# Appendix A

# ICDF 30% Design Package — Document Review, Comment, Resolution List – EPA

# ICDF 30% DESIGN PACKAGE

# DOCUMENT REVIEW, COMMENT, RESOLUTION LIST - EPA

## DOCUMENT TITLE: 30% ICDF RD Comments – (General)

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
|---|---|---|---|---|
| 1 | General | | The design inventory is based on the CERCLA Waste Inventory Database(CWID). The CWID was developed primarily from process knowledge coupled with analytical data used when available. As a result the design inventory is a compilation of estimates rather than actual analytical results from many of the INEEL CERCLA sites. This may result in a large uncertainty in predicting actual shipment constituent and concentration ranges.<br>Suggestion: The results of correlation or verification studies between the CWID and actual site specific data should be included in this portion of the text to support the accuracy of the design inventory. | The CWID is based on all the available analytical data from previous site characterizations, not from process knowledge as indicated in the comment. Therefore, the only uncertainty is how well the site was characterized. The design inventory uses the available data and provides additional estimates on potential contamination (even though this contamination may not have been detected at a site) based on conservative assumptions. We agree that this may lead to large uncertainty, but the uncertainty would overestimate the waste present.<br>Based on June 19 meetings, the waste inventory will be discussed as part of the WAC and O&M Plans in the 60% and 90% submittals. The SSSTF O&M Plan and WAC will also provide additional information to the regulatory agencies for input.<br>On the suggestion, the correlation of CWID to actual site specific data is one to one, since the CWID is the site specific data. |
| 2 | General | | The modeling presented in the 30% design documents use different input parameters for the engineered cover than were previously determined to be required to minimize infiltration. Assumptions made previously in using CWID indicate the engineered cover is critical to minimization of contaminant mobilization. The details of the engineered cover design should be as conservative as previous modeling indicates is required. | We agree that the engineered cover is critical to minimization of contaminant mobilization. The previous model assumed infiltration rates through the cover and now we have much more detailed analyses of the infiltration rates. Agreement was reached regarding the modeling criteria for the final cover and the results using these criteria will be provided in the 60% submittal. |

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
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| 3.** | General | | Several documents in the ICDF 30% Design are annotated outlines, rather than completed documents. As such it is not possible to determine the adequacy of the submission.<br>Suggestions: These annotated outlines should be submitted as more complete documents for the 60% submission, which includes the Remedial Design /Remedial Action Work Plan, the Construction Quality Assurance Plan, and the Operations and Maintenance Plan. In addition to completing text in these documents, specific features to include as appendices in the ICDF 30% Design include: cost analysis, description of ongoing maintenance (both pre-and post-closure), air emissions modeling, operating procedures, and safety analyses. | Several of the documents were intended to be annotated outlines for the 30% submittal, since they are not normally included with a Title I package. These documents are being provided at this time to make sure that all the necessary topics will be addressed with these documents during submittal of the RD/RA work plan.<br>A limited 60% submittal of key ICDF documents will be prepared. Based on the June Agency meetings, the 60% submittal will include the following:<br>• Landfill WAC w/QA requirements<br>• Evaporation pond WAC w/QA requirements<br>• Fate and transport modeling w/sensitivity analysis<br>• Groundwater monitoring DQO's and strategy<br>• Tertiary monitoring system<br>• NESHAPs and air emission modeling<br>• Evaporation pond liner equivalency determination<br>• CQA – test and frequency tables<br>• General process flow diagrams for landfill and evaporation pond |
| 4.** | General | | There is no description of how to prevent dusts and wastes from migrating from the ICDF during filling, via mechanisms such as windblown dispersion, or by being tracked out on trucks. | Comment to be incorporated into 90% design. Generally water will be used as dust suppression. The use of other dust suppressants is also under consideration and will be described in the 90% submittal. |
| 5.** | General | | Plans are to track disposal locations for specific wastes in the ICDF in terms of x, y, and z coordinates. However, there is no discussion on how this tracking will be accomplished, or how this information be collected and stored?<br>Suggestion: A coordinate system dividing the landfill into a grid sizing of 25ft x 25ft for each 10ft elevation would allow retrieval of wastes while minimizing landfill operations to confine wastes within a specific grid box. | The waste placement plan will evaluate the disposal operation to determine an optimal obtainable grid spacing. It was discussed of using a grid size equivalent to the volume within the 25' x 25' x 10'. Tentative agreement was reached in a 50' x 50' x 5' grid size. |

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| 6.** | General | | The burial methods for some containerized wastes is not clear. For example, EDF-ER-277 (Waste-Soil Design Ratio Calculations) describes the burial of boxed wastes, but not drums. However, drummed wastes are anticipated, according to EDF-ER-286 (Waste Placement Plan). Wood boxes will be crushed, and their contents spread and compacted in the ICDF, as described in EDF-ER-286 (Section 3.3); it is not stated whether drums will also be crushed, and their contents spread. It is further assumed that containers to be crushed will contain only soil and a plastic liner. The Waste Acceptance Criteria for the ICDF Landfill shows that both drums and boxes may contain PCBs, rads, or asbestos; if these materials are removed from containers, and spread around the ICDF; the potential for them to be tracked out on a vehicle, or to be blown out of the ICDF with the wind, must be mitigated. Such mitigative procedures should be described. | Comment to be incorporated into 90% design. Drums will be included in the 90% EDF-ER-277. The only waste containers that will be crushed and spread are the wood boxes. Drums and other metal containers will be landfilled in tact. |
| 7.** | General | | Steel boxes will be placed in the landfill intact, and buried in the pattern described in EDF-ER-277 and EDF-ER-286. Additionally, the Waste Acceptance Criteria for the ICDF Landfill (Section 5.4.6) states that steel boxes will only be filled to 95% of their total volume. If boxes are stacked vertically, this could lead to >1ft of settlement over time. A landfill loading plan that minimizes settlement to <1% should be submitted with the 90%. | Comment clarified during June 12, 2001 conference call that the <1% is not a requirement. The settlement requirements will be incorporated in the 90% design. Localized settlement based on stacking boxes and containers will be evaluated in the 90% landfill subsidence/compaction EDF. |
| 8. | General | | Please clarify the handling of all containers to be placed in this ICDF, and make all EDFs consistent with all other EDFs. | Comment to be incorporated into 30% design. |

**30% RD for ICDF Landfill & Evap Pond (The following comments pertain to the 30% RD submission which is a secondary document)**

**DOCUMENT TITLE: DOE/ID 10848, RD/RAWP**

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
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| 39.** | Sect. 2.2.6 | 2-4 | The Group 5 Monitoring Plan is inadequate to address the groundwater monitoring requirements for the ICDF. A specific groundwater monitoring plan for the detection of releases from each land disposal unit is required based on flow line analysis of releases from the units. Also, releases may occur from areas other than the sump. | A separate groundwater monitoring plan for the ICDF will be developed. The groundwater monitoring objectives will be defined and provided to the Agencies as part of the 60% submittal. |

# DOCUMENT TITLE: DOE/ID 10852, ICDF Landfill and Evaporation Pond O&M Plan

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
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| 40.** | General | | The O&M Plan should include a section on groundwater monitoring to meet the 40 CFR 264 Subpart F ARARs. | Groundwater monitoring will be implemented in accordance with the groundwater monitoring plan. A reference to the groundwater monitoring plan will be made in the O&M Plan. The discussion also evaluated a vadose zone monitoring system directly under the clay liner which will be included in the 90% O&M Plan. |
| 41. | Sect. 3.0 | | The section on landfill cells does not contain information about how waste will be transported into the landfill, placed, and compacted, or how to prevent carry-out of contamination on vehicles or as dusts. The plan also provides no information about waste wetting and dust control measures. Is there to be a plan for minimization of leachate production? (See page 4-1&2 of EDF-ER-267 providing compaction requirements/design assumptions for waste fill) | Procedures will be developed for operational processes governing these activities and issues. Detailed procedures will be available for agency inspection at the facility, but will not be submitted for specific agency review during design development per DOE protocol. Items that are necessary to ensure protectiveness of the remedy will be included in the RA Work Plan submittal.<br><br>Waste wetting and dust control is a subject of a White Paper. Results of this white paper will be incorporated into the RA Work Plan O&M Plan. |

## DOCUMENT TITLE: SPC-1476, ICDF Landfill Technical Specs

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
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| 42. | Sect. 02371, Part 2.1.A | | The separation geotextile is listed as six-ounce nominal. In our opinion, eight-ounce fabric is required to withstand normal construction damage, assuming that this layer is required to function as a layer separation. The twelve-ounce geotextile is considered to be a minimum required to achieve a cushioning. The design engineer may desire to review the requirements for this cushion and specify a sixteen-ounce geotextile. | 1. Separation geotextile: Our recommendation of a 6 oz. Nonwoven fabric for the separation geotextile is appropriate for this layer. The 8 oz. Fabric does have greater strength properties, however the strength of the 6 oz. (70lbs tear and puncture) is sufficient for expected construction damage. Additionally the 8 oz. fabric because of its thicker weave has smaller apparent opening size (AOS) and thus is more likely to clog with fines as they flush through the ops layer. Resolution was reached to include the potential for the 6 oz fabric to tear during installation into the CQA Plan required observations.<br><br>2. Cushion geotextile: Comment noted. Engineer will evaluate the use of a 16 oz. fabric for the cushion geotextile in future design phases. We have utilized 12 oz. cushion geotextile in numerous similar applications, and currently sized it based on anticipated maximum particle size restrictions for the drain gravel of 3 inches. If this particle size changes (increases), then the design for the cushion geotextile will be re-assessed. It should be noted that the additional thickness gained by 16 oz. vs. a 12 oz. is 0.05 inches. Additional justification will be provided for the specific fabric selected in the 90% submittal. |
| 43. | Sect. 02666, Part 3.1.B | | See comments for 90% design, ICDF Excavation and Test Pad. | See response for same. |
| 44. | General | | Several specifications in SPC-1476 are incomplete. For example, Section 11312 (Leachate Pumps) does not completely specify functional tests in Part 2. Instead, missing items in these specifications are listed in parentheses. These specifications should be completed and submitted in the 60% design. This is true for several sections in these specifications. | All specs in SPC-1476 were developed to the 30% design level and thus many sections are not fully complete. These sections will be completed and submitted in the 90% design submittal. |

## DOCUMENT TITLE: EDF-ER-274, ICDF Leachte/Cont. Reduction Time Study

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
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| 45. | Sect. 3.2, 1st Para. | | Site water for dust suppression only is estimated at 10,000 gallons per week for the ICDF. On small landfill sites (such as ICDF), one water truck per day for roadway to working face, is a typical amount. ICDF may require more water for dust control of landfill, soil compaction, and working face activity in addition to road dust control. Assuming a 4,000 gallon water truck, this is 20,000 gallons per week. Does this make a difference to what is being computed? A sensitivity analysis is needed to demonstrate this. | Comment noted. See response to Comment 56 regarding justification for use of 10,000 gallons per week for dust suppression for the ICDF in our analysis.<br><br>We will re-run the PHREEQE model to simulate a 20,000 gallon-per-week contribution from dust control/compaction water as a sensitivity analysis and provide these results in the 90% design for this EDF. |
| 46. | Sect. 3.2, 1st Para. | | The assumption is that the landfill soil is water saturated. In MSW landfills, the empirical evidence suggests that one gets a more concentrated leachate from low flows/rainfalls versus steady flow. These results may be valid if there is to be continuous leaching, as in a bioreactor landfill, but the results of this analysis are troubling because there will not be continuous leaching at ICDF, and the analysis suggests that it is conservative. | Comment noted. For minerals with limited solubility, the concentration in leachate is limited by solubility, so that a smaller amount of leachate will show the same concentration. The amount of mass removed will be less with a smaller volume of water.<br><br>For soluble compounds such as iodide salts, the leachate would be more concentrated. However, the same amount of mass would be extracted during the operations period as the mass calculated assuming no solubility limit.<br><br>Mass balance calculations will be included in the 90% submittal. |

## DOCUMENT TITLE: ICDF Design Inventory, EDF-ER-264

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
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| 47. | Sect. 2, 1st Para. | 2 | The text states that "For radionuclides, the concentrations in the design inventory were decayed to a common date of January 1, 2002." Please provide additional details of how starting points for these decay estimates were selected as the CWID is based primarily on process knowledge as opposed to actual analytical data. | See response to comment #1. The CWID is the actual analytical data and is NOT based on process knowledge. The design inventory uses the CWID data (actual analytical data) to the extent possible and then supplements with process knowledge. Since the concentration and sample date are known, the decay process is straight forward. |
| 48. | Sect 4, 5th bullet | 16 | The text states that the "The amount of contaminant at each site was determined by multiplying the contaminant concentration estimates by the entire volume identified in the CWID report." It is unclear how process knowledge would provide site specific data on the extent of contamination that would be required to estimate the volume of contaminated soils. Please provide additional discussion that provides details of how an estimate of soil volume or extent of the area of contamination was determined from the CWID if the CWID relies on process knowledge. | See response to comments #1 and #47 concerning the CWID data. For the volume of contaminated soil, the estimates from the OU 3-13 Record of Decision were used for the WAG 3 sites and other CERCLA documents for the other non-WAG 3 sites. The volume of contamination soil is consistent with the outline of the "environmentally controlled area" (ECA). |
| 49. | Sect. 4, 1st bullet | 17 | The text states the "...scaled data generally provides a more conservative estimate of the contaminant concentration." The text should include the details of how the scale was developed and compared with the limited analytical data available and how the two data sets were evaluated. Please provide supporting text for the statement that scaled data is more conservative than analytical data. | Additional text will be provided that clarifies the conservative approach in the 30% revised submittal. |

## DOCUMENT TITLE: EDF-ER-279, Hydrologic Modeling of Final Cover

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
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| 50. | Sect 3, 1st Para. | 3-1 | The infiltration simulation conducted on the proposed cap design resulted in predicted infiltration rates of 0.037 to 0.049 cm/yr, which are less than the 0.1cm/yr value noted as a significant impedance to COC migration in the ICDF Screening Model Report. The text further states that these numbers are conservative as they do not take the lateral drainage layers into account. Please provide an estimate of the potential additional capacity of the soil cover including the lateral drainage layers and discuss the use of different infiltration values for the cover modeling. Due to the limited time frame of the meteorological record relative to the 1000-year time frame, a high degree of conservatism in the design of the cap is warranted. | Comment will be incorporated by expanding the discussion regarding the conservative assumptions used in the modeling in the 60% submittal. Also specific criteria was developed during the meeting that provided a broad range of sensitivity analyses that will also be presented in the 60% submittal. |
| 51. | Sect 3, 1st Para. | 3-1 | There is no section describing O&M requirements to maintain these infiltration rates. Estimates of the effects of thinning of the silty loam due to aeolian erosion over time or the effects of animal burrowing through the loam to the bio-intrusion layer should be discussed in the text. Please provide the estimated impact on the predicted infiltration rates of both these scenarios. Please provide additional discussion that identifies the long tern O&M requirements and periodic testing and maintenance to insure the predicted performance of the cover. | The current design for the final cover is based on minimizing infiltration into the ICDF. Design requirements for the cover system to resist erosion and maintain cover integrity over the 1000 year design life will be evaluated for the 90% design and results included in the Liner and Final Cover Long Term Performance Evaluation and Final Cover Life Cycle Expectation (EDF-ER-281). |

## DOCUMENT TITLE: Leachate Generation Study

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
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| 52. | Sect 1, 1st Para | 1-1 | The text provides as one purpose/objective of this EDF the statement "Leachate generation from the INEEL CERCLA Disposal Facility (ICDF) landfill must be stored and treated at the site." The leachate produced by the ICDF will be collected and pumped into evaporation ponds where contaminant residue or sludge will precipitate from the liquid as it evaporates. | Comment to be incorporated into 30% design. |
| 53. | Sect 1, 1st Para | 1-1 | The text of this section does not include specific details of how and where the waste produced over the life of the Evaporation Ponds will be "...stored and treated..." and ultimately disposed of after the post closure period when presumably leachate collection will cease and plans to cover the Evaporation Ponds begins. Please provide this information in the text. | Evaluation of the Evaporation Pond closure requirements will be incorporated into the 90% design. |
| 54. | Sect 1.2, Operating Conditions, 1st Para | 1-2 | The text describes the climatological data set as "...a ten-year period of the wettest precipitation years...". While this statement is essentially true some frame of reference should be included to indicate that recorded meteorological data (from which this decade was selected) represents a limited time span of 50 years. It should also be noted that the ten-year period selected as the wettest in the past 50 years may not be a worst case scenario considering the expected half life of several of the contaminants and the projected life of the landfill. | Comment to be incorporated into 30% design to note the period of record from which precipitation data was gathered. Note that while the precipitation data used in the analysis is obtained from the existing 50 year record, it is considered conservative and appropriate to apply the wet 10 year precipitation cycle to leachate generation for the ICDF which will actively operate over an approximate 15 year period, and then be covered. Once covered, leachate generation will be significantly reduced, if not eliminated, by the proposed cover for the landfill. The historical record of precipitation graph will be presented in the revised 30% submittal along with identifying the 10 year period used in the analyses. |
| 55.** | Sect 1.2, 1st Para | 1-2 | Although the period selected represents on average the years with the most precipitation the maximum rainfall years none are consecutive. Please include a statement describing the sensitivity of the Cell 2 HELP model scenario to the effects of two or three consecutive wet years without intervening years of decreased precipitation. | The period of precipitation record used in the analysis is for a consecutive 10 year wet cycle at the site (1967 – 1977). Within this time period, years 1970 and 1971 were above average precipitation conditions for consecutive years, and 1968 was one of the wettest years on record at the facility. As such, the use of these data for the Leachate Generation Study is considered conservative. It should also be noted that the year |

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| | | | | producing the highest leachate generation rate in this study was used in the Evaporation Pond Sizing with Water Balance and Make-Up Water Calculations (EDF-ER-271), are applied to the pond for 3 consecutive years to establish pond depth and freeboard design. The revised 30% will include graph and chart to help describe the specific data used. |
| 56. | Sect 2.2, 1st & 2nd Para. | 2-1 | The text in the first paragraph states that based on water application rates "...at other sites suggest that 5000 gallons of water would be added to the landfill surface...". Please describe the overall similarities of these "other sites" to the conditions that will be encountered at INEEL in regard evapotranspiration rates and frequency of high wind days. Both of these parameters will affect the number of days requiring dust suppression and the effective length of each application. Repeating applications more frequently will increase the total volume of water added to the landfill. | Water for dust control is site-specific based on several factors (including waste types and characteristics, placement methods and equipment, weather, operating period, and more) and so is not comparable between sites. However, based on our experience at other sites around the Northwest and Western US, our conclusion is that 5000 gallons twice per week is within reason for a facility such as the ICDF. These sites will be referenced in the revised 30% submittal. This water use assumption is based on the entire operating period of March through November for the site. Actual application may likely be less in the wetter operating months and more in the drier months. (Note that application of 10,000 gallons per week over this operating time period adds 4 inches to the average annual precipitation for the operating cells in the Leachate Generation Study.) Furthermore, water application will not be the sole source of dust suppression for the various areas of the cell. Consideration will be given to alternative covers and dust-suppression applications (such as polymer-based spray-on applications) to assist in dust control while attempting to minimize water usage and subsequent leachate generation. |

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| 57. | Sect 2.2, 1st & 2nd Para | 2-1 | The second paragraph states that it was assumed that water for dust suppression would be spread over the landfill cell surface. Dust suppression activities are more likely to be concentrated along the haul road and the particular working area of Cell 1 where active filling activities are being conducted. Please discuss the effects on the modeling of more localized of dust suppression water application. | Please see response to Comment 56. Dust suppression measures other than water may be applied in some areas of the landfill (such as on haul-roads) in order to reduce water application and leachate generation within the cell. In addition, the Leachate Generation Study has been developed to be conservative in that it looks at a 10 foot uncovered lift in the active cells and open side slope conditions for pond sizing. During waste placement water application at an active face will move throughout the lift as the fill face moves and over the placement time period should model to be distributed rather than concentrated in application. |

## DOCUMENT TITLE: EDF-ER-273, ICDF Permeable Reactive Barrier Decision Analysis

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
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| 58.** | Sect 4.0 | | This study's objective is to determine if the remedial action objectives (RAOs) are in compliance with the design. An important and consistent assumption in this study is that compliance occurs after installation of the cap. This assumption is a self-fulfilling prophesy since the cap is suppose to achieve RAOs, but artificially moves the start time of zero out to 15 years at the time of cap placement thereby leaving the first years of landfill operation unprotected. The PRB would provide an additional protective barrier during the first 15 years, prior to cap placement and would be necessary to protect against leakage beneath hotspot concentrations. | During the first 15 years of landfill operation the leak detection system will be functioning to identify liner leakage in terms of rates (volumes), and concentrations of constituents. It will also function to remove any leakage from the secondary liner composite liner system thereby reducing the driving head of leakage through the liners. This system is in addition to the primary leachate collection system and primary composite liner that removes leachate from the cell as it develops. Note that the intent of providing a liner system that exceeds the design requirements of the ARARs (Subtitle C) by inclusion of a GCL beneath the primary liner is to further reduce and control leakage from the primary liner system within the cell (and evaporation ponds). These systems functioning in tandem provide the necessary protection needed to guard against potential hotspot contamination.<br><br>From a long-term standpoint, the need for a PRB will be determined based on consensus fate and transport modeling, the WAC, and the design inventory. Wastes can also be treated, if necessary, at the SSSTF or by mixing PRB media with wastes prior to landfilling. |

## DOCUMENT TITLE: EDF-ER-276, ICDF Evaluation ...

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| 59. | Table 1 | | The authors made various assumptions about the permeability of the operating layer and leachate drainage materials, for design calculation purposes. These design assumptions should be verified with actual laboratory confirmation tests. | Permeability data for these materials were obtained from the ICDF geotech report (DOE/ID-10812, 2000) and thus additional testing is not required during design. It should be noted that additional testing on the leachate drainage gravel (which is anticipated to be processed from native soil during the ICDF cell excavation) will be performed to confirm the specified permeability values. Results will be presented in 90% design. Testing requirements for the leachate drainage materials will be required in the CQA Plan. |

## DOCUMENT TITLE: EDF-ER-282, ICDF Seismic Evaluation of Landfill and Evaporation Pond

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| 60.** | General | | The calculations should either include the methodology presented in the EPA report, "RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities," April, 1995, or a specific statement by the designer that the evaluations methods used are more conservative than required by EPA for RCRA Subtitle D or C landfills. | A statement will be added to clarify the design submittal. RCRA Subtitle D seismic design guidance methodology was used, as there is no specific guidance for Subtitle C facilities. Specific references that were followed or specific procedures that were used in the evaluation will be included in the 90% submittal. |

## DOCUMENT TITLE: EDF-ER-268, ICDF Slope Stability Assessments

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| 61. | General | | The calculations for veneer stability and global stability used different interface shear strengths; please resolve the discrepancy. | The use of different interface shear strengths is correct as the veneer stability and global stability analyses are evaluating two distinct and different loading conditions. Veneer stability is evaluating loading conditions on the sideslope prior to placement of waste and is subject to low normal stress loading (< 600 psf). Global stability evaluates the loading condition after refuse is placed is subject to much higher normal stresses. The result is that these different loading conditions result in two very different critical interfaces and corresponding shear strengths. Section 3.1.1 explains the rationale for veneer stability interface strengths and Section 4.1.1.1 the rationale for global stability. Resolved to tie the different shear strengths into the conclusions and then to explain why only one interface shear strength is required in the specifications. |
| 62. | General | | We recommend that the project specific interface shear strength tests that incorporate the GCL follow the methodology described in "Effect of Swell Pressure on GCL Cover Stability," Stark, T.D., ASTM STP 1308, 1997. | Assuming that the comment refers to Stark's recommendation that GCL shear tests should be conducted after completion of free swell or the actual time that will elapse between GCL placement and soil cover construction so that shear strength parameters are representative of field hydraulic conditions – our response is as follows:<br>GCL internal and interface shear strength will be determined using the recently developed ASTM standard D6243 – "Standard Test Method for Determining the Internal and Interface Shear Resistance of GCL by the Direct Shear Method". The ASTM standard incorporates the recommendations in Stark's paper for evaluating the hydraulic conditions for the GCL shear test. The most important consideration is that testing be performed that is representative of field hydraulic conditions. For the ICDF interface shear testing all GCL specimens will be soaked in water for 24 hours under the each test |

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| | | | | normal stress prior to shearing. We feel this is representative, perhaps even a little conservative, of actual field hydraulic conditions, as the GCL for the ICDF lining system is "sandwiched" between 2 geomembranes and will be "dry" for an extended period of time – at least long enough that the overlying ops layer will have already been placed before it is hydrated. Thus "free swell" conditions for the GCL in the ICDF lining system is not anticipated. |

## DOCUMENT TITLE: EDF-ER-266, ICDF Subsurface Consolidation Calculation

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| 63. | General | | The calculation that predicts 1.2 feet of settlement is overly conservative. The assumption of 15 feet of compressible clay material within the alluvial deposit that is predominantly sands and gravels is particularly conservative. The designer may need to reevaluate the assumptions leading to this conservative conclusion. | Agreed. The maximum thickness of the "old alluvium" material underlying the landfill is approximately 2.5 feet based on the boring logs. The predicted consolidation of the compacted clay liner alone is 0.3 feet. The consolidation of 3 feet of "old alluvium" would be on the order of 0.2 feet. The difference between this amount of consolidation and the 1.2 feet predicted is 0.7 feet providing a factor of safety of 1.7. The factor of safety that will be used to quantify the conservatism used in the design for liner and cover long term (i.e., 1000 years) performance. |
| 64. | General | | The settlement computed for the compacted clay liner should be revised after the results of the Soil Amendment Study are finalized. | Comment to be incorporated into 90% design.<br><br>The physical properties of the admix/compacted clay material planned for the landfill liner will be compared to the input parameters used to initially predict the amount of settlement. Based on this evaluation, the calculation may be revised to determine if the settlement will exceed the initial predicted amount. Other parameters that may change between the 30 percent and 90 percent design that could impact settlement such as the cover loading will be evaluated to verify that settlement would not exceed the initial predicted amount of 1.2 feet. Resolved that a sample would be taken from the completed test pad for consolidation testing to quantify future settlement. |

## DOCUMENT TITLE: EDF-ER-267, ICDF Landfill Compaction / Subsidence Study

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
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| 65. | General | | Please incorporate the compaction requirements into the O&M Plan. | Comment to be incorporated into 90% design. |
| 66. | Sect 3 | 3-1 | This section shows the anticipated long-term settlement of the landfill; the term "long-term" should be specified in months or years. | Comment to be incorporated into 30% design. |
| 67. | Sect 3 | 3-1 | This study discusses anticipated subsidence in terms of the overall subsidence expected over the entire area of the landfill. However, the potential for localized subsidence and compaction is not included in this study. Please include the effects on infiltration if a smaller area subsides to form a depression where rainfall could accumulate. This issue should also be further addressed in the operations and maintenance plan, which should describe the plans to inspect and repair the cover as needed during all phases of ICDF operations. | The potential for ponding on the ICDF landfill cover is unlikely for the following reasons:<br>• The landfill cover will be overbuilt to maintain a positive draining slope between 3 to 5 percent after settlement has occurred.<br>• The majority of settlement will occur during operation as waste is placed in the cell prior to cover construction.<br>• The majority of the waste will be comprised of gravely soils that settle quickly and more uniformly.<br>• Debris will be placed uniformly in the landfill.<br>• The cover will be maintained during the post-closure period, which will be described in the operations and maintenance plan.<br>Additionally, the cover is robust and hydrologically modeled as a flat surface.<br><br>This discussion will be incorporated into the 90% design by calculating potential settlements from proposed debris types to examine the localized settlement impacts as a sensitivity. |
| 68. | Appendix A | | The first page of this appendix is unreadable; a legible photocopy should be submitted with the 60% design. | A legible copy will be provided in the final 30% design. |

## DOCUMENT TITLE: Landfill Leachate Collection System Design Analysis, EDF-ER-280

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
|---|---|---|---|---|
| 69.** | Sect 1 | 3-1 | The basis for the design assumption of the system being able to remove a 1 in 25 yr 24hr storm event within 72 hours is not provided. Also, in addition to a 1 in 25 yr storm event, the system should be able to remove more frequent storm events within 24hrs. Calculations to support pump sizing for a high five year storm even should also be used to size the high flow pump. | Comment to be incorporated into 30% design. Explanation of the design basis will be clarified by stating what storm event can be pumped out of the cell in 24 hours. It was discussed that being able to handle the maximum annual event may be the appropriate design size. |
| 70. | Sect 3.2 | 3-1 | This section states that the high-flow pump must be able to pump 82 gallons per minute, in order to remove the leachate from a 25-year, 24 hour storm event within 72 hours. However, Appendix C shows a maximum flow needed of 77 gallons per minute. Although the conclusion is the same regardless of which value is used (a 100 gpm pump is needed), the values presented in Section 3.2 and Appendix C should agree. | Comment to be incorporated into 30% design by making text agree with Appendix C. |

## DOCUMENT TITLE: EDF-ER-277, ICDF Waste-Soil Design Ratio Calculations

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
|---|---|---|---|---|
| 71. | Sect 1.2, 3rd Bullet | | Text states that the steel boxes are assumed to be incompressible. In another report, the steel boxes are assumed to be 95 to 99 percent full. Depending upon the structural condition of these boxes, some collapse can be anticipated during placement of subsequent lifts. | We agree that some collapse can be anticipated. However, the objective of this EDF was to analyze how much debris can be placed in the landfill and how much soil was needed to provide a stable waste fill. The settlement and collapse of the boxes and the resulting settlement will be addressed in EDF 267 Landfill Compaction/Subsidence Study. |

## DOCUMENT TITLE: Liner/Leachate Compatibility Study, EDF-ER-278,

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
|---|---|---|---|---|
| 72. | General | | Although not directly related to chemical compatability, the physical properties of the liner materials should be included in the 30% RD, e.g, tensile strength, puncture resistance, etc. and what changes are noted, if any in these properties when exposed to selected chemicals. | Comment to be incorporated into 30% design. |
| 73. | Sect 1.3 | 1-2 | The text states the mechanisms that could cause the clay liner to be rendered less effective or ineffective. These include concentrated salts, divalent cations, concentrated organic solutions, and strong acids or bases. Table 2-1 shows that divalent cations, such as calcium, are expected in the leachate. However, this EDF does not discuss the clay liner element any further with respect to compatibility with leachate. This analysis should include a discussion of the clay liner's compatibility with expected leachate concentrations. | A literature study will be performed to support the clay admixture used in the test pad. This study will be followed by a more detailed analysis in the 90% submittal. |
| 74. | Sect 2, Table 2-1 | 2-1 | This table shows anticipated maximum leachate concentrations. However, no organic leachate concentrations are included in this table. However, these concentrations were estimated as shown in ICDF 30% Design, Volume 2 of 5, Leachate/Contaminant Reduction Time Study, EDF-ER-274, which does include organic contaminants in the leachate. Although organic concentrations are not anticipated to be high, this document should show whether these organic concentrations are within the design parameters for the liner. | Comment to be incorporated into 30% design. |
| 75. | Sect 2, Table 2-1 | 2-1 | Some leachate concentrations shown, such as for sodium, were not found in EDF-ER-274. Please identify the specific table where these values are located in EDF-ER-274. | Comment to be incorporated into 30% design. |
| 76. | Sect 4, Table 4-1 | 4-1 | This table shows the liner material performance for selected leachate concentrations. The temperature shown in the heading of the far right column should be corrected. Also, please explain why only a limited number of the contaminants from Table 2-1 are presented in this table. | The temperature in the heading will be corrected in the 30% submittal. The purpose of Table 4-1 was to provide an example of how the compatibility of the liner materials will be reported in subsequent submittals. A complete list of potential leachate constituents will be included in the 90% design submittals. |

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
|---|---|---|---|---|
| 77. | Appendix A | | Although this appendix shows the liner manufacturer's chemical resistence data, these data may or may not apply, depending on whether the form of the chemical is the same as the form expected in leachate. This is especially true for inorganic contaminants, such as arsenic. Appendix A lists concentrations for arsenic acid, while the arsenic in the leachate may not be acid. The liner should be shown to be resistant to compounds actually expected in the leachate. | Comment to be incorporated into 90% design. |

## DOCUMENT TITLE: EDF-ER-281, Liner and Final Cover Long-Term ...

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
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| 78. | Sect 3.0 | | This document identifies the 30% design scenario and contains a list of issues to be evaluated. Future submittals should contain specific information about the long-term compatibility of geosynthetic materials with radioactive materials. | Comment to be incorporated into 90% design. Recommendation was given to also include recent Daniel's paper regarding radionuclide effect on geomembranes. |

## DOCUMENT TITLE: EDF-ER-269, Leachate Generation Study

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
|---|---|---|---|---|
| 79. | Section 2.6, 2nd Para. | | Version 2 of HELP grossly underestimates the maximum hydraulic head on the liner when compared to EPA's preferred Mound Method Equation, as detailed in EPA530-R-93-017, Solid Waste Disposal Facility Criteria — Technical Manual, 11-1993, revised 1998, pages 171-173. Although the Version 3 HELP calculation of hydraulic head on liner has been changed from Version 2, it still underestimates the hydraulic head due to differences in the formula and technical assumptions.<br><br>Suggestion: The underestimate is approximately 4 times for the ICDF, which does not violate the 12 inch maximum; hence, the HELP model estimation appears to be adequate. | The maximum head will be checked with additional reference equations and reported in the 30% design calculations. |
| 80. | Section 3.1, 1st Para | | See comment about maximum head on liner. | See associated response. |

## DOCUMENT TITLE: Waste Acceptance Criteria for ICDF Landfill

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
|---|---|---|---|---|
| 81. | Sect. 1.1, 6th bullet | 1-3 | More specificity is needed on what wastes will compromise the safety or integrity of the ICDF.<br><br>Suggestion: For example, wastes with >10% voids can compromise the cover integrity. Reactive wastes can compromise safety. Liner incompatable wastes can compromise integrity. | Will be incorporated in 60% submittal. Will add specificity as requested: wastes with greater than 10% voids could compromise the cover integrity due to subsidence. Reactive wastes could compromise worker safety. Liner incompatible wastes could compromise liner integrity. |
| 82.** | Sect. 1.2 | 1-4 | The design of the ICDF shall meet the requirements of the NCP. The acceptable dose risk to the general public identified at DOE 435.1 is outside the acceptable 15 mrem/yr risk range for CERCLA remedial actions. | Incorporated. The text will be clarified to indicate that the landfill will be designed and managed to meet the 15 mrem/yr exposure to public. Higher dose limits are allowable for DOE rad worker and will be controlled through ALARA and other DOE guidance. Meeting the requirements of 435.1 will still be included in the paragraph. Additionally, the visitor exposure will be included. |
| 83. | Sect. 2.4.1 | 2-2 | This section describes the type of knowledge that will be acceptable to determine waste concentrations for WAC purposes. Several of these types of knowledge should be reinforced by additional information, as follows. A mass balance from a controlled process that has a specified output for a specified input should include analytical data from the time of generation to reinforce knowledge of the anticipated waste stream. Analytical data on a waste is ideal; analytical data from a similar waste should include sufficient information to document that the two wastes are essentially the same. Test data from a similar process should also include sufficient information to document that the waste is essentially the same as that from the similar process. Additional acceptable knowledge requirements (the second set of bullets on this page) will have to be determined on a case-by-case basis. (VR) | Comment to be incorporated into 60% design<br>Incorporated: Language will be added on acceptable knowledge to state " Mass balance from a controlled process that has a specified output for a specified input ***including time of generation.***"<br><br>"Test data from a similar process ***including sufficient information to documents that the waste is essentially the same as that from a similar process.***" The 60% submittal will clarify what is acceptable for waste profiling.<br><br>"If the information is sufficient to quantify waste constituents and characteristics, as required by the regulations and unit-specific acceptance criteria, the information is considered acceptable knowledge. ***These types of information will require a separate concurrence by the ICDF Complex management prior to the waste being accepted at the Complex.***" |

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
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| 84.** | Sect. 3 | 3-1 | The burden of insuring the acceptability of wastes going into the ICDF is solely the responsibility of the ICDF operators. Whether the information is generated at the excavation site or at the SSSTF, the QA and determination that disposal in the ICDF is acceptable must remain with the ICDF operator. The 90% RD/RAWP must be clear on this issue. | Incorporated: The text will clarify that the ICDF operator is responsible for insuring the acceptability of waste being disposed in the ICDF. The WAC will state that the final check that waste is acceptable for disposal is the responsibility of the ICDF operator. The upcoming SSSTF WAC will also clarify this issue. |
| 85. | Figure 3-1 | 3-2 | The representativeness of the waste profile must be an independent QA check prior to acceptance of the profile. | Discussed the need for the regulatory agencies to be included on the approval of the waste profiles on a site by site basis. Resolution of this issue will be with the SSSTF WAC that includes roles and responsibilities. In additional, definition of the representativeness of the waste profiles will be addressed in the SSSTF WAC. |
| 86. | Sect. 3.10.1 | 3-9 | Table 3-3 includes roll-off containers, although disposal of roll-off boxes is not described in earlier EDFs. Will soil only be the only material carried in roll-off boxes, and dumped into the landfill for spreading and compression? EDFs describing the placement of materials in the ICDF should describe how roll-off containers will be handled. | Incorporated: The use of Roll-offs for soil will be incorporated into other documents as appropriate. Procedures for unloading and handling roll-offs will be part of the O&M plan. |
| 87.** | Sect 5.1.3 | 5-2 | The 20X rule only applies to metals. How organics will be managed is not addressed. | The text will specify that "If total ***heavy metals*** concentrations exceed the TCLP regulatory levels for characteristic waste by application of the 20x rule…<br><br>Also, the following sentence will be added "For wastes containing organic constituents that would cause the waste to be characteristic by TCLP the constituent must be present below the applicable LDR and UST levels for the waste to be accepted into the ICDF." |
| 88.** | Sect 5.1.5 | 5-2 | Although a number of prohibited wastes are listed, it is unclear how the QA program will function to assure that prohibited wastes are not received. | Incorporated: The text will be expanded to clarify how the QA program will assure that prohibited wastes are not received. |
| 89.** | Table 5-2 | 5-2 | Within AOC wastes will be limited to those waste with constituent concentrations where conservative modeling (to include loss of FML liners, cover settlement and peak precipitations) result in a no exceedances of MCLs or commutative risk-based levels identified in the ROD. | Comment to be incorporated into 60% design. The 30% WAC revision will present a logic for calculating WACs for all constituents based on the risk RAOs identified in the ROD, including risk via groundwater ingestion pathway and no exceedence of MCLs. The specifics of the WAC development approach will be discussed under separate cover. |

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
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| 90. | Table B-1 | B-3 | This section lists isotopes and conversion factors for each. The heat of decay listed in this table should be used to estimate the heat generated per container, which Section 5.2.7 of the WAC states will be limited to 3.5 watts per cubic meter; however, it is noted that radioactive decay may not be the only heat source in each container. | Calculation of heat generated per container and a listing of other contributors of heat to the container can be added to the waste profile process. Will clarify that incompatible wastes will not be accepted. |

## DOCUMENT TITLE: Waste Acceptance Criteria for ICDF Evaporation Pond

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
|---|---|---|---|---|
| 91.** | Sect. 1.5.2 | 1-5 | The concept of users is confusing. The primary purpose of the Evaporation pond is to manage ICDF leachate. The acceptability of the Evaporation pond for leachate and other liquid CERCLA wastes is based on a risk evaluation for both the air and groundwater pathways. Also, waste types excluded from the ICDF (e.g., TRU, high level, etc.) Would not be allowed into the evaporation ponds. | Text will clarify users as USDOE and its subcontractors.<br><br>We agree that wastes types not allowed in the ICDF (high level waste, TRU wastes) will not be allowed in the pond, and will clarify the EP WAC. |
| 92.** | Sect. 2.4.1 | 2-2 | Acceptable knowledge must be based on representativeness and QA.<br><br>Suggestion: Some of these types of knowledge should be reinforced by additional information, as follows. For example, analytical results from previous well sampling are acceptable, if it can be shown that this well has consistent chemical concentrations over time. | Comment to be incorporated into 60% design.<br><br>Incorporated, the text will clarify and qualify what is acceptable knowledge for waste from previously sampled wells e.g. the well has had consistent chemical and/or radiological compositions over time. |
| 93. | Sect. 5 | 5-1 | Although a number of prohibited wastes are listed, it is unclear how the QA program will function to assure that prohibited wastes are not received. | Incorporated: A QA program will be developed to ensure that prohibited wastes are not accepted. |
| 94. | Sect. 5.1.3 | 5-1 | Editorial comment.<br><br>Suggestion: This section lists "Other Prohibited Wastes," including TRU wastes (number 7). TRU wastes do not have to be listed in this section, since they are already prohibited per Section 5.1.1. | Comment to be incorporated into 30% design. |
| 95.** | Sect. 5.3 | 5-1 | Radiological restrictions will also based on a modeled reasonably maximally exposed (RME) individual calculation of 15 mrem/yr. | Incorporated, text will be added that Radiological restrictions will also be based on a reasonably maximally exposed (RME) individual of the public calculated at 15 mREM/yr. In addition, ecological risks will be evaluated. |
| 96.** | App A | | It is unclear what the purpose of a DOE CAMU position paper has in this 30% RD. It should be deleted as inappropriate to extract language or interpret language from the ROD. Please delete. | Resolved that DOE will develop DQO's based on the language in the ROD and gain consensus from IDEQ and EPA regarding the operation of the Evaporation Ponds. The CAMU paper will be modified to a DQO white paper and included with the text in the 60% design submittal. |

## DOCUMENT TITLE: Design 5 of 5, drawings

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
|---|---|---|---|---|
| 97. | Dwg C-204 | | Will the sump detail presented in this drawing allow the hydraulic head on the liner to be maintained to less than one foot in the sump area? | Yes. The leachate head within the sump area shown will be maintained below 12 inches through the low-flow and high flow pump control systems. Note that these pumps will be controlled by leachate level transducers that will be attached to the pump discharge columns. Details of these control systems will be provided in subsequent design submittals. |
| 98. | Drwg. C-301 | | When compared to Cell 1, construction access to the bottom of cell was illustrated. How will access to the bottom of Cell 2 be achieved without traversing waste contents of Cell2? | Construction access to Cell 2 will be provided from a separate access road to be constructed in the Cell 2 area during excavation of the cell. This construction access ramp would be temporary and removed upon placement of final liner systems in the cell. Operational access to Cell 2 is anticipated to occur from/over the Cell 1 fill area as final cover is not anticipated to be placed over Cell 1 until the entire landfill is completely filled. |
| 99. | Drwg. C-302 | | Cell 2 leachate is to flow into the Cell 1 sump for removal. The concepts illustrated of Cell 2 leachate flow through the drainage medium across Cell 1 appears to be inefficient. Can Cell 2 leachate be assisted with a pipe across Cell 1? Can the leachate detection be separated to distinguish a liner leak between each cell? Please elaborate. | The central leachate collection pipe and collection system shown for Cell 1 will be continued directly into Cell 2 without interruption.. The design of the system assumes this continuous connection. More detail will be provided in subsequent design submittals regarding the leachate collection system interfaces between cells. |
| 100. | Drwg. C-303 | | Drawing C-203 for Cell 1 illustrates 30 feet clear from toe of slope to allow for construction of Cell 2. Verbal comments during the meetings of the week of May 7, 2001, indicated that this area was to be used as a clean area to park landfill equipment. Dimensional details on Drawing C-303 has only 15 feet available over the actual liner. Moreover, the contractor for Cell 2 will require a minimum of 10 feet to construct the interface connection between the two cells. Some additional thought is required to determine acceptable construction dimensions at the Cell 1 and 2 interface. As illustrated in the detail, Cell 2 just appears to get plugged onto Cell 1. More run-out is required for the 3-foot clay liner to achieve a satisfactory connection to existing material | Comment understood. Additional details will be provided of this interface in the 60% design. |

## DOCUMENT TITLE: Evap. Pond Sizing, EDF-ER-271

| ITEM | SECTION/ FIGURE/ APPENDIX | PAGE | COMMENT | RESOLUTION |
|---|---|---|---|---|
| 101.** | General | | The pond sizing should also calculate wave runup freeboard needs assuming a sustained +70mph windspeed | Comment will be addressed in the RD/RA work plan during the 90% design based on recommended wind speed as recommended by structural criteria for sustained wind loads. |
| 102.** | Sect. 2, #2 | 2-1 | To be conservative, it is appropriate to assume two back-to-back 1 in 25 yr storm events for the ICDF which would be pumped to the evaporation pond in performing sizing calculations. | Comment will be incorporated in 90% design by analyzing an average water year and putting in back to back 25-year storm events. |