the site?*

2. *For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?*

3. *Has the future land use been communicated to the regulators and is it acceptable to them?*

4. *Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?*

5. *Is the site's cleanup plan consistent with the end state depicted in its land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent.*

6. *Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?*

Risks/hazards

7a. *Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?*

.The surface contamination of the site has been removed, and surface closure with no restrictions has been approved by the State of Colorado. Since no residual surface contamination remains, there should be no residual risk associated with surface use. Because of subsurface contamination (not yet modeled or assessed), intrusion restrictions are imposed. While these are not risk-based restrictions, they are presumptive in nature – and are designed to prevent exposures to as-yet uncharacterized subsurface contaminants, but likely to contain at least "radioactive fission products, plutonium, uranium, and tritium". The site surface is privately owned, with the DOE retaining long-term stewardship of the subsurface.

7b. *The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include, for example, risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.*

Since the surface has already been cleaned up and the subsurface contamination is to be left undisturbed, there will be no further remediation work at the site. So "risk balancing" of worker vs other risks is not relevant to the current site conditions. Therefore the absence of a discussion on risk balancing for this site is understandable.

8. Have all the hazards that will remain, that drive the land use, been identified?

No. The subsurface characterization and modeling has not yet been accomplished.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

The surface has been clean-closed, with no residual contamination. Subsurface contamination has yet to be investigated. However, intrusions into the subsurface are restricted, and the subsurface long-term stewardship is responsibility of DOE. So surface-only use of the site should be protective to human health and the residual environment (such as it is post-cleanup). Note: it is noted that the private owner has a water well permit (table 2.1), despite the site's subsurface use restrictions. This apparent contradiction needs to be explained in the text.

10. Are the residual hazard levels protective of the end-state?

Yes. See item # 9. Current and future land use is for livestock grazing, recreation and fishing (a fishpond).

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

There are subsurface intrusion restrictions and deed restrictions for the site. The contaminant boundary will be assessed and modeled to determine its extent and the need for extending the subsurface use restriction zone. Oil and gas drilling within a three-mile off-site zone are under oversight of the Colorado Oil and Gas Conservation Commission and for review/monitoring by DOE.

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

No risk-assessment reports have been completed.

13a. Have all the EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment and have those documents been approved for use by the appropriate senior DOE site manager? For instance where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

A human health risk assessment was completed in 1996 to determine what monitoring would be required if certain materials were to be left in place. Based upon that risk assessment, a surface cleanup resulted in surface closure with no further action required and no restrictions. A risk assessment is to be applied to future subsurface modeling, the results of which will be applied to oil and gas drilling restrictions in surrounding zones.

The basis of the prior cleanup remedies, while aided by risk data, was not really risk-based. The surface was cleaned to the level of unrestricted surface use – even though this land is anticipated to be primarily for cattle grazing and recreation. However, the presence of a single summer residence on-site may have been influential, since the test was on private land. Furthermore, there may have been a cost advantage to remediate this site to residential standards rather than recreational, based upon local conditions, cleanup methods, and the avoidance of needing to perpetually maintain surface institutional controls. This basis for the cleanup decision should be described in the document.

13b. *Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?*

While the CSM does not strictly follow guidance (didn't include ecological receptors), it is sufficient since surface contamination has been removed and drilling restrictions are in place.

13c. *Is the CSM and narrative consistent?*

Yes.

13d. *Is sufficient information provided as follows?*
List of hazards/contaminants of concern and their concentration levels as well as the cleanup level for each hazard

The contaminants of surface source area 1 were listed (TPH, benzene, ethyl benzene, toluene, total xylenes, barium, lead). While no pre-cleanup concentrations are given, after cleanup "no further contaminated soil in or around the pond" were found. Furthermore, no radioactive contamination has been found in an onsite spring nor in three test site wells. .

Pathways to the environment

Yes.

Projected risk levels expected and/or concentrations expected after remediation

The surface is clean-closed, with no further action needed – so there are no projected risks or concentrations. The subsurface contamination will not be characterized (modeled) until 2005.

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

A 1996 human health risk assessment for the site is referenced, and indicated that monitoring would be needed if the pre-cleanup materials had been left on site. Post cleanup produced State of Nevada approval for "no restrictions and no further actions."

13e. *Are all potential receptors and pathways identified?*

Yes, although ecological receptors are not indicated on the CSM.

13f. *For all potentially complete exposure pathways identified in the current state CSM, does the RBES CSM show that the pathways will be blocked?*

Yes.

13g. *Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of the rate of movement of plumes) to the extent that it aids the explanation of the risk basis for the end state under discussion?*

No. The subsurface characterization will not start until 2005. Of issue is the potential for gaseous radionuclide migration and its potential to contaminate natural gas. Drilling restrictions and institutional controls could be impacted by the results of subsequent subsurface modeling and monitoring.

13h. *Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?*

Since the surface has been clean-closed, failure analysis is not relevant to it. It is noted that if radionuclides are eventually found in nearby production wells that drilling restriction areas and institutional controls would be evaluated to determine needed changes.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

15. *Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?*

16. *Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the "disconnects" between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?*

17. *Have the future roles and responsibilities of the parties involved in site cleanup been identified (e.g., DOE, current owner, future owner, other federal and state agencies)?*

18. *To what degree does the site's regulators, key stakeholders, Tribal nations and local government representatives agree with the currently identified and the planned risk based end-state?*

February 24, 2004

CRESP Comments to Shoal Site Specific RBES Vision Document Checklist

Contributors:

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Site: **Shoal**

General Comments:

Version 2 of the Shoal RBES is substantially improved and does a good job of addressing or clarifying previous HQ comments and issues.

The site's surface contamination was clean-closed and approved by Nevada DEP in 1998 with acceptance of "no post-closure monitoring" and "no land use restrictions". The characterization of the subsurface contamination started in 1996, and subsurface closure is expected to be complete by 2011. As in other Offsites, the characterization of the subsurface, through groundwater migration models and monitoring well validation, is basic to determining the adequacy of the compliance boundaries and subsurface intrusion restrictions. Military training and some public open space use of the surface is expected, although no land use plan is currently available from DOD, the agency that continues to manage the site's surface. The site is part of a land withdrawal used for Navy military training.

Part I. Specific Content Questions for RBES Vision Document
Land use

1. *Does the site have a land use plan that fully describes the end state and the future land use at the site?*

2. *For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?*

3. *Has the future land use been communicated to the regulators and is it acceptable to them?*

4. *Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?*

5. *Is the site's cleanup plan consistent with the end state depicted in its land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent.*

6. *Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?*

Risks/hazards

7a. *Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?*

Since the surface has been clean-closed, with no residual contamination and no further remediation required, both the State of Nevada and DOE concluded therefore that no risk assessment was needed for the surface. This appears to be a reasonable conclusion.
Since no residual surface contamination remains, there should be no residual risk associated with surface use.

Because of subsurface contamination is currently being characterized, intrusion restrictions are imposed. While these are not yet risk-based restrictions, they are presumptive in nature – and are designed to prevent exposures to as-yet adequately characterized subsurface contaminants. Subsurface contaminants of concern may include a number of radionuclides, including plutonium, uranium and tritium, as well as lead and other materials associated with the tests.

7b. *The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include, for example, risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials.*

These risks should be described in the document for both the current cleanup baseline and the RBES.

The surface was clean-closed at three corrective action sites, with NDEP acceptance, and no post-closure surface monitoring or land use restrictions. Since the surface has already been cleaned up and the subsurface contamination is to be left undisturbed, there will be no further remediation work at the site. So "risk balancing" of worker vs other risks is not relevant to the current site conditions, nor are tradeoffs between ecological and human health or future vs current risks. Therefore the absence of a discussion on risk balancing for this site is understandable.

8. Have all the hazards that will remain, that drive the land use, been identified?

The surface is cleaned. The subsurface characterization and modeling has not yet been finished. A second round of fieldwork has produced a revised flow and transport model that is before regulators for approval.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

The surface has been clean-closed, with no residual contamination, and should be protective. Subsurface contamination and groundwater modeling have yet to be fully investigated – although table 4.1 indicates "Site subsurface characterization is complete" However, intrusions into the subsurface are restricted and institutional controls are in place. The compliance boundaries are not yet fully described and will need validation and periodic updating. The subsurface will remain the long-term stewardship responsibility of DOE.

The surface-only use of the site should be protective to human health and the residual environment, since no more surface cleanup is required. The ecological environment was previously impacted during prior cleanup when sections of the site were "scraped bare of native vegetation."

10. Are the residual hazard levels protective of the end-state?

Yes, for surface use since there is no residual contamination (see item # 9). This is important, since there is military and public access to sections of the site. No threatened or endangered species are known to be at the site. Current and future land use is likely to be for ranching and military use, although DOD and BLM will be responsible for determining the land's future surface use. Subsurface intrusion (test cavities, subsurface soil, groundwater) is restricted by DOE/NSO. No radioactivity due to the Shoal site has been detected in off-site wells.

11. *If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?*

There are to be subsurface intrusion restrictions for the site. A contaminant boundary will be negotiate a compliance boundary with NDEP, will apply models to determine its extent and the need for extending subsurface use restriction zones. The risk-basis for setting contaminant boundaries and intrusion restrictions is not described.

12. *Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?*

The surface has been clean-closed, so no risk assessment is indicated for it. No site risk assessment reports are referenced for the CSMs, although the recent report noted regarding the site's groundwater contaminant boundary modeling (Pohlmann et all, 2004), while not seen by these reviewers, might provide data directly relevant to human and ecological risk assessment.

13a. Have all the EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment and have those documents been approved for use by the appropriate senior DOE site manager? For instance where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

The basis of the prior cleanup remedies was not defined in risk terms. The surface was cleaned to the level of unrestricted surface use – even though this land will not be residential but is to primarily be used for U.S. Navy training grounds and as open public land. However, there may have been cost or other advantages driving cleanup of this site to residential standards, based upon local conditions, cleanup methods, and the benefit of not needing to perpetually maintain surface institutional controls. The basis for the original cleanup decision should be described in the document.

The basis for current or planned subsurface intrusion restrictions, while clearly driven by concerns of intercepting radionuclide and other wastes, is not defined in terms of human or ecological risks. In table 4.1 it is indicated that the "subsurface risk-based compliance boundary will be refined based on the subsurface modeling results," yet no indication of how the modeling data will be integrated with human and ecological risk information.

13b. *Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (both*

human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?

The CSM is quite scant in its description. It does not take into consideration that surface soil could (although won't, because of the blocked pathways) present a risk to recreational, ecological and military users through direct contact with surface soil.

13c. *Is the CSM and narrative consistent?*

Yes.

13d. *Is sufficient information provided as follows?*
List of hazards/contaminants of concern and their concentration levels as well as the cleanup level for each hazard

The contaminants of surface area have been clean-closed, as accepted by the State, so no residual concentrations were provided.

Pathways to the environment

Yes.

Projected risk levels expected and/or concentrations expected after remediation

The surface is clean-closed, with no further actions needed – so there are no projected risks or concentrations. The subsurface modeling and risk assessment is in progress.

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

No existing requirements were identified for specific substances, since surface was clean-closed and approved by the State for no further action. Subsurface contamination not yet defined.

13e. *Are all potential receptors and pathways identified?*

Dermal contact pathway for potential human and ecological receptors not noted in CSM, however would be blocked by lack of residual contaminants after surface cleanup.

13f. For all potentially complete exposure pathways identified in the current state CSM, does the RBES CSM show that the pathways will be blocked?
Yes.

13g. *Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of the rate of movement of plumes) to the extent that it aids the explanation of the risk basis for the end state under discussion?*

No. The subsurface characterization and groundwater modeling is not completed. Of issue is the potential for radionuclide migration. Drilling restrictions and institutional controls could be impacted by the results of subsequent subsurface modeling and monitoring.

13h. *Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?*

Since the surface has been clean-closed, failure analysis is not relevant to it. It is noted that drilling restrictions and institutional controls can be influenced by the results detected in monitoring wells – which provide a failure detection analysis for breakthrough contamination at rates or concentrations greater than modeled.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

15. Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?

16. Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the "disconnects" between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?

17. *Have the future roles and responsibilities of the parties involved in site cleanup been identified (e.g., DOE, current owner, future owner, other federal and state agencies)?*

18. *To what degree does the site's regulators, key stakeholders, Tribal nations and local government representatives agree with the currently identified and the planned risk based end-state?*

February 6, 2004

CRESP Comments to Nevada Test Site Specific RBES Vision Document Checklist

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Part I. Specific Content Questions for RBES Vision Document: NTS

General Comments:

The vision for the NTS appears realistic; however, while the RBES vision document clearly speaks to the general role of risk as a component of its decision analysis methodologies, it does not put forward a solid case for supporting that specific decisions made were risk-based - if indeed they were. The decisions may have been based upon practical considerations, reflecting NTS conditions, but may not necessarily have been derived from or reflective of the RBES process. The document should present a better case regarding its use (directly or indirectly) of risk in decision-making. For example, for those decisions that were risk-based, appropriate documentation should be noted, specific narratives should be provided for the conceptual site models provided, and ecological hazards should be explained.

Part I. Specific Content Questions for RBES Vision Document: Nevada Test Site

Land use

1. **Does the site have a land use plan that fully describes the end state and the future land use at the site?**

   Yes, the 2000 Resource Management Plan details the current and future land use for the site and environs. Site land use is divided into industrial areas and waste management areas, with nine different types of zones based on the activities that occurred there. There are no areas designated for commercial, agriculture, residential or recreational use.

The site is entirely surrounded by federally-owned and DOD-controlled land. The endstate is to restore the environment to allow the "maximum continuation of the national security mission" and to support accelerated cleanup across the DOE complex. The future use of the land is not expected to change.

2. **For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?**

These plans are not mentioned, only the Performance Management Plan.

3. **Has the future land use been communicated to the regulators and is it acceptable to them?**

It seems that future land use is well-communicated, to the extent allowable by National Security. The RBES Vision states that the final endstate goal still needs to be resolved with regulators.

4. **Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?**

For the NAFB property, land use planning is integrated. It is not clear in the RBES how the BLM and National Forest lands are currently used, or if there are any plans for land use changes. Since recreation and grazing are allowed on these lands, it will be important to assure, through working with these other Federal agencies, that humans or livestock that may occasionally inhabit or gain access to parts of the NTS site will not be exposed to elevated levels of contaminants.

5. **Is the site's cleanup plan consistent with the end state depicted in your land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent?**

The endstate, including closure-in-place with monitoring, has already been achieved for the largest Hazard Area – the subsurface contamination from underground testing. However, the development of boundaries for this Area is pending the completion of groundwater modeling. If modeling were to reveal any potential pathways for groundwater to reach receptors, the cleanup plan would have to be revised to mitigate the hazard.

The soils contaminated from above-ground testing will be either closed or fenced, with monitoring, and relinquished to the DOD or NNSA. Finally, the endstate for over 1,000 potentially contaminated industrial areas will be for most to be "open for free, unrestricted surface use" and others to be "stabilized for restricted use."

6. **Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?**

After the EM mission is complete, responsibilities will be turned over to the U.S. Air Force and to the NNSA. The RBES Vision document states that the planning process for this transition is underway. Land ownership is clearly identified in the document.

Risk/hazards

7a. Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?

It is not apparent in the RBESV document that risk was fully and explicitly considered. For example, it appears that the 1000 pCi/g limit for soils cleanup of surface and shallow subsurface radiological contamination is a negotiated limit between DOE, NDEP and the U.S. Air Force. However, there is no mention in the document if that 1000 pCi/g limit is risk-based or even risk-influenced, and if it reflects current and future land use on the site.

7b. The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include for example risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.

There is no overt discussion of risk balancing; there are some indirect references to the manner in which corrective action units are prioritized based upon "overall risks" and other factors; however, risk balancing, if indeed practiced by the site, should be described in the RBESV document. Furthermore, there is no indication of ecological

risk at all or the worker risk associated with the activities that will result in clean closures for several of the industrial sites. The failure to provide this information is surprising, since anecdotal and informal discussions have long suggested that worker risk considerations have had a lot to do with what has and has not been done at NTS.

Finally, it appears that only risks associated with radiological contaminants are considered.

8. Have all the hazards that will remain, that drive the land use, been identified?

It appears that all radiological hazards that will remain have been identified—at least qualitatively. Quantitative estimates (unclassified) of radionuclide source terms have been listed.

There is little, if any, discussion concerning other chemical hazards e.g., solvents. Model "towns" were constructed for nuclear weapons and explosives testing and other construction and demonstration support activities were conducted. Consequently, there may well be other potential residual hazards that should be considered in the RBESV document. The fact that NTS is a major recipient of mixed wastes (see below) makes this omission hard to understand.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

The information provided in the RBESV document does not appear to be in sufficient detail to confidently answer this question. For example, the corrective action level of 1,000 pCi/g appears to be an interim level that the Air Force has accepted for soil cleanup activities; however, the information concerning whether the limit takes into consideration the biological relevance of the key source radionuclides and whether the limit was defined based upon risk is not provided. Furthermore, there is no discussion of ecological hazards.

10. Are the residual hazard levels protective of the end-state?

It is not clear that the soil cleanup level (i.e., 1,000 pCi/g) used was derived from risk-based information.

Furthermore, there is little if any mention of future landfill closures and the manner in which human health and the environment will be protected in the future.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

In the RBESV document, different areas will be cleaned up to various levels (e.g., 1,000 pCi/g for total transuranics in soils on the TTR, 400 pCi/g for the Double Tracks and Clean Slate 1 areas, etc.) and this information (i.e., for radiological contaminants) is provided in the document. However, information concerning other types of contaminants (e.g., solvents, conventional explosives, etc.) is not provided.

The approach to groundwater is "[c]losure- in-place with monitoring [as this] is considered to be the only feasible corrective action because cost-effective groundwater technologies have not been developed to effectively remove or stabilize subsurface contaminants." This is a reasonable assertion as there were a total of 200 (of the 828) underground nuclear tests were conducted "in proximity of, or within, the water table. This testing resulted in over 132 million curies of radioactivity in the subsurface of the NTS."

For NTS Hazard Area 1 (groundwater) contaminant boundaries will be developed based on groundwater modeling results "and five-year Proof-of-Concept" to define areas that contain water that may be unsafe for domestic and municipal use. A monitoring network will be installed to ensure future protection of the public and the environment. Institutional controls will be continued, and wells will be monitored, sampled, and refurbished/replaced, as applicable." However, it is not clear what will happen if the contaminant boundary is found to extend past the site boundary. For example, by what process will DOE find ways to restrict groundwater access beyond the current site boundaries? This would appear to be part of the regulatory process – but is not described.

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

There are only very general CSM narratives in the text. Increased text specificity, relating more clearly to each Hazard Area CSM, would improve comprehension. Furthermore, the one-to-ten numbered CSM actions that block the various pathways are difficult to quickly understand, as their interpretations (pages 47-49) are not accessible proximate to the CSMs, which are displayed up to 35 pages later in the text. A succinct definition of the ten "pathway control mechanism" blocks should be repeated close to the CSMs. Specific (and explicit) narratives should be provided in the document.

13a. Have all EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

The document does not cite or even note the existence of the many formal risk assessments that were performed.

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (from both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?

The conceptual site models are not complete in that CSM-specific narratives are not provided and little if any information is provided concerning ecological hazards.

13c. Is the CSM and narrative consistent?

There are only general, not CSM-specific, narratives provided and thus one cannot say that the CSM and narratives are consistent.

13d. Is sufficient information provided as follows?

List of hazards/contaminants of concern and their concentration levels, as well as the cleanup level for each hazard

Underground radionuclide inventories are provided to the extent possible (based upon issues like classification) as a bounding condition on the source term. “The inventory includes tritium, fission products, actinides, and activation products. These data are grouped according to six geographic test centers at the NTS (five CAU areas with two sub-divisions in Yucca Flat). This inventory provides an estimate of radioactivity remaining underground at the NTS after nuclear testing. Curie activities and atoms are reported as of September 23, 1992, the date of the last underground nuclear test at the NTS. This inventory does not represent the total radioactivity dissolved in the groundwater beneath the NTS, but is strictly a compilation of the residual radionuclide inventory remaining from those underground nuclear tests.” Surface and near-surface radiological contaminants soil concentrations are displayed for some areas (table 4.2.1). A very general list of non-radionuclide contaminants is listed for industrial sites (“hazardous organic an inorganic chemicals, unexploded ordnance, petroleum hydrocarbons ,,”), but this list could be much more specific and does not list any concentrations or ranges.

Pathways to the environment

An excellent job is done in enumerating and describing the potential pathways.

Projected risk levels expected and/or concentrations expected after remediation
Projected future risk levels are only described in general, qualitative terms for radiological contaminants; little mention is made of the specific risk levels that will be present at the end state. No specific mention is made of the concentrations of radiological contaminants at the end state or of contaminants other than radiological in nature.

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit
This information does not appear to be provided in the RBESV document. For example, the 1000 pCi/g limit for soils cleanup appears to be a negotiated limit as opposed to being risk-based.

13e. Are all potential receptors and pathways identified?

Inadequate descriptions of the potential ecological receptors are provided in the RBESV document. This is compounded by the fact that there are no CSM-specific narratives included in the RBESV document.

13f. For all potentially complete exposure pathways identified in the current state CSM, Does the RBES CSM show that the pathways will be blocked?

All potentially complete exposure pathways are indicated as being blocked in both the current- and end-state CSM.

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

No information is provided on plumes or their potential migration. This is very surprising given the focus on groundwater as the major pathway of concern.

13h.Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?

No failure analyses are provided in the document.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

It does not appear that the cleanup decisions were driven by RBES or similar principles. ~~or~~ If they were, a decision basis is not clearly described. However, it appears that the vision as stated is appropriate for the site even though the RBESV document could be improved.

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

There is mention of LLW and MLLW landfills that are currently open to "support the closure of DOE sites across the U.S. by maintaining the capability to dispose of low-level waste (LLW) and to develop the capability to dispose of mixed low- level waste (MLLW)." These landfills will need to be closed in the future; however, the manner in which the landfills will undergo closure is not detailed to a satisfactory degree. For example, the RBESV document indicates that "[c]losures and long-term stewardship obligations (such as monitoring) will be implemented in accordance with regulatory requirements to ensure there is no risk to workers, the public, and the environment as the result of disposed waste." However, there is no mention of the RBES process in the future closures although this may have to do with the fact that said closures will take place after the end-state indicated by the appropriate Federal Guidance.

15. Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?

Groundwater contaminant boundaries will be developed based on modeling results and periodically monitored to define areas that contain water that may be unsafe for domestic and municipal use. "Institutional controls will be continued, and wells will be monitored, sampled, and refurbished/replaced, as applicable." However, again it is not clear what will happen if the contaminant boundary is found to extend past the site boundary. For example, will DOE purchase the land or otherwise find ways to restrict groundwater access?

16. Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the "disconnects" between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?

17. Have the future roles and responsibilities of the parties involved in site cleanup been identified (e.g., DOE, current owner, future owner, other federal and state agencies)?

The RBESV document does a reasonable job of identifying the future roles and responsibilities of those parties (e.g., NNSA) that will be involved in future cleanup activities. However, such information for a number of sites on the NTS are not described:

> "This document does not address Corrective Action Sites on the Nevada Test Site (NTS) and Tonopah Test Range (TTR) under the responsibility of DOE/NNSA NSO Defense Projects nor those under the U.S. Department of Defense (DoD) Defense Threat Reduction Agency. Environmental restoration at these sites is not under the purview of NSO EM and information about planned strategies for cleanup is not available for all corrective action sites. These sites are few in number compared to those under EM, so the overall impact to the comprehensiveness of this RBES vision document is modest."

The above indicates that sites on the TTR are not addressed in this RBESV document; however, information is presented on the TTR and the distinction between those sites covered and those omitted as well as the reasons for the omissions is unclear. Clarification of why NTS did not include these areas is needed.

18. To what degree does the site's regulators, key stakeholders, Tribal nations and local government representatives agree with the currently identified and the planned risk based end-state?

The RBESV document indicates that a plan (i.e., DOE/NSO EM *Performance Management Plan*) is underway to maintain the appropriate public involvement, and that this plan will continue to be followed in the future. There was some indication that the public involvement in the RBES process is not entirely integrated at the time that the vision document was developed.

Variances

19. Has the vision document identified all applicable variances between the current end state and the RBES?

20. If potential variances are not listed, list variances that should be considered and provide short description for each.

21. Were the variances adequately evaluated per the guidance (e.g., per page D-1 of the guidance are the key attributes [cost, schedule, scope and risk] listed, are barriers identified, and are next steps identified)?

Other Comments (cross cutting issues, coordination with other programs and Corporate Projects)

22. List as Comments any other items of concern with the document, such as text that is confusing, clarity and completeness of maps and CSMs.

23. The reviewer's overall perception regarding his/her review of the site's RBES document should be summarized through statements responding to the following:

    -Does the site RBES submission adequately articulate an end state vision for the site that is risk based, readily sustainable, appropriately protective of human health and the environment, and consistent with the site and surrounding area's planned land use? Explain and cite examples.

    -Are variances between the end state RBES vision and the current site cleanup baseline end state clearly identified and defined? Explain.

    -If there is no variance identified, is there adequate justification as to why the current site cleanup baseline end state meets the requirements for a RBES, i.e., does the RBES document show that the cleanup is sustainable, protective, and consistent with the site's surrounding land use? Explain.

Is a conference call with the site necessary? ___ yes ___ no

Part 1a. Comments addressing improvements to the RBES Vision documents

24. The comments that will be generated in response to the questions in Checklist Parts I & II will for the most part address the compliance of the RBES Vision document with the RBES Policy statement and its associated published guidance. That is, the review team conclusions to the questions will in summary provide to the sites that information and the specific changes to the document necessary to produce a compliant document.

    In addition to this information, the RBES Review Team is to provide back to the sites items for consideration that would improve the RBES Vision document(s). These comments are to be separately identified as improvement items, as opposed to compliance items.

    - This could include for example, recommendations for additional contextual information that would further the explanation of any proposed individual RBES, or a site's position that the currently planned end state is appropriately risk based and sustainable. Other data, analyses, or examples illustrating positions being proposed germane to the RBES Vision discussion or justification could be recommended for inclusion if that would make an RBES hypothesis more readily understandable.

    - Another fruitful area would include additional information to be included in the Variance report that would provide analysis of the variance(s) of the RBES from currently planned end state(s). Such analyses could be aimed at identifying issues, obstacles, and concerns with the variances identified and how the Department will address and resolve them.

    - The items listed under Question #23 in Part I should be considered again for the purposes of this section of the Checklist. That is, what improvements in the RBES Vision document clarity could be made to improve either its understanding or otherwise support decision making by DOE relative to pursuit of any change in EM project/site end state and subsequent initiation of discussions with site regulators, stakeholders, or interested or affected Governments?

February 24, 2004 (Revised)

CRESP Comments to Oak Ridge Site Specific RBES Vision Document Checklist

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Part I. Specific Content Questions for RBES Vision Document:

Land use

1. Does the site have a land use plan that fully describes the end state and the future land use at the site?

The Oak Ridge Reservation (ORR) encompasses about 35,000 acres, and its proposed end state or future land use plan varies by area, current use and level of contamination. The ETTP, ORNL and Y-12 sites occupy about 30% of ORR. The ORNL and Y-12 sites will operate as major industrial facilities, with ongoing missions of research and development (ORNL) and defense-related manufacturing and stockpile stewardship (Y-12). They will be operated by DOE-NNSA. The ETTP site will be cleaned up for reuse as a commercial industrial park. Approximately 70% of ORR is forest covered and portions of the reservation have been designated conservation and wildlife management areas (cannot determine exact location of size of these as maps or further narrative is provided. (page 22 & 23)

2. For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?

Not explicitly stated. Mention is made of needs for facility and infrastructure improvements at ORNL in the "ORNL Land and Facilities Plan (UT-Battelle 2002)" and for the Y-12 site in the "Y-12 National Security Complex Ten-Year Comprehensive Site Plan (BWXT 2003). In addition they state that overall land use planning under the "ORO Comprehensive Integrated Plan" has determined that most of ORR, with the exception of the ETTP site, will be required for current and future mission needs (page 22).

3. Has the future land use been communicated to the regulators and is it acceptable to them?

The proposed land uses were developed in conjunction with an End Use Working Group, which TDEC and EPA, in 1997 (page ii). Some changes have been made since then by DOE-NNSA for security purposes and to provide room for its modernization program at the Y-12 site, which appear to have been accepted by the regulators.

4. Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

Yes

5. Is the site's cleanup plan consistent with the end state depicted in its land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent.

Yes

6. Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?

It is unlikely that an explicit agreement has been reached with the City and/or other owner/operator of the proposed industrial park, with regard to proposed RBES changes in end state residual contaminant levels and institutional controls that may be required for industrial reuse of the ETTP site. RODs for Zones 2 (main plant area) and Zone 3 (groundwater) have not been completed, and the RBES vision proposes several changes to current cleanup strategies (page 35 & 36)

Risk/hazards

7a. Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?

Risk appears to have been considered, at least in some way, in most of the decisions made; however, it would be difficult to judge whether or not ES&H risk has been "fully and explicitly considered" in the RBESV document because there are quite a number of missing maps and conceptual site models. Remediation reflects RODs (which are interim). The document notes that remedy selections were on the

basis of a number of factors, risk being only one of them. While some of the references in the RBESV document may have risk assessments in, none is clearly noted. There are mentions of "providing the greatest risk"; however, adequate information is not provided, and the document is not clear whether the “greatest risks” concern human health (versus ecological). It is not evident that ecological risk was considered. The document does not present tables of current and residual risks as required by the guidance—remediation concentrations are merely provided (in Tables 4.2 and 4.3). Although these appear somewhat based on risk (e.g., excess cancer risk), they may not necessarily be so.

7b. The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass “risk balancing” in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include for example risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.

There is some small indication that risk-balancing has been taken into consideration. For example, the RBESV document states on p ii:

> “In recent years, remediation decisions have evolved from narrowly focused actions designed to address individual contamination sites to watershed-scale decisions designed to best address the cumulative impacts of multiple contamination sites within a watershed. The resultant watershed decision-making allows a decision on the end state to be made in concert with the decision on the series of remedial actions needed to protection of human health and the environment for that end state. By considering the technical practicability and cost of achieving a range of end states, the decision-makers can make informed risk-based decisions consistent with the anticipated end use.”

However, because many of the RBES maps are not provided in this version, it is difficult to judge the degree of risk balancing. Ecological resources appear largely ignored—there are no data on species or ecosystems at risk, no maps with species of concern, and no direct references to ecological risk assessments for species or habitats of concern on the ORR. Although mention is made of parts of ORR as a NERP, none of the ecological data is provided that must be available from the NERP database. It is not clear what species or habitats are at risk in the Oak Ridge Wildlife Management Area.

8. Have all the hazards that will remain, that drive the land use, been identified?

It would appear that for those three (of six) areas with RODs in place and two that are partially in place that the hazards have been adequately identified (for those areas described by the RODs). The hazards for the other areas—and the groundwater—appear to have not been identified. Furthermore, the available information is difficult to locate in the document, and there is no clear table with current (and residual) risk levels to human and ecological receptors as was requested in the guidance and amendments.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

There are cases presented that the current states in some ORR areas (e.g., Melton Valley) are not protective. As stated in the RBESV document:

> "The Baseline Risk Assessment (DOE 1997a) for Melton Valley concluded that radionuclides in contaminated soils and sediments present unacceptable risk levels «1 x 10-4 ELCR) for industrial, recreational and residential exposure scenarios. The predominant exposure pathway is direct external exposure to gamma radiatiop, primarily due to Cesium-137 (median concentration in soil = 162 pCi/g, maximum = 700,000 pCi/g) and Cobalt-60 (median concentration in soil = 15 pCi/g, maximum = 500,000 pCi/g). Potential ecological risk to terrestrial biota also was identified for radionuclides, metals, and PCBs in soil and sediment, although lines of evidence were limited."

Furthermore, because risk is not explicitly described or quantified in the RBESV document, this is impossible to evaluate this question fully. Remediation concentrations are given for industrial workers and unrestricted use areas; however, these may not necessarily be risk based for all contaminants and hazards. The document does mention cumulative risk, which is a positive attribute of the ORR RBES. Ecological receptors are not discussed in any detail, which is a significant shortcoming.

10. Are the residual hazard levels protective of the end-state?

This would again be difficult to assess completely because of missing conceptual site model information as described above. All the CSMs provided indicate that the pathways to potential receptors will be blocked and the corresponding narratives indicate that conditions will be protective in the future. However, no data are provided to support that the residuals levels are protective.

Furthermore, there is no mention of specific ecological receptors. There is little mention of the fish consumption problem with Poplar Creek and the Clinch River. This is a long-standing problem that has required fish advisories. Some mention of this particular problem must be included, with appropriate risk assessments (including residual risk following remediation, or lack thereof). The relevant CSM (Fig. 4.4a2) does not reference any ecological or human health risk assessments, risk levels, or residual risk levels. It may be that fish consumption should be listed as a pathway in addition to food chain.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

    No such restrictions appear to be mentioned as institutional controls appear to be relied upon for restricting use of contaminated environmental media.

The problem of mercury and other contaminants in fish found in the Clinch River and Poplar Creek should be mentioned because people currently fish there (and there have been consumption advisories). The risk to the fish themselves should also be mentioned (as well as the relatively low fish populations found, presumably because of contaminant levels).

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

The CSMs and corresponding narratives do not explicitly reference ORR risk assessment reports for all planned remediation work (although in many instances the RBESV document cites CERCLA/RCRA documents). The RBESV document must be much clearer in describing what risk assessments have been carried out and their nature (e.g., by disposal site, watershed, site, etc.).

13a. Have all EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

The CERCLA/RCRA cleanup activities appear to have undergone risk assessments, and there is extensive documentation for the approval of RODs (or lack thereof). However, there is no specific mention of risk assessments and/or their approvals.

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk

(from both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?

The conceptual site model information is not complete. There are many missing maps and CSMs. Many of the CSMs that are included are difficult to read (including on the computer). Specifically, surface water should have a food web pathway that leads to both human and ecological receptors. The same pathways should be shown on both the current use and RBES CSM (where only the RBES CSM should show pathways as blocked). For example, Fig. 4.1a2 shows residential commercial use on current but not on the RBES CSM. Furthermore, the receptors should be the same on both CSMs (however, because the pathways will be blocked on the RBES CSM, there should be no risk).

Not all receptors have been included (as, for example, many of the ecological pathways and receptors have been lumped). For example, the ecological receptors are listed as a broad category rather than examining the particular species at risk, or as broad categories (e.g., terrestrial, aquatic, etc.) as requested in the guidance addendum. The risks to aquatic and terrestrial vary, particularly on a site such as ORR with a diversity of habitats. An on-site recreational receptor may be warranted for the CSMs.

13c. Is the CSM and narrative consistent?

These are not entirely consistent and in some cases many of the barriers/actions are lumped. For example, barrier number 5 on p. 77 includes hydraulic isolation, removal, groundwater treatment, monitoring, and land-use controls. In general, the narratives are too terse to explain adequately the risks to human and ecological receptors. The narratives should also reference the appropriate human and ecological risk assessments (per the guidance).

13d. Is sufficient information provided as follows?

List of hazards/contaminants of concern and their concentration levels, as well as the cleanup level for each hazard

The hazards are listed; however, concentration levels are not provided either for current or end states.

Pathways to the environment

This is difficult to assess without the complete CSMs.

Projected risk levels expected and/or concentrations expected after remediation

Projected risk levels for human health are provided.

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

In general, the above information is not provided for all hazards and contaminants, particularly for the ecological receptors.

13e. Are all potential receptors and pathways identified?

There are many potential ecological receptors that are not presented. Ecological receptors should be divided into terrestrial versus aquatic, some mention of particular ecological receptors of concern should be made, and the food chain should be added to surface water (and possibly groundwater) pathways. Whenever there is an agricultural pathway (from water) there are going to be exposures to ecological receptors via the food chain. Food chains emanating from agricultural fields is a big concern for potential movement to ecological systems. Furthermore, the intruder scenario appears to be missing.

13f. For all potentially complete exposure pathways identified in the current state CSM, does the RBES CSM show that the pathways will be blocked?

For those CSMs provided, all potentially complete exposure pathways identified in the current state CSM are indicated as blocked in the corresponding RBES CSM. However, consumption advisories, which will be needed into the future (especially for Poplar Creek), need to be mentioned in the narrative.

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

Without maps, this cannot be evaluated. Plumes are mentioned in some parts of the RBESV document as well as extents (and depths); however, no indications of the rates of movement of the plumes are provided. It would be useful to the reader if this information was provided in tabular form. This information is particularly important at Oak Ridge where plumes and surface water and people are in such close proximity.

13h.Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?

This aspect of the RBES is generally lacking in detail (both qualitative and quantitative) if not altogether missing.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

15. Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?

16. Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the "disconnects" between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?

17. Have the future roles and responsibilities of the parties involved in site cleanup been identified (e.g., DOE, current owner, future owner, other federal and state agencies)?

18. To what degree does the site's regulators, key stakeholders, Tribal nations and local government representatives agree with the currently identified and the planned risk based end-state?

Variances

19. Has the vision document identified all applicable variances between the current end state and the RBES?

20. If potential variances are not listed, list variances that should be considered and provide short description for each.

21. Were the variances adequately evaluated per the guidance (e.g., per page D-1 of the guidance are the key attributes [cost, schedule, scope and risk] listed, are barriers identified, and are next steps identified)?

Other Comments (cross cutting issues, coordination with other programs and Corporate Projects)

22. List as Comments any other items of concern with the document, such as text that is confusing, clarity and completeness of maps and CSMs.

23. The reviewer's overall perception regarding his/her review of the site's RBES document should be summarized through statements responding to the following:

    -Does the site RBES submission adequately articulate an end state vision for the site that is risk based, readily sustainable, appropriately protective of human health and the environment, and consistent with the site and surrounding area's planned land use? Explain and cite examples.

    -Are variances between the end state RBES vision and the current site cleanup baseline end state clearly identified and defined? Explain.

    -If there is no variance identified, is there adequate justification as to why the current site cleanup baseline end state meets the requirements for a RBES, i.e., does the RBES document show that the cleanup is sustainable, protective, and consistent with the site's surrounding land use? Explain.

Is a conference call with the site necessary? ___ yes ___ no

Part 1a. Comments addressing improvements to the RBES Vision documents

24. The comments that will be generated in response to the questions in Checklist Parts I & II will for the most part address the compliance of the RBES Vision document with the RBES Policy statement and its associated published guidance. That is, the review team conclusions to the questions will in summary provide to the sites that information and the specific changes to the document necessary to produce a compliant document.

    In addition to this information, the RBES Review Team is to provide back to the sites items for consideration that would improve the RBES Vision document(s). These comments are to be separately identified as improvement items, as opposed to compliance items.

    - This could include for example, recommendations for additional contextual information that would further the explanation of any proposed individual RBES, or a site's position that the currently planned end state is appropriately risk based and sustainable. Other data, analyses, or examples illustrating positions being proposed germane to the RBES Vision discussion or justification could be recommended for inclusion if that would make an RBES hypothesis more readily understandable.

    - Another fruitful area would include additional information to be included in the Variance report that would provide analysis of the variance(s) of the RBES from currently planned end state(s). Such analyses could be aimed at identifying issues, obstacles, and concerns with the variances identified and how the Department will address and resolve them.

    - The items listed under Question #23 in Part I should be considered again for the purposes of this section of the Checklist. That is, what improvements in the RBES Vision document clarity could be made to improve either its understanding or otherwise support decision making by DOE relative to pursuit of any change in EM project/site end state and subsequent initiation of discussions with site regulators, stakeholders, or interested or affected Governments?

February 16, 2004

CRESP Comments to Pantex Site Specific RBES Vision Document Checklist

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Site: **Pantex**

Part I. Specific Content Questions for RBES Vision Document

Risks/hazards

7a. *Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate or consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?*

The document demonstrates an ongoing commitment to assess human and ecological risk, and to respond to evolving guidance from TCEQ, EPA, and DOE, consistent with the site's planned industrial end state as an ongoing nuclear weapons and high explosives program resource. A new section of the report (1.4 Risk Assessment Status) indicates that a Revised Final BRA Work Plan for Waste Management Groups (WMG) was partially approved in 2003 by TCEQ and has very recently submitted ecological risk assessment (December, 2003) and radiologic investigation (February, 2004) plans for TCEQ approval. The current report's Data for Appendix D, which will include examples of contaminants, their concentrations, associated risk levels, and expected residual risks/concentrations, is in process of being compiled.

However, there is not a clearly defined end state vision because risk characterizations and assessments are still in process and therefore are incomplete. It should be emphasized that the data that will eventually be placed in Appendix D will help an effective articulation of the RBES vision for the Environmental Programs to be implemented at the site.

7b. *The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include, for example, risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting*

from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.

No discussion of risk balancing is apparent. For example, the current discussion does not address health and safety risks faced by workers in achieving environmental management goals.

8. *Have all the hazards that will remain, that drive the land use, been identified?*

No. Contaminants have generally been discussed within each WMG section of the report, but in many cases contaminants that will remain have yet to be listed and to be characterized in terms of concentrations found. Residual hazards will be influenced by the cleanup criteria applied and the extent of contamination determined by ongoing characterization studies. Data from Appendix D, when available, is important in characterizing the residual hazards.

The Ogallala Aquifer is the primary regional source of drinking water. It is currently characterized as uncontaminated. Surface cleanup and containment of the contamination in the Perched Aquifer through pump and treat activities, are intended to preserve the quality of the Ogallala Aquifer. .

9. *Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?*

Surface cleanups are such that they are “not expected to be a human health problem”. Ecological risks were addressed in screening level risk decisions but are being updated and expanded to meet more recent guidance from TCEQ. When Appendix D data is available, it will present clearer evidence of the degree of protectiveness.

10. *Are the residual hazard levels protective of the end-state?*

Based on the stated industrial land use and fulfillment of stated risk reduction criteria, the protectiveness level should be sufficient.

11. *If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?*

No restrictions are noted, except for continued industrial use of the site.

12. *Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?*

Yes. Admin Record AL-PX-SW-003657 is the reference for current CSMs..

13b. *Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?*

The CSMs provided vary from Guidance – particularly relating to the receptors and uptake mechanisms. For example, human and ecological receptors should have been identified rather than environmental media such as soils and sediments. However it is understood that the CSMs were the outcome of prior negotiations with the stakeholders, including the TCEQ.

13c. *Is the CSM and narrative consistent?*

Yes, however, like the CSMs, they are not extended to human and ecological receptors.

13d. *Is sufficient information provided as follows?*

List of hazards/contaminants of concern and their concentration levels as well as the cleanup level for each hazard

This information is currently not displayed but will be included in Appendix D.

Pathways to the environment

Yes, in the CSM and in the narrative.

Projected risk levels expected and/or concentrations expected after remediation

This information is currently not displayed but will be included in Appendix D.

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

Yes, as referenced in state risk reduction standards on Tables 4-1 and 4.2

13e. *Are all potential receptors and pathways identified?*

No. See comments in 13b.

13f. *For all potentially complete exposure pathways identified in the current state CSM, does the RBES CSM show that the pathways will be blocked?*

As previously noted, the CSMs do not follow Guidance but have been previously approved by regulators and stakeholders. Certain receptors (workers, ecological) are not identified in the CSMs, so blockage of pathways to them is not demonstrated, however blockage is clearly shown to environmental media.

13g. *Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of the rate of movement of plumes) to the extent that it aids the explanation of the risk basis for the end state under discussion?*

Yes.

13h. *Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?*

Not discussed.

February 13, 2004

CRESP Comments to Paducah Site Specific RBES Vision Document Checklist

Contributors:

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OVERVIEW
The Paducah Gaseous Diffusion Site (PGDS) is about 1.1 square miles, surrounded by a DOE buffer zone, located 10 mi west of Paducah city and south of the Ohio River. It is a complex site with some dispersed hazard "areas" and an ongoing mission of uranium enrichment (operated by United States Enrichment Corporation). Although it is a small site there are significant offsite plumes of trichlorethylene and technetium-99, which has necessitated DOE providing alternative water supplies to homes whose wells were contaminated.

Overall this is an impressive document indicating substantial thought and effort. It is largely compliant with the guidance, but some exceptions as well as suggestions for enhancing the document as a communication tool are indicated. It is well organized and quite readable. A total of nine hazard areas are depicted on maps and CSMs that are generally well prepared, with the major exception that the CSMs lack adequate descriptions of the barriers already in place or proposed, their potential for failure, etc.

The site understands the RBES concept (see Figure 1.10, recognizing the discrepancy between "current planned end state" and RBES, for example for the Hazard Areas 3 burial grounds). This figure could also have a time scale (horizontal axis) indicating whether it is carried out to 10 or 20 years, and the shape of the end state could indicate transition to Legacy Waste or Long-term Stewardship.

The reports states that even currently, because of access and institutional controls, there are no hazards which pose an excess risk of cancer greater than one in a million. In the absence of these barriers some risks are greater than 10^{-4}.

Remediation alternatives are clearly indicated, and many remedial actions have been completed.
The variance section is particularly strong, clarifying the discrepancy between the RBES and the current planned end state, and delineating the procedures for moving forward on this issue.

Page 15 (section 2.3) mentions Seismic issues and there is a map depicting physiography and faults. Section 2.3 should be expanded to indicate possible consequences. The mere existence of faults may sound dangerous to stakeholders, but fault activity should be discussed. It wouldn't hurt to move the text and the figure 2.3 closer together.

Land Use and Ecologic Receptors

Section 3.2 (page 24) mentions "Ecological activities" and is fairly rich, not necessarily on the PGDP itself, but in the surrounding Wildlife Management Area. It isn't clear whether access to the WMA is restricted for security or is open to recreation. At the time of a prior site visit by review personnel, it seemed to be open. Substantial habitat diversity is described, including various successional stages. A variety of birds and mammals characteristic of the major habitats are mentioned, and hunting is alluded to. Although 11 listed species potentially occur on DOE lands, none have yet been documented. It isn't indicated whether they have been looked for, how close they occur, or whether such important habitats as the Tupelo Swamp are critical habitats. Considering the detail given to human health risk, the ecologic issues are dealt with sparsely, but open space ecological/preservation is part of the future land use vision.

The area of a site is an important aspect of its future utility for sustaining ecosystems. It is hard to find the area for each of the operable units, several of which are dispersed across the site.

Since variance is an issue it would be interesting to see a map of the planned end state versus the RBES for those areas where there is a projected discrepancy**.**

Overall a valuable report, weakest link is the ecological treatment.

Also, the document would benefit from an improved/expanded discussion of the MNA scenario and the anticipated ground water-surface water contaminant transport issues under different levels of source control/treatment since this appears to be a major area of disagreement with the regulators.

Part I. Specific Content Questions for RBES Vision Document:

Land use

1. **Does the site have a land use plan that fully describes the end state and the future land use at the site?**

   There is a land use plan in effect, the 2004 *Site Management Plan,* and the RBESV is consistent with this plan, with the stipulation that the project land use conforms to local plans but that plans may change. The current situation and the RBES situation

are considered identical for land use and demography. The likelihood of converting agricultural to residential land along main highways is mentioned but not shown on the RBES maps.

Except for offsite rural residential use, the future site land use is industrial or recreational.

2. For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?

N/A

3. Has the future land use been communicated to the regulators and is it acceptable to them?

This question doesn't seem to apply directly as the future land use has been ascertained based on local plans, not a DOE invention. The switch of remediation control from an Administrative Consent Order to a Federal Facilities Agreement indicates acceptance by the regulators.

4. Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

Yes. The land use is concordant with projections of future land use and development, retaining the existing site as industrial (even following possible termination of the uranium enrichment). The surrounding areas would remain mainly as forest reserve and agriculture, with only slight residential growth projected. It should be noted that continued direct dialogue with the surrounding local governments and with McCracken County will ensure that the regional land use plans and projections are consistent with site future use plans. Since PGDP is a major employer in the area, workforce reduction would make the immediate vicinity less attractive for development.

5. Is the site's cleanup plan consistent with the end state depicted in your land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, please specify.

The cleanup plan is spread over nine areas. A summary table would have been helpful in understanding the site and the cleanup plan. Extensive detail is given for each of the hazard areas or operable units. The explanatory boxes will be useful to stakeholders reviewing the document. The report indicates that there are no current

exposure pathways due to the presence of barriers, but then presents the risk estimates if no mitigation were present. This is very helpful.

In general, this RBESV does a commendable job of describing potential receptors, including the methods of exposure, under each hazard area.

Note: the key to the CSM on p.44 seems to be missing the text. It would be helpful to have this key (when fixed) on the CSM diagram.

The following table summarizes an understanding of the text, reflecting its clarify for risk communication. In all cases it is stated that there are no completed pathways currently (or projected) because of barriers in place. So risks are indicated as if there were no barriers.

Ecologic receptors are addressed in the risk assessment for Area 6 Landfill (table 4.7) where excess risks to wildlife are identified. The table is only an interpretation.

Operable Unit	Extent	Main contaminants	Media impacted	Remediation status	Barriers in place	Institutional controls	Ecological receptors	Health Risks
1 Ground Water	Diffuse	TCE, Cd, Sb and seeTable 4.2	GW	Pending	Access	GW limits		Yes for residential
2 Surface water	Source, ditches, creeks	PCB, Sb, Fe,V, U, PAH,Cs-137,	SW	Removals pending	Access	monitoring	Mentioned, no information	Yes for recreation & fish ingestion
3 Burial ground #1	3 sites	As, Mn, U, V, PAH,Th-228	Soil		Capping	Access	Theoretical but in industrial zone	Yes for worker
4 Surface soil	Dispersed	Mn,V,U, PAH, PCB,Cs-137, Th228	Soil	RI pending		Access	Potential	Yes for workers.
5 Landfill	2 sites & cell	Solvents, asbestos, radionuclides	Soil, GW	RI pending	Monitoring, land cover	Access	mentioned	
6 Burial ground #2	4 areas	As, Sb, Mn, V, PAH, Th-228, Al, Cr, Hg, Al, Fe,Be	Soil		Landcover Alternate water supply	Access	SW to biota is a current pathway	worker
7 Legacy Waste	Dispersed	LLW, PCB,HW,	Soil, SW, GW	RA pending Removal pending		Temporary pending complete offsite removal	Not known	Worker
8 Cylinder yard	DUF conversion	Uranium hexaflouride	Soil	Pending, maintenance	Conversion and offsite disposal	Temporaryh	All paved, no receptors	
9 GDP area	facilities	PCB, freon, oils, Cr,Tc-99, TCE, Pb, Asbestos.	Buildings, soil	Pending	Access	Security	Potential	Workers

6. Have the landowners (current and planned) been identified and communicated with? If the land ownership clearly identified in the vision document? If so, are those landowners in agreement with the planned land use?

Ownership is clearly identified. The possibility that DOE might acquire additional neighboring land to improve its control of plume sites, is mentioned. It is not clear if all of the private neighboring land owners/users have been specifically identified and given information about future land use. The future of the PGDP is certain only to 2010.

Risk/hazards

7. **Is risk (ES&H risk, not project risk) fully considered and appropriate or consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?**

The extent of human health risk details incorporated into tables for each of the operable areas is impressive. It would have been interesting to see this information in a table. The ecologic issues were not dealt with, perhaps because this relatively small industrial site is not viewed as ecologically important. On the other hand it is partially surrounded by relatively natural habitat in a wildlife management area, contains an important and unusual swamp, and restoration of habitat on the site after cleanup would add significantly to the extent.

8. **Have all the hazards that will remain, that drive the land use, been identified?**

Yes. The plumes will remain. Some of the soil contamination will remain. Institutional controls and monitored natural attenuation (MNA) are some of the barriers.

9. **Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?**

There is a policy issue as to whether MNA can be considered protective without other institutional controls to warn or to restrict access. By definition, MNA requires a time frame before the hazard is sufficiently attenuated. While MNA is a remediation option, it isn't a barrier.

10. **Are the residual hazard levels protective of the end-state?**

If monitoring is maintained and if residential development in potentially affected areas does not occur, and if the site continues under industrial use scenario, then the residual hazards will be protective of future human receptors. It can't be determined whether the residual hazards will be protective of ecologic receptors.

11. If restrictions are imposed on GW, provide basis for restriction .

Significant ground water restriction has already occurred. Several houses have been put on alternative water supplies. The plumes will persist, although source remediation should curtail their spread.

12. Do the CSMs and narratives reference the site risk-assessment reports where they are completed?

The supporting text area-by-area references the risk assessment. The risk results are not directly linked to the CSM diagrams. However, this report handles risk quite well.

In the CSM section are figures tracking pollutants from contaminated source to RBES. The various receptors tap into this exposure pathway. It seems the arrows should go left to right, signifying an impact on the different types of workers.

Figure 4.2a.1 purports to show Hazard Area 2, with the surface water operable unit. But surface water is not indicated on these maps.

13. Have all EM cleanup remedies either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is to be performed has such risk assessment been similarly approved?

These questions are not answered explicitly. Since there has been regulator approval to date, one can infer that there has been approval. Risk assessment has been completed and presumably approved.

It appears that EM activities at Paducah are still early.

13b. Is the conceptual site model complete. Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (both human health and ecological)?

CSM and map set are provided for nine separate hazard areas. The CSMs identify barriers and what appear to be sustainable end-states, but beyond short descriptors the narratives do not provide any detailed explanation of these barriers, their potential for failure, the need for maintenance, etc.

13c. Is the CSM and narrative consistent?

They are mainly consistent, however the map and CSM sets are grouped together at the end of the narrative section, making it very difficult to link the numbered barriers on the CSMs with the earlier narratives. There are nine hazard areas, so the ninth RBES CSM appears about 35 pages after the associated narrative. Also, the CSMs identify barriers and what appear to be sustainable end-states, but beyond short descriptors the narratives do not provide any detailed explanation of these barriers, their potential for failure, the need for maintenance, etc.

13d. Is sufficient information provided:

List of hazards/contaminants of concern and their concentration levels: This is handled very well. However, asbestos is not mentioned in the table on page 6. Asbestos was previously a major issue in the scrap metal yard. A major manual removal of asbestos was required before the scrap metal could be removed. If asbestos contamination is still an issue, it should be noted.

Pathways to the environment: These appear to be adequately depicted.

Projected risk levels expected and/or concentrations expected after remediation: This is covered in text but not indicated on the diagrams.

Basis in risk for existing requirements, or for regulatory limits to provide the risk context for the applied limit: The risk basis is not found in the document.

The detailed tables (e.g. Table 4.1) for each of the operable units provide the risk numbers for various scenarios for each contaminant of concern. This is a very nice presentation. Ecological risks are not addressed.

13e. Are all potential receptors and pathways identified?

Yes, although the ecologic receptors are not broken down in the table on the CSM diagram.

13f. For all potentially complete exposure pathways identified in the current state CSM, Does the RBES CSM show that the pathways will be blocked?

Yes, although MNA by itself is not currently an adequate block, since it doesn't provide protection until attenuation has occurred, usually over a considerable period of time. MNA can be a good and acceptable remediation alternative (or alternative to remediation), but if there is a completed pathway at the outset, there needs to be some institutional control to separate the receptor from the exposure. The fate of the plumes under an MNA scenario and the ground water-surface water pathway need better discussion.

Also see problem noted in 13b above

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

Yes. The plumes are a prominent part of the EM mission and there is information on their history, extent, impact and future monitoring. However, no data was provided on depth or rate of movement. The RBES map (an MNA scenario) shows the plumes in the same location as the Current State.

13h. Has there been a failure analysis completed? Are the failure modes for each barrier identified and their consequences mentioned.

No, this is not handled adequately. No failure analyses, even qualitative analyses, have been provided.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states *(on a media-by-media basis for air, water, soil, etc.)*?

Yes, they appear to be. Since the site subsurface contains DNAPL areas there will be a need for either ACLs and/or a determination of Technical Impractability at some point.
There appears to be disagreement about the need for and effectiveness of source control/treatment with respect to the achievability of MCLs over particular time horizons.

Are examples provided in the document? Are the statements in the document consistent throughout the text?

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

The site appears to be on an RBES path.

15. Have remedial actions completed to date been consistent with the RBES vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?

Note: this question should be reconsidered. Since RBES is for the most part forward looking, the only decisions already made that should be examined are those that have either not yet been implemented, or those that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems). For these decisions, the question of appropriate conservatism in the decision basis should be examined.

16. What are the "disconnects" between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?
Is it clear what the regulatory drivers are for the cleanup?

There appears to be a need for resolution with respect to the options being considered for MNA with and without DNAPL source control/treatment.

17. Have the future roles and responsibility of (e.g., DOE, future owner, other federal and state agencies) been identified?

18. To what degree do the site's regulators, key stakeholders, Tribal nations and local government representatives agree with the risk based end state?

Didn't see anything on this, apart from what can be inferred from the information on variances.
Variances

19. Has the vision document identified all applicable variances between the current end state and the RBES? (*teams should specify major variances)*

Yes, it seems to.

20. If potential variances are not listed, list variances that should be considered and provide short description for each.

21. Were the variances adequately evaluated per the guidance (e.g., per page D-1 of the guidance are the key attributes [cost, schedule, scope and risk] listed, are barriers identified, and are next steps identified)?

Others/Comments (cross cutting issues, coordination with other programs and Corporate Projects)

(List as Comments any other items of concern with the document, such as text that is confusing)

Is a conference call with the site necessary? ___ yes ___ no

Suggested additional question for the Risk Team: "Does the document identify the sites' cleanup standards?"

February 6, 2004

CRESP Comments to PORTSMOUTH Site Specific RBES Vision Document Checklist

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The CRESP review is undertaken with three objectives: 1) to ascertain that the current RBES Vision Statement draft is in compliance with the guidelines, 2) to identify areas where the draft can be improved, 3) to enhance its value and clarity for stakeholder communication.

Overall this document reflects a lot of thought and work and an effort to clarify some complex situations. It shows a good understanding of the discrepancy between RBES and current end states, and the EM mission at many of the operable areas is at a sufficiently early stage that a RBES can enhance the progress to completion. There are a few weaknesses that were identified to enhance the utility of the document for risk communication to stakeholders and its role in future negotiations with stakeholders.

The Feb 6th revision provides additional improvement in expanding the information on "Media and Pathways" and "Risk Levels" for each of the units.

Background
The Portsmouth Gaseous Diffusion Plant (PORTS) was one of three plants producing enriched uranium with the gaseous diffusion process. It is currently in cold-standby condition and will be maintained as such at least until 2006 by which time new uranium enrichment technology will render it obsolete. It has an ongoing EM mission (completion date not clear). A conversion facility is planned for the treatment of the large quantities of depleted uranium hexafluoride (DUF_6)currently stored on site and conversion is anticipated to require 25 years. A similar facility is planned for Paducah. Presumably transport-safety and cost considerations warrant two separate conversion facilities, although the plan would also handle Oak Ridge stored DUF_6. There are also plans for expanding the United States Enrichment Corporations activities and energy initiatives on the site, outside of DOE's activities. DOE is also studying the possible construction of a "modern, intrinsically safe" nuclear power plant at Portsmouth.

PORTS is located in a rural area about 5 mi south of Piketon and 27 miles north Portsmouth. DOE owns 3714 acres, 1200 acres of which are the developed area within the perimeter road. Of the latter 500 acres are fenced for controlled access. Both national and state owned forest reserves are nearby and overall the surrounding area is largely agricultural. A number of domestic wells exist close to the DOE boundary (fig 2.3a1).
Ecological receptors include Little Beaver Creek and nearby Scioto River Valley. Part of the area has been designated for ecological/preservation and includes wetlands as well as prairie (the latter being an increasingly critical habitat in the United States). For the most part, however, ecologic receptors are not specified, ecologic impacts are not quantified, and although possibility of food chain transfer is mentioned, it does not appear that ecologic considerations have been (or will be a major issue). The handling of ecologic receptors is a weak link in this document. There is not adequate discussion of species of concern and habitats are mentioned but impacts not detailed, even though an ecologic risk assessment has been completed.

There are no anticipated changes in land use, demography or infrastructure "within the planning horizon", but I couldn't find a statement whether this is a 10 yr, 20 yr, or other horizon. Population growth in the 1990s was 4% and the same is projected for the current decade.
The site has completed a *Plant-wide Baseline Human Health Risk Assessment* and a *Baseline Ecological Risk Assessment*, the former of which is extensively reference. Access restrictions are currently in place at landfills and solid waste management units. Groundwater extraction and treatment is underway with the aim of reaching the Maximum Contaminant Level.

The future use risk scenario is to protect onsite workers from dermal contact and to allow use of groundwater from beneath site for drinking. This does not inhalation of volatiles or incidental ingestion when soil is disturbed by workers. Reliance on the site's ground water for drinking, seems inconsistent with regulatory decisions at other sites, for example, Paducah. The proposed cleanup under the current baseline end state for the surface soil is to a residential standard with a risk level of 10^{-6} (page 4-10).

The RBES vision document has been completed "prior to stakeholder input". This seems to be a common limitation, but stakeholder input at an early stage makes an RBES more valuable and realistic.

There is a clear statement of the discrepancy between the current remediation trajectory and the RBES vision as follows: "The RBES Vision assumes the institutional controls remain in effect to control site and land access," with more reliance on post-cleanup stewardship and a shift in the point of compliance for GW to the site boundary rather than the plume itself. Reliance on Best Available Technology to remediate GW, and seeking Alternative Concentration Limits to the MCLs. With perpetuation of the current GW restrictions, the worker dermal/ingestion exposure to GW would no longer apply in

risk assessment. And the site would remain under DOE-control with industrial scenario on the secured area and commercial recreation outside.

Although some interim actions have been taken, much of the proposed remediation has not been completed. It is interesting that as of 1997 "further investigation and potential remediation of 41 SWMU's and/or facilities were deferred until D&D of the GDP." The latter is not scheduled until after 2006. The rationale for deferring even the investigation is not clear.

The list of hazard areas 1 to 9 on page 4-2 does not agree with the text which comprises 10 areas (including #7 deferred areas).

The following table is ONLY a reflection of my (Gochfeld's) understanding from Chapter 4, indicating its clarity to this reader. Human risk refers to the risk estimation assuming that none of the mitigating factors are in place.

Hazard Area	Future use	Impacted media	COC or risk drivers	In place	Activities	Future concern	Receptors	Unmitigated Human risk	ECO
1 groundwater (11 subareas)	Industrial commercial including drinking GW	Soil, GW SW	U As Cr PAH V Dichlorethylene	Some lining & caps	GW monitoring and restrictions Access control	Potential offsite GW Possible offsite food chain	Workers Intruders ecologic	3.6 x10^{-5} (As, Cr)	Mentioned
2. surface soil 41 subareas; 13 had elevated health risks.	Industrial much remaining under DOE	Soil, SW.	Be PAH U As VOC Cr PCB U-238 Quantity not completely known	Security and patrols	Mostly deferred Continue access control, caps	Risk target is residential	Workers visitors ecologic	Some >10^{-3} HI>1	Fish are monitored; eco receptors thru food chain
3. landfills	DOE control and maintenance of	Soil, SW	As, Be, PAH, Sb PCB, chlordane	Closed caps & leachate collecti	Monitoring Access control	Failure of caps or collect	Recreational visitor Intruders	>10^{-4} HI=1.6 for visitor	If roots penetrate caps

	barriers			on in place. No additional work except monitoring		ion	Remediation workers		
4. legacy waste area not given	Apparently unrestricted once waste is removed?	Soil, SW	Hg Tc-99 TCE metals, PCBs rad PAH	Access control	Future complete removal	Unlikely migration to food chain	Workers visitors ecologic	$>10^{-6}$ (PCB,PAH)	Mentioned, but all waste will be removed
5.cylinder yards size of area?	Ongoing storage at least until 2025	Soil, SW	Be, As U-235 U-238 PAH	Access control GW restriction Workers by HASP	Deferred pending D&D and conversion Fenced secured	Unlikely migration to food chain	Workers visitors Ecologic	>10-4	Paved pad, no eco receptors until pad removed? Migration to SW nearby
6. GDP	Mainly buildings set for D&D	Soil	PCB, PAH rad	Access control Excavation & GW restrictions	Deferred pending D&D, ultimately complete source removal	Unlikely migration to food chain	Workers visitors ecologic	$>10^{-3}$ mainly PAH	Not applicable
7. deferred units	Uncertain, under RBES these would	Variable	No entry in table 4.2	HASP in place.	Deferred pending D&D			HI<1 and cancer risk $<10^{-4}$ was	Not stated

	have been evaluated by now							criterion	
8. Surface water impoundments 8 units		Sediment SW	Cr, As Be PAH PCB Sb Mn nitrobenzene	Access control HASP	All deferred Future remediation, access, deed restrictions	Subject to migration	Workers visitors ecologic	>10-3 for recreational visitor mainly Cr,As	Monitor fish, water, vegetation
9 surface water ditches creeks 5 units	Industrial commercial with eventual removal of sources	Sediment SW	Cr As U-238 PCB PAH Mn	Monitoring (NPDES), access control	Access & security, warning signs Workers protected by permits, PPE, and natural attenuation	Migration pending clean up and natural attenuation	Workers visitors ecologic	$>10^{-3}$ for visitor Cr As U	Fish monitoring (results not given)
10 switchyards transformers 5 units	Electrical substations still in use RBES use industrial	Soil sediment SW	PAH As [PCB]	Some remediation complete	Worker protection by permits, PPE	Low potential for food chain	Workers visitors ecologic	>10-2 for workers PAH Cr	Plants and nitored

The variance report organized in Table 5-1. is clear.

COMMENT ON MAPS:

The scale used on the Site-Specific maps does not provide for adequate coverage of land uses, populations, etc. outside the site boundary. The site attempted to address some of the problem by providing additional regional maps covering land use, population density and ownership (these are Site Specific map requirements, not Regional) that were drawn to encompass a 10 mile radius from the site, but these cover too large an area to be useful. For example, on Fig 3.2 which shows transportation corridors it would help orient if the 4-lane highway about 1 mi West of the site were identified. It is mentioned in the text.

The text speaks of National forest in the "eastern extent" but the Map 2.3a3 show private land abutting the site on the east.

Part I. Specific Content Questions for RBES Vision Document:

Land use

1. **Does the site have a land use plan that fully describes the end state and the future land use at the site?**

   "DOE's long-term vision for the site is evolving and will depend on future decisions by DOE that consider input from its stakeholders." The current plan is to maintain DOE control and industrial uses for the secured area and commercial/recreational use for the area outside the perimeter road, consistent with the 1995 Future Use vision of the site.

   It was just announced in January 2004 that a new advanced centrifuge commercial plant will be constructed and operated at Portsmouth.

2. **For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?**

Unclear who will be long-term owner and if NNSA, whether land use is consistent with 10 Year Plan.

3. **Has the future land use been communicated to the regulators and is it acceptable to them?**

Apparently currently being developed and negotiated, but presumably an industrial use scenario has been accepted. Much of the remediation and even investigation has been deferred until the D&D of the GDP is completed (post 2006?).

4. Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

They are apparently not at a stage where this has been finalized. There are three zones: DOE controlled (500 acres), area to be released for brownfields redevelopment within the perimeter road (700 acres), and a peripheral area (2500 acres) where commercial/industrial or recreational uses could occur with DOE still maintaining institutional controls. It is unclear what type or scale of commercial or recreational uses could occur, and if, for example, a potential commercial use might require a worker exposure scenario in addition to recreational visitor scenario.

A plan prepared by the local re-use organization is mentioned, but again, more detail should be provided as to exactly what land use plans are in place for the areas outside the site boundary. Local governments should be contacted directly for copies of most recent planning and zoning documents to review consistency and protection requirements. (Page 1-2, top paragraph should include regional governments, including Pike county and Piketon government officials, as stakeholders.)

5. Is the site's cleanup plan consistent with the end state depicted in your land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, please specify.

The cleanup plan has not been finalized. The remediation is at a sufficiently early stage where cleanup levels and future uses can be discussed with stakeholders. There is extensive discussion of this matter under variances.

6. Have the landowners (current and planned) been identified and communicated with? If the land ownership clearly identified in the vision document? If so, are those landowners in agreement with the planned land use?

DOE will continue to own at least the inner "circle" of secure land with an industrial mission. The future ownership of the remaining land within and outside the industrial core have not been determined. The outside boundary of the site is bordered by

private landowners. It is unclear whether these landowners have been or will be directly contacted for comments on the land use plans for the site.

Risk/hazards

7. **Is risk (ES&H risk, not project risk) fully considered and appropriate or consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?**

Risk has been estimated for each of the human receptors and each of the hazards in most of the 10 hazard areas (except #7). Remediation agreements with state and federal EPAs have taken risk into account in some ways. The RBES vision identifies alternative ways of reducing risks to humans.

8. **Have all the hazards that will remain, that drive the land use, been identified?**

It appears to be the case. At least the hazards that drive the risk assessments are identified under each of the areas. For some waste areas plans involve complete removal of source. For others, sources will be contained in place with barriers to prevent (or monitor) migration.

9. **Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?**

For the most part, although plans have not been completed for all areas. It is difficult to evaluate the protection of ecological receptors.

10. **Are the residual hazard levels protective of the end-state?**

The determination is made that for the currently planned end-state any residual risks will be *de minimus* and for the RBES vision the planned access and institutional controls will also be protective.

11. **If restrictions are imposed on GW, provide basis for restriction .**

Restrictions are currently in place. The current plan is to remediate GW plume to drinking water standards. The RBES identifies a reasonable alternative for discussion taking into account the future land use on and projected lack of development adjacent to the site.

12. **Do the CSMs and narratives reference the site risk-assessment reports where they are completed?**

The narratives reference the human health risk assessment.

13. Have all EM cleanup remedies either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is to be performed has such risk assessment been similarly approved?

A substantial part of the RI has been deferred pending cleanup. We infer from the document that this means that complete characterization of hazards as well as risk estimation have been deferred as well.

13b. Is the conceptual site model complete. Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (both human health and ecological)?

There are small inconsistencies between supposed achievement of a sustainable risk-based end state and what is shown on several CSMs. Examples:

1) What are incomplete pathways (not included in Guidance)? How are they defined and used? On Fig 4.1b2 why are runoff and infiltration shown as incomplete pathways?
2) On Fig 4.2a2 for surface soil CSM, there is an inhalation pathway shown to intruders but not to workers. If workers are protected by PPE/HASP or other devices, a separate dashed line with that barrier should be shown. Fig 4.2b.2 (RBES for surface soil) shows an inhalation pathway to intruders and ecological receptors – why isn't it blocked?
3) On Fig 4.4b.2 (RBES Legacy Waste) there is an ingestion/food pathway coming from groundwater, but apparently affecting no one. Why???
4) On CSM for Hazard area 6 (Fig 4.6a2) the table is blank, even though the GDP is currently operating. Since there are no ecologic receptors on the GDP this could be indicated. But there are workers.
5) On Fig 4.8a2 for surface water impoundments it needs to be clarified why resuspension/ volatilization are incomplete pathways. Also, the narrative describes a barrier that controls/restricts worker exposure, but no worker is shown as potentially at risk in the table.

But the most serious problem is the lack of failure probability and consequence discussion in any of the CSM narratives, although the current cleanup trajectory assumes that there will be failures.

13c. Is the CSM and narrative consistent?

Yes, except as noted above in 13b.

13d. Is sufficient information provided:

List of hazards/containminants of concern and their concentration levels: Generally good data are provided for most of the Hazard Areas. Surface soils have not been fully evaluated (see comment on deferral above). On the other hand the Risk Table 4.2 is clear and useful.

Pathways to the environment:
These are identified, although the receptors are not completely indicated in the tables on the diagrams (see above comment).

Projected risk levels expected and/or concentrations expected after remediation: Narrative indicates that risks will be *de minimus.*

Basis in risk for existing requirements, or for regulatory limits to provide the risk context for the applied limit: Nine agreements have been signed.

13e. Are all potential receptors and pathways identified?

I have raised questions above about when workers are or are not included in the table. “Construction” workers presumably includes “remediation workers” and “environmental samplers”.

13f. For all potentially complete exposure pathways identified in the current state CSM, Does the RBES CSM show that the pathways will be blocked?

> For the most part they are blocked, but for example completed and uninterrupted pathways exist for surface soil to recreational uses, intruders and ecologic receptors (unspecified). See 13b for more information.

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

Maps show extent of plumes, but I didn’t see the other information (composition, depth, movement, impact). There is an integrated ground water monitoring plan and restrictions on use of ground water.

13h. Has there been a failure analysis completed? Are the failure modes for each barrier identified and their consequences mentioned.

No.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states *(on a media-by-media basis for air, water, soil, etc.)*?

Are examples provided in the document? Are the statements in the document consistent throughout the text?

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

QUESTIONS 14 TO 21 HAVE NOT BEEN ADDRESSED BY CRESP FOR THIS SITE.

15. **Have remedial actions completed to date been consistent with the RBES vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?**

    Note: this question should be reconsidered. Since RBES is for the most part forward looking, the only decisions already made that should be examined are those that have either not yet been implemented, or those that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems). For these decisions, the question of appropriate conservatism in the decision basis should be examined.

16. **What are the "disconnects" between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?**

Is it clear what the regulatory drivers are for the cleanup?

17. **Have the future roles and responsibility of (e.g., DOE, future owner, other federal and state agencies) been identified?**

18. **To what degree do the site's regulators, key stakeholders, Tribal nations and local government representatives agree with the risk based end state?**

Variances

19. **Has the vision document identified all applicable variances between the current end state and the RBES? (*teams should specify major variances)***

20. **If potential variances are not listed, list variances that should be considered and provide short description for each.**

21. **Were the variances adequately evaluated per the guidance (e.g., per page D-1 of the guidance are the key attributes [cost, schedule, scope and risk] listed, are barriers identified, and are next steps identified)?**

Others/Comments (cross cutting issues, coordination with other programs and Corporate Projects)

(List as Comments any other items of concern with the document, such as text that is confusing)

Is a conference call with the site necessary? ___ yes ___ no

Suggested additional question for the Risk Team: "Does the document identify the sites' cleanup standards?"

February 23, 2004

CRESP Comments to Rocky Flats Site Specific RBES Vision Document Checklist

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Rocky Flats Environmental Technology

Much more information is provided in this second draft. It is clearer, but not perfectly clear, what portion of the soil and groundwater cleanup requirements are driven by regulatory standards for the cleanup and maintenance of surface waters to residential levels, versus what is required to protect the on-site wildlife refuge worker. Monitoring of surface waters at Walnut Creek and Woman Creek at Indiana Street (the site's eastern boundary) have shown no action level exceedances for radionuclides since 1997, when monitoring was first initiated. Thus, it is unclear why surface waters are of such concern in the Rocky Flats Cleanup Agreement and in this RBES vision document. No CSMs or data on specific contaminants are provided that might help answer some of these questions.

RF provides a number of maps with this draft, but very few follow RBES Guidance requirements. The Site Context maps are especially difficult to understand because the site boundaries are often not clearly delineated and very little of the lands outside the site boundaries are shown.

Frankly, the absence of detailed remediation plans, institutional processes, risk analyses, and other elements in this document suggests that the site is not programmed for closure in 2006.

<u>Part I. Specific Content Questions for RBES Vision Document:</u>

Land use

1. Does the site have a land use plan that fully describes the end state and the future land use at the site?

The Rocky Flats National Wildlife Refuge Act of 2001 provides for permanent federal ownership of the existing site and establishment of a wildlife refuge. Which lands are to be included in the Refuge and which will remain classified as industrial is difficult to determine. Figure 2.2b Map of Open Space appears to indicate that a large area in the center, where most of the facilities have been located, will remain industrial. To date only 1700 acres have been officially transferred by DOE to the U.S. Fish & Wildlife Service. (page 10)

2. For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?

N/A

3. Has the future land use been communicated to the regulators and is it acceptable to them?

The Rocky Flats Cleanup Agreement (RFCA) was recently amended to recognize that "the reasonably foreseeable future land use for the site." (page 10)

4. Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?

It is difficult to determine if and how it is integrated with surrounding land uses. The maps provided do not follow the Guidance requirements, and thus do not provide good visualization of what the contiguous land uses are outside the boundaries of the site. RF is bordered by private property to the south and west, which is largely undeveloped. RFFO has no information from these landowners as to future plans for this property. (page 24)

5. Is the site's cleanup plan consistent with the end state depicted in its land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent.

Not entirely. The RFCA specifies that surface waters will be cleaned up to residential like standards (10^{-5} incremental cancer risk, based on someone drinking 2 liters of surface water every day for 30 years), and not the wildlife refuge worker associated with this agreed on land use. It notes on page 13 that surface water on the site will likely be used as a drinking water source. Yet, on page 20 it says that surface water will not be used. Is this a typo? We think so. On-site use of surface water would be inconsistent with prohibitions on groundwater use and use of land for anything but a wildlife refuge. These are critical differences because groundwater cleanup requirements are being driven by these surface water requirements.

6. Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?

It is assumed that future use of the land as a wildlife refuge was approved by neighboring towns and land-owners during the negotiations that led to that designation by the President.

Risk/hazards

7a. Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?

Not always. The RFCA specifies that surface waters will be cleaned up to residential like standards (10^{-5} incremental cancer risk, based on someone drinking 2 liters of surface water every day for 30 years). These standards are regulatory driven, and not based on risk to the on-site worker. Soil cleanup strategies appear to be based on the wildlife refuge worker associated with this agreed on land use.

7b. The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include for example risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.

There is no discussion of risks to remediation worker or the ecology of its cleanup strategy, and thus no mention of any risk balancing.

8. Have all the hazards that will remain, that drive the land use, been identified?

The narrative generally describes the contaminants that are being addressed, but no information is provided with regard to expected post-cleanup levels. Of special concern is the lack of detailed information regarding the proposed cleanup and end-state of the two landfills. The present landfill occupies about 20 acres, is unlined and wastes are forty feet thick along its eastern face. The original landfill occupies about 20 acres and is located on steep, unstable slopes. Section 3.1, page 23, states that the two areas will likely have engineered soil covers that will remain after

closure, but does not discuss what hazards will remain. This deserves much more attention.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

No information is provided with regard to expected post-cleanup levels of known contaminants except to say that the RFCA, when implemented, will be protective of human health and the environment. No CSMs are provided to identify potential receptors and methods of protection. The two landfills noted above are of greatest concern, since no information is provided on how or if they will be cleaned up, or how the proposed end-state will be protective of human health and the environment. Given that the site is to be closed soon, the lack of CSMs on individual hazard areas is a major concern. We do not agree that their preparation should be delayed until a comprehensive risk assessment is prepared.

10. Are the residual hazard levels protective of the end-state?

No information is provided with regard to expected post-cleanup levels of known contaminants to determine if they will be protective of the end state. However, the document notes that engineered structures, such as soil covers, groundwater treatment systems, and surface impoundments will be in place at closure, and that post-closure activities will be required in order to ensure that the final remedy remains protective of human health and the environment. It also states that, "The risks posed by residual contamination will be examined in the Site's Comprehensive Risk Assessment (CRA), which will also examine risks to ecological receptors. The CRA will be incorporated into the site's RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study Report, which will examine the need for any additional remedial work beyond that currently contemplated ..."

DOE management, regulators and other stakeholders should not have to wait until after completion of the proposed cleanup to determine if the strategy was effective. A thorough reading of the document also indicates that several cleanup remedies, and related need for institutional controls, have not as yet been chosen. Where preliminary, but not final, remedy decisions have been made, the document should describe what residual contaminants might remain and what additional institutional controls may be necessary to be protective of the proposed end-state.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

The RFCA specifies that surface waters will be cleaned up to residential like standards (10^{-5} incremental cancer risk, based on someone drinking 2 liters of

surface water every day for 30 years). Data from Walnut Creek and Woman Creek at Indiana Street (the site's eastern boundary) show no exceedances above action levels for radionuclides since 1997 when it first began the monitoring. No mention is made of exceedances above action levels for VOCs, nitrates and other groundwater contaminants at any of these points of compliance, but the RFCA requires cleanup of soils and groundwater to protect surface water for potential residential use.

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

No CSMs are provided. RF says that it "does not yet have an agreed upon conceptual model that is contained in a single document" and that it "anticipates developing a conceptual site model document, as part of the Comprehensive Risk Assessment (CRA) methodology. It then goes on to list its understanding of many of the "physical, chemical, biological, historical and social factors that bear upon the sources, pathways, and receptors at Rock Flats." This is not a satisfactory response. CSMs for both Current and RBES vision should be prepared for each major hazard area, based on the best available data, and with a notation where appropriate, that supporting risk assessments have not been completed.

13a. Have all EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment, and have those documents been approved for use by the appropriate senior DOE site manager? For instances where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

There is no specific mention of risk assessments associated with the proposed cleanup remedies, and as noted in 10 above the document states that, "The risks posed by residual contamination will be examined in the Site's Comprehensive Risk Assessment (CRA), which will also examine risks to ecological receptors. The CRA will be incorporated into the site's RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study Report, which will examine the need for any additional remedial work beyond that currently contemplated ..."

13b. Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (from both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?

No CSMs are provided.

13c. Is the CSM and narrative consistent?

No CSMs are provided.

13d. Is sufficient information provided as follows?

List of hazards/contaminants of concern and their concentration levels, as well as the cleanup level for each hazard

Only in partial narrative form. A detailed table should be provided.

Pathways to the environment

Only in partial narrative form.

Projected risk levels expected and/or concentrations expected after remediation

Only in partial narrative form. A detailed table should be provided.

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

Yes for risk-based soil cleanup standards and for surface water at boundaries, but unclear on basis for groundwater cleanup strategy.

13e. Are all potential receptors and pathways identified?

No CSMs are provided, and detailed discussions of potential receptors and pathways in the narrative is spotty.

13f. For all potentially complete exposure pathways identified in the current state CSM, Does the RBES CSM show that the pathways will be blocked?

No CSMs provided

13g. Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of rate of movement of plumes to the extent that it aids the explanation of the risk basis for the end state under discussion.

Several maps are provided that show the location of several plumes, but they are difficult to read and no other data is provided.

13h.Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?

No failure analyses are mentioned for any of the remedies or proposed institutional controls. Of greatest concern are the two landfills. The present landfill occupies about 20 acres, is unlined and wastes are forty feet thick along its eastern face. The original landfill occupies about 20 acres and is located on steep, unstable slopes. While a soil cover was placed on this landfill after 1968, debris is exposed in some areas. The document states that the materials, for the most part, will be left in place with soil covers atop the landfills that will remain after closure, but does not discuss what hazards will remain and how sustainable the proposed soil covers are expected to be.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

Some cleanup decisions appear to be risk related, but others such as the cleanup of soils and groundwater that may impact on-site surface water quality are clearly regulatory driven.

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

There appear to be a number of remedial decisions that have not as yet been made, and it is unclear whether these future decisions will be risk-based versus intended to meet CERCLA or other regulatory requirements. This is remarkable given the fact that the site is supposed to close in a few years.

15. Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?

There is nothing in the document that would indicate that any pending cleanup or remedial strategy decision will be made outside the context or requirements of the existing Rocky Flats Cleanup Agreement.

16. Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the “disconnects” between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?

March 5, 2004

CRESP Comments to Sandia Site Specific RBES Vision Document Checklist

Contributors:

Barry Friedlander, UMDNJ
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Charles W. Powers, UMDNJ

Site: **SNL (Sandia National Laboratory)**

General Comments:

Version 2 of the SNL RBES is substantially improved and does a good job of addressing or clarifying previous HQ comments and issues. A clear description of the risk assessment methods employed, and stakeholder involvement is provided. The SNL Consent Order with the State is included – which also outlines the State risk analysis requirements. The State human health target, for the sum of all contaminants, is 1E-05 risk for cancer and a Hazard Index of less than one for non-carcinogens. Risks are applied to current and "reasonably foreseeable future land use" scenarios. The Compliance Order on Consent, negotiated in 2003, uses risk-based end states "for all sites being submitted for NFA", and applies risk to future land use. The future land use scenarios for the site were developed in 1995 from a collaborative stakeholder evaluation. An active involvement of stakeholders in this effort is noted, particularly in the formation of the ER response, setting of risk-based remediation criteria, and determination of end state land use. The site hazards, grouped into three categories for ease of evaluation and implementation, include contamination residuals in a) engineered units, b) four groundwater areas, and c) NFA sites (cleaned up only to recreational or industrial levels).

Compliance responsibilities for the site are beginning to be transferred to a permanently funded SNL/NM department, as ER starts to transfer stewardship responsibilities to NNSA.

Part I. Specific Content Questions for RBES Vision Document
Land use

1. *Does the site have a land use plan that fully describes the end state and the future land use at the site?*

2. *For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?*

3. *Has the future land use been communicated to the regulators and is it acceptable to them?*

4. *Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?*

5. *Is the site's cleanup plan consistent with the end state depicted in its land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent.*

6. *Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?*

Risks/hazards

7a. *Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?*

Yes. The document describes the risk assessment methodologies applied by the ER program. Some of the cleanup exceeded industrial and recreational based cleanup criteria because of changes in the state criteria and the relative ease to accomplish this cleanup.

7b. *The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include, for example, risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.*

While risk-balancing wasn't specifically discussed, it is strongly implied through the risk-based responses in the ER program. Onsite worker and ecological risks were explicitly considered in framing the actions. Offsite public health risks were considered to be not significant or applicable because remediation is essentially complete and the residual contaminated plumes are fully contained within site boundaries.

8. Have all the hazards that will remain, that drive the land use, been identified?

The hazards have been well characterized that drive the land use.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

Yes.
The residual contamination is stated as being below the risk levels acceptable for industrial or recreational land use. To improve the clarity and communication value of this report, it would be useful to include the residual concentrations, cleanup criteria and residual risk levels in tables 4.1.2-1, 4.1.3-1, and 4.1.4-1. Much of this information is required under the Risk Assessment Report section of the SNL Consent Order of December 16, 2003.

10. Are the residual hazard levels protective of the end-state?

Yes.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

The facilities are located in a larger military setting, so it has access restrictions based on security requirements. The current hydro-geological conditions do not indicate a viable groundwater supply from the perched aquifer formations underlying SNL, therefore specific restrictions have not been envisioned and implemented. The deep aquifer (Middle Rio Grande Basin) has not been contaminated and no restrictions are necessary on its use.

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

The report provides information on the results of site characterizations and risk assessment studies and the general reference list (Section 6.0) contains a number

of relevant risk references. However, the information provided in the narrative sections accompanying the CSMs is not adequately cross-referenced.

13a. Have all the EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment and have those documents been approved for use by the appropriate senior DOE site manager? For instance where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

Information has been provided that suggests that each EM cleanup has been based upon formal risk assessments. It is not possible, based upon the information provided, for the reviewer to know the level of regulatory approval obtained within the site.

13b. *Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?*

No. The CSMs should show cleanup actions and administrative controls (as described in the narrative sections) as barriers used to exposure pathways in Figures 4.1.2-1, 4.1.3-1, 4.1.4-1 and 4.2.2-1. The Vision Document Guidance describes how engineered and administrative controls or barriers should be shown in the CSMs. An example of a partial depiction of an engineered barrier is provided in figure 4.1.4-1 (for recharge or infiltration).

13c. *Is the CSM and narrative consistent?*

Yes, except for comments noted in 13b.

13d. *Is sufficient information provided as follows?*
List of hazards/contaminants of concern and their concentration levels as well as the cleanup level for each hazard

List of hazards is provided, but concentration information is limited. A list is provided in Appendix C for the COCs, but does not include residual concentrations. Cleanup levels are mentioned in the narratives, but should be included in tabular form.

Pathways to the environment

Yes.

Projected risk levels expected and/or concentrations expected after remediation

Risk levels are either specified or implied in the text. Concentrations are usually not indicated.

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

Yes. The site uses EPA RAGS, adapted by NMED and EPA Region 6.

13e. *Are all potential receptors and pathways identified?*

Yes.

13f. For all potentially complete exposure pathways identified in the current state CSM, does the RBES CSM show that the pathways will be blocked?

Note comment in 13b.

13g. *Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of the rate of movement of plumes) to the extent that it aids the explanation of the risk basis for the end state under discussion?*

Yes.

13h. *Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?*

Not directly applicable, because the barriers are primarily completed remedial actions.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

15. *Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If not, have they been based on more or less conservative risk-scenarios or assumptions?*

16. *Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the "disconnects" between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?*

17. *Have the future roles and responsibilities of the parties involved in site cleanup been identified (e.g., DOE, current owner, future owner, other federal and state agencies)?*

18. *To what degree does the site's regulators, key stakeholders, Tribal nations and local government representatives agree with the currently identified and the planned risk based end-state?*

February 23, 2004

CRESP Comments to SLAC Site Specific RBES Vision Document Checklist

Contributors:

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Site: **SLAC (Stanford Linear Accelerator)**

General Comments:

This document is well written and is responsive to both the Guidance and to comments on the previous version. Hazard areas have been added, one original variance has been deleted and another added, indicating a detailed and serious review supporting the current document's development.

Part I. Specific Content Questions for RBES Vision Document
Land use

1. *Does the site have a land use plan that fully describes the end state and the future land use at the site?*

2. *For PSO sites, is the land use plan consistent with the Site Ten-Year Plan and Institutional Plan?*

3. *Has the future land use been communicated to the regulators and is it acceptable to them?*

4. *Is the site's land use plan fully integrated with planned land use of the areas adjacent to the site? If not, are there receptors that require different level of protection than land use designation would imply?*

5. *Is the site's cleanup plan consistent with the end state depicted in its land use plan in terms of cleanup levels, future uses, and remaining hazards? If not, what is not consistent, and how is it inconsistent.*

6. *Have the landowners (current and planned) been identified and communicated with regarding the RBES Vision? Is the land ownership of the site and immediate surrounding areas clearly identified in the Vision document? If so, are those landowners in agreement with the planned land use?*

Risks/hazards

7a. *Is risk (ES&H risk, not project risk) fully and explicitly considered in the Vision document? Is this risk consideration appropriate and consistent with the site's end-state use so that cleanup standards are consistent with the planned end state land use?*

Yes. The industrial land use of the site will continue. The hazards associated with VOC's petroleum products and PCB contaminated groundwater and soil have been clearly described for seven key hazard areas. A tabular summary of key contaminants, concentrations, and applicable standards (risk-based, if available) would add to the readability of the document for a wider audience. Some of the material that can go into the proposed tables is already available – concentrations for COCs in each source area are presented in Section 1.3, these can be combined with the risk associated with concentrations in the proposed table. A partial summary of necessary information regarding the composite risks (cancer and non-cancer) associated with contaminants is summarized and presented in table 4.1 and, for storm water release, in tables 4.2 and 4.3.

7b. *The RBES Guidance requires risk balancing as part of the overall consideration of risk in cleanup of DOE sites (see the Guidance Clarification). Does the RBES Vision document encompass "risk balancing" in its discussion of overall risks associated with the remainder of the EM mission at the site? This would include, for example, risks to current as well as future on-site and off-site populations, workers responsible for achieving the designated cleanup at the site, and risks to off-site populations resulting from off-site transportation of contaminated materials. These risks should be described in the document for both the current cleanup baseline and the RBES.*

Risk balancing issues were not identified and, therefore, not apparent in the overall cleanup consideration. Typical worker risks would include risks due to excavation of contaminated soils and risks in transporting contaminated soils for offsite treatment.

8. *Have all the hazards that will remain, that drive the land use, been identified?*

A rather detailed discussion of hazards, by the seven hazard areas, is given and it appears that major remaining hazards have been identified. The hazards have been associated with land use (industrial land use) where applicable.

9. Are the hazards remaining left in a condition that is protective to human health and the environment (ecological receptors), if applicable?

Yes, with the application of identified protective measures, restrictions and other blocks.

10. Are the residual hazard levels protective of the end-state?

The report envisages an industrial land use in perpetuity. The full application of identified protective measures, restrictions and other blocks, as described, is consistent with – and should be protective of - the assumed end-state.

11. If restrictions are imposed on any contaminated environmental medium (e.g., ground water), are they clearly stated along with the basis for the restrictions?

Yes. Has been developed for industrial use (with signage, land use restrictions, institutional controls), but is zoned residential – with Area 7 considered potentially residential because it is privately leased by Stanford University. Groundwater is not considered a source of drinking water because low well production rates, along with high total dissolved solids and sulfate concentrations make it not suitable for consumption or household use (RWQCB, 1995). Monitored natural attenuation and associated land use controls are described for residual contamination likely to be present in the considered end-states for different hazard areas.

12. Do the Conceptual Site Models and narratives reference the site risk-assessment reports where they are completed?

The text accompanying Hazard Area 7 references both a human and ecological risk assessment for that area, which is listed in the section 5.0 References as SLAC, 2003e.

13a. Have all the EM cleanup remedies that are either in place or anticipated to be enacted undergone a formal risk assessment and have those documents been approved for use by the appropriate senior DOE site manager? For instance where a site-wide risk assessment is yet to be performed, has such risk assessment been similarly approved? If a risk assessment has not or will not be performed, the RBES Vision document should so state and justify why not.

Preliminary human risk assessments for cancer and non-cancer endpoints have been undertaken for each Hazard Area, and are clearly reviewed. Ecological risk assessments have been prepared for storm water run off as part of Area 7. The

barriers and interventions have all been considered in light of the risk assessment results, and in some instances have suggested negative or positive variances. As noted previously in this review, inclusion of additional risk data associated with noted COC concentrations in hazard areas is desirable.

The document does not state if approvals of the risk assessments have been reviewed and approved at appropriate senior management levels at the site.

13b. *Is the conceptual site model complete? Is it sufficient to identify a sustainable risk-based end state? Does it consider all the pathways and receptors at risk (both human health and ecological perspectives)? Are the major assumptions and uncertainties for each CSM clearly stated?*

Current and RBES CSMs have been prepared for Area 7 and for a group of areas that either require actions to get to RBESs or to further define the contamination. Only the current CSMs have been prepared for a group of Areas for which no further action is indicated, and therefore are already at an RBES. The CSMs appear to consider all relevant pathways, but should number and define in the CSM diagrams the types of blocks. Blocks are well described, however, in the text. Uncertainties are not specifically discussed.

13c. *Is the CSM and narrative consistent?*

Yes, except for the lack of blockage descriptions in the CSMs, which are present in the text.

13d. *Is sufficient information provided as follows?*
List of hazards/contaminants of concern and their concentration levels as well as the cleanup level for each hazard

The contaminants are listed and the maximum concentrations are given for some. The cleanup levels are not usually indicated.

Pathways to the environment

Yes

Projected risk levels expected and/or concentrations expected after remediation

Described for several areas but not described for storm water. The storm water scope of work, and its results on risk, is not included because it is “under operations and therefore, is not part of the DOE/EM mission” (page 4-28).

Basis in risk for existing requirements, or for regulatory limits, to provide the risk context for the applied limit

Studies are referenced for risk levels found in risk assessments.

13e. *Are all potential receptors and pathways identified?*

Yes.

13f. *For all potentially complete exposure pathways identified in the current state CSM, does the RBES CSM show that the pathways will be blocked?*

Yes, but needs to describe block type on CSM (is well described in text).

13g. *Is information on plumes provided (i.e., depth of plume, extent of plume, some measure of the rate of movement of plumes) to the extent that it aids the explanation of the risk basis for the end state under discussion?*

Yes.

13h. *Has a failure analysis been completed? Are the failure modes for each barrier identified, and are their consequences adequately described?*

There was some discussion of failures for some areas which was added in the revised version of the document. In some cases barriers had not yet been defined, so it was not yet feasible to discuss their potential failures and consequences.

Cleanup Strategy/Regulatory

14(a). Are the current/existing remedial decisions driven by risk-based end states (on a media-by-media basis for air, water, soil, etc., or other appropriate basis)? Are the statements in the document consistent throughout the text?

14(b). If there are future remedial decisions that have not been made, is there any information that the decisions will be driven by risk based end states?

15. Since RBES is forward looking, environmental cleanup actions in place need not be examined explicitly. But environmental cleanup actions pending as a result of decisions already made but not yet implemented, and those implemented but that will continue to have project cost and schedule impacts (e.g., ground water pump and treat systems) should be reviewed as part of the RBES Vision development process. Are these decisions consistent with the RBES Vision? If

not, have they been based on more or less conservative risk-scenarios or assumptions?

16. *Are the regulatory drivers/standards for cleanup of the site clearly stated? For both the currently planned end state and the RBES? What are the "disconnects" between the current cleanup path as required by the regulatory drivers and that based on projected land use and the associated risk?*

17. *Have the future roles and responsibilities of the parties involved in site cleanup been identified (e.g., DOE, current owner, future owner, other federal and state agencies)?*

18. *To what degree does the site's regulators, key stakeholders, Tribal nations and local government representatives agree with the currently identified and the planned risk based end-state?*